

Berry Notes

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Prepared by the University of Massachusetts Fruit Team

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UPCOMING MEETINGS

From the Editor:

December 15-16, 2004: New England Fruit and Vegetable Conference, Manchester, NH

The New England Fruit and Vegetable Conference (NEFVC) will be held December 15-16, 2004 at the Center of New Hampshire Radisson Hotel in Manchester, NH. Concurrent morning and afternoon education sessions by researchers, extension specialists, industry personnel, and growers will present the most up-to-date production, integrated pest management (IPM), and marketing information to an audience of commercial and hobby fruit and vegetable growers in the Northeast. Pesticide recertification credits for certified applicators in New England and New York will be available for all sessions. In addition, a trade show with over 60 exhibitors will feature the latest products and services for fruit and vegetable growers. There is no pre-registration, however, a registration fee of \$20 per person per day will be collected at the door.

The NEFVC is co-sponsored by the Massachusetts Fruit Growers' Association and other New England states fruit and vegetable growers' associations, the New England Vegetable and Berry Growers Association, and New England University Cooperative Extensions.

Brown Marmorated Stink Bug - A New Pest? The brown marmorated stink bug, *Halyomorpha halys*, is an Asian import that has been found in PA, NJ, MD and WV (marmorated = marbled coloration). It has spread from the first reported collection (1996) in Allentown, PA. It is a pest of stone fruit, apples, string beans, raspberries, soybeans, some landscape ornamentals and possibly other plants. It is also particularly annoying when the insects congregate in large numbers on homes in fall, as they search for protected sites to

overwinter. We have had no reports to date of these stinkbugs from Long Island. More information and photos are at: www.rce.rutgers.edu/stinkbug/ and

<http://paipm.cas.psu.edu/pdf/bmsbug.pdf>. Note that it may be confused with western conifer stink bug, which also congregates on homes in fall. It is somewhat similar in appearance, commonly found around Long Island and not generally a plant pest. (*Source: Long Island Fruit & Vegetable News, Vol.04, No. 30, Oct. 2004*)

Strawberry

Cold Acclimation in Strawberries

Pam Fisher, Ontario Ministry of Agriculture and Food

The process of developing tolerance to cold temperatures is called acclimation. Cold acclimation in strawberries begins when days get shorter in late summer. Short days alone will trigger strawberries to develop tolerance to -2° or -3°C. For further acclimation, plants must be subjected to cold temperatures, i.e. days of about 10°C and nights around 0°C. Photosynthesis is also required for cold acclimation to occur, so plants which are mulched before these conditions have been met will not be as winter-hardy.

Even when fully acclimated, or hardened-off for winter, strawberry plants are not as tolerant of cold temperatures as other perennial fruit crops. Cold injury to crowns appears as browning of crown tissue. Crowns will be killed at temperatures of -12°C to -14°C in the crown, but even tissue temperatures of -6°C to -9°C can lead to fewer leaves, leaf distortion, and fewer flowers and fruit. The extent of cold-temperature injury in strawberries is determined by many factors. These include the extent of cold acclimation, the cultivar, the part of the plant affected, the rate and duration of freezing, and cultural practices. Rapid freezes, when tissue temperatures drop 2 to 3 degrees per hour, are fatal. Although the duration of freeze also affects how much injury occurs, most injury occurs in the first 24 hours of damaging temperatures. Freeze / thaw freeze cycles will also cause more injury than consistently cold temperatures, if the thaw lasted more than 2 to 3 days.

Nutrient and water status of strawberry plants also affects cold acclimation. Excess or deficient nitrogen will inhibit acclimation. Optimum levels of phosphorous promote acclimation. Plants acclimated under dry conditions fare better than plants which are not slightly water-stressed.

Mulching is important to prevent cold-temperature injury. Snow is the best insulator against the cold, but

snow is not consistently present throughout the winter in much of Ontario. Straw mulch, applied from mid-November to mid-December, provides good winter protection. Straw mulch also moderates soil temperatures and prevents freeze-thaw cycles which can damage plant roots and lift crowns out of the soil. Wheat straw or oat straw are good mulching materials, applied at 2.5 to 3.5 tons per acre. This mulch should be applied after two or three good hard frosts, but before temperatures reach -7°C to -9°C for extended periods. Most growers apply mulch between mid-November and mid-December. The settled straw mulch should be about 2 to 3" thick. A light rain or snow after the straw is applied will help settle the straw so it doesn't blow away.

Be sure the straw is clean, or free from weed seeds. However, do not use straw that was treated with glyphosate before harvest. We have observed glyphosate injury in the spring on several occasions, where the straw mulch was treated with glyphosate before harvest.

More straw is needed when raised beds are used. Raised beds can be 4 to 6°C colder than flat beds, but mulching overcomes most of this negative effect. Growers who grow strawberries on raised beds covered in black plastic often use a heavy-weight floating row cover, such as Tytar 518, instead of straw. It is reported that the combination of black plastic lined beds, with a floating row cover, provides adequate winter protection, even in colder regions of the northeastern USA.

It's a beautiful fall. With cool sunny days, cool nights, and some hard frosts, strawberry plants will be going through the process of acquiring winter hardiness. If cool weather continues, you can say good night to your strawberry plants and tuck them in with a nice warm blanket in mid-November to mid-December. If October and November are unseasonably warm, beware of applying mulch too early. For more information call toll free: 1-877-424-1300. (*Source: Ohio Fruit ICM News, Vol. 8, No. 38, Oct. 21, 2004*)

Winter Mulch for Strawberries

Sonia Schloemann, UMass Extension

An important fall job in commercial strawberry production is mulching. Strawberries are commonly grown in cold climates, such as the northern US and Canada, but the strawberry plant itself is actually quite vulnerable to cold injury. Research has shown that, without mulch, strawberry crowns can suffer damage at

temperatures below 12°F and unprotected strawberry plants can suffer desiccation damage from drying winter winds. A protective mulch can protect strawberries from cold by providing insulation, and from desiccation by providing a barrier against drying winds. Mulches will also protect plants from injury caused by soil heaving, which results



from freezing/ thawing cycles during the winter. So, a key to consistent quality strawberry production in cold climates is in protecting the plants from severe temperatures or temperature swings through the practice of mulching.

Production systems can also affect the need for mulching. Plants on raised beds, for example, are more vulnerable to cold and desiccation injury than plants in level plantings, especially in locations that are exposed to strong winter winds. Annual production systems, such as fall planted plasticulture, may utilize less hardy or disease susceptible cultivars. As we will see, mulching practices must adapt to these new systems.

When should the strawberry grower plan to apply mulch? Research suggests that a good timing guide is to apply mulch after three consecutive days with a soil temperature of 40°F or below. This soil temperature usually occurs after multiple frosts, and when the plants have slowed growth in response to cooler temperatures. It is best to apply mulch before the soil freezes solid. So, in New England, mulches are usually applied in late November.

What is a good mulch material? The traditional mulching material for strawberries in New England is straw. Straws from wheat, rice, oats, or Sudan grass work well. Straws coarser than Sudan grass are not



*Kasco straw demulcher,
www.marketfarm.com/cfms/straw_demulcher.cfm*

recommended. Straw should be clean, free from weed seed, and contains a minimum of grain seed. Strawberry growers can produce their own straw, often cutting the straw before the grain seed is viable. Store straw for mulching in a dry area. Occasionally, grain seedlings can become a weed problem the following spring; an application of sethoxydim will give good control.

How much mulch should be applied? A traditional, level matted row planting will require 2.5 to 3 tons of straw per acre for a 2 to 3 inch deep mulch, or about 300 small bales of average weight. Raised bed plantings and sites with strong wind may require twice this amount for adequate coverage.

How is the mulch applied? Smaller plantings may be mulched by hand by shaking out the bales of straw over the row. Larger plantings often use bale choppers to break up the straw bales and distribute the straw over the bed. Choppers are available for both small bales and large round bales.

How and when is the mulch removed? In the spring, when plants begin to show growth under the



*Mulchmaster™ straw mulcher,
www.agromatic.net/mulch.html*

winter mulch (new green tissue), the mulch should be raked off the rows to allow sunlight to penetrate and reach the foliage. Delaying removal will delay plant growth and flowering and may reduce yield. Mulch can be raked off by hand with ordinary yard rakes in smaller plantings. In larger plantings, various mechanical tools are available ranging from modified hay rakes and tedders to equipment specifically designed for the purpose.

Floating row covers as mulch. These covers are composed of a plastic such as polypropylene, spun-bonded into a fabric that is permeable to light, air, and water. Research and growers' experiences demonstrate that these covers are useful for winter protection of strawberry plantings. While floating row covers are available in several weights, only the heavier weights are recommended for winter protection. At present a widely available weight recommended for winter strawberry protection is 1.25 oz/yd² (42 g/m²). A variety of fabric widths are available, with common widths ranging from 15 feet to 60 feet. This

material currently costs about 4 cents per square foot. With proper care, this heavier fabric should last 3-4 seasons. Floating row covers are widely used to protect annual plasticulture plantings.

Row covers are best applied on still days. Be sure to line up sufficient labor to place the row cover. If possible, use wider widths for more efficient application. The row cover edges must be anchored, as must areas where two covers overlap. A variety of methods are used to anchor the edges. Edges may be

anchored with posts, rocks, or tube sand. The edges may also be covered with soil.

Once the mulch is in place, the job is not done for the winter. Monitor the planting frequently. If straw has blown off areas, replace at once. Watch the edges of row covers, and adjust anchors if needed. Repair any rips or holes as soon as possible.

Any references to equipment or product brand names does not constitute endorsement over like products or equipment.

A Picture is Worth a Thousand Words, Part III: Strawberries

Cathy Heidenreich, NYSAES Cornell University

This is the third in a series of articles spotlighting websites that provide excellent pictures of small fruit diseases, pests, and disorders. This month we are focusing on strawberry web sites. A short description of each web site follows the html address. Happy viewing!

Strawberry Diagnostic Tool

<http://www.hort.cornell.edu/departement/faculty/pritts/BerryDoc/>

Author Marvin Pritts developed the on-line Berry Diagnostic tool for Strawberries, Raspberries, Blueberries, and Ribes as a companion to the NRAES Production Guides. It is to assist with the identification of diseases, insects, chemical injury and physiological disorders that affect berry crops in northeastern North America and eastern Canada. Simply click on the strawberry fruit to be re-directed to the strawberry section that holds images of various strawberry diseases, pests and disorders, organized according to symptom appearance on various plant parts.

Strawberry Diseases in Michigan

<http://www.msue.msu.edu/vanburen/e-1728.htm>

This is an on-line Michigan State University Fruit IPM Extension Bulletin by S. Perry and D. C. Ramsdell. Images are linked within the body of the text describing each disease, but they also appear as a gallery at the end of the bulletin.

Identification of Diseases on Strawberry Fruit

http://www.gov.on.ca/OMAFRA/english/crops/facts/straw_diseases.htm

This guide, found on the Ontario Ministry of Agriculture and Food website, was developed Pam Fisher. It includes both disease images and descriptions for botrytis, anthracnose, and leather rots.

Strawberry Pests

<http://www.uky.edu/Agriculture/Entomology/entfacts/fruit/ef207.htm>

Ric Bessin, extension entomologist from the University of Kentucky, provides both digital images and descriptions of strawberry pests. (*Source: New York Berry News, Vol. 3, No. 10, Oct. 2004*)

Blueberries

Chart of the Effect of Soil pH on Nutrient Availability pH, pH and pH

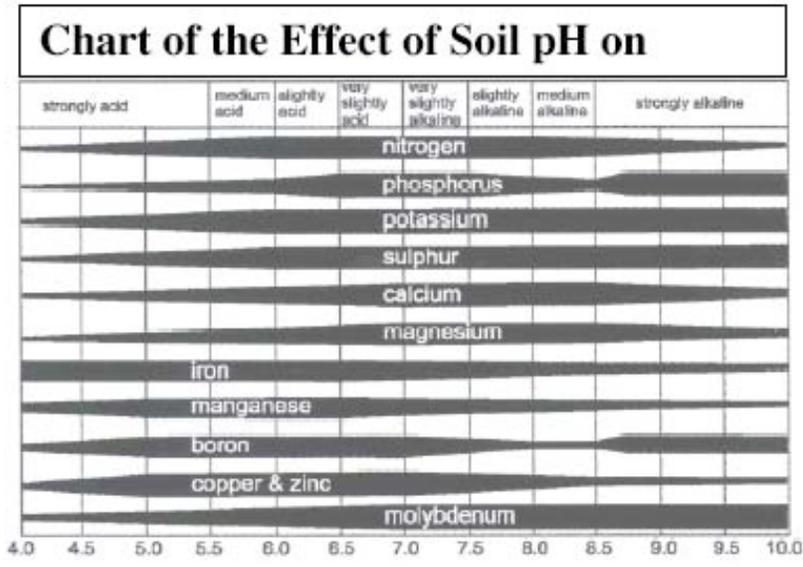
Gary C. Pavlis, Rutgers University

Those who know me have heard me say that the three most important things you need to know to grow blueberries are pH, pH and pH. This year I have analyzed blueberry soil samples and come up with a pH range of 2.4 to 8.2. That's right 2.4 and 8.2. Neither of these was from New Jersey where blueberries tend to be on low pH soils however a 7.2 pH was in New Jersey. The 8.2 soil was due to the use of mushroom soil incorporated into the planting hole. The 2.4 soil I

believe was due to an extremely large sulfur application. In both cases the plants were still alive! As I have mentioned many times, the optimum range for the pH blueberry soils is 4.5 – 4.8. When the pH is not in this range, the availability of nutrients is affected, i.e. the plants may take up too much or too little of a particular nutrient. The table shown below shows how pH affects nutrient availability. At first glance, you might think that the best pH is 6.0 – 7.0 because most nutrients are most available within that range. However, the

blueberry is unique and cannot efficiently take up nutrients within that range.

Research has shown that iron chlorosis often develops in soils with a pH above 5.2. Iron at high pH's becomes chemically bound and unavailable to the plant. Phosphorus uptake is most efficient in a pH range of 4.0 and 5.0. Nitrogen in the leaves increases as soil pH increases from 4.5 to 5.0 but decreases above 5.0. In soils at a pH of 5.2, nitrogen is converted from the useful acidifying ammonium form to the less useful



nitrate form. In soil having a pH below 3.5, aluminum and manganese become very soluble and toxic to the plant.

The bottomline, check your pH often, every year on soils that are not naturally around 4.5. If the pH must be lowered, the fall is the best time because it takes months for the pH to drop. An April application will take to late June at best

to bring the soil to the optimum range. That's too late and plants will become stunted. (Source: *The Blueberry Bulletin*, September 16, 2003 Vol. XIX, No. 21)

Blueberry Mulching

George Perry, Penn State Cooperative Extension

Mulch plays a very important role in blueberry production in Pennsylvania. The Highbush blueberry plant is grown on upland soils in most locations of Pennsylvania. Highbush blueberry is naturally adapted to a lowland, acid soil so amendments must be made to the soil for a successful planting on upland locations. Highbush blueberry roots thrive in an open, porous soil which is high in organic matter, well drained and supplied with adequate moisture. Blueberry roots are in the upper 18 inches of the soil. Upland soils are generally drier, higher pH and lower organic content than lowland soils. It is important to maintain a constant moisture content near the surface of the soil and optimum soil acidity, one of the most successful ways is using mulch. Annual mulching has been found to reduce weed growth, lower soil temperatures in summer, help maintain uniform soil moisture and develop a better soil structure, prevent heaving and subsequent root injury, control soil erosion and reduce the costs of cultivation.



The following research material is from *Blueberry Science* by Paul Eck. The favored mulching material is sawdust, preferable a well composted softwood sawdust (Moore and Pavlis, 1979). Pinebark is also excellent and compacts less than sawdust. Four to six inches of mulch are needed initially, with annual additions of one inch of sawdust to maintain the depth. If fresh sawdust is used, an additional 50 to 100 percent N may be necessary for the first few years to compensate for increased microbial activity. Well-composted sawdust requires less supplemental nitrogen. Other organic materials that have been used, not as effective as sawdust, include corncobs, straw and leaves. Manure and stable bedding must be well composted before

they are safe to use and even than are not as desirable as sawdust since they may increase soil pH.

In a long term experiment on a commercial Highbush blueberry planting in Arkansas, (Moore and Pavlis, 1979) found that plants continuously mulched with sawdust outyielded plants mulched only for the first year, first two years, or first three years after planting. They also observed that straw mulch was

effective, but deteriorated more rapidly than sawdust. The incorporation of peat moss in the soil at planting also resulted in higher yields in following years.

In addition to its use as a mulch, composted sawdust has been found beneficial when applied in the planting hole, particularly in conjunction with the mulch (Brooks, 1972). In these studies fertilizer applications had to be increased threefold to produce vigorous growth. (Cummings, 1981) was able to overcome the harmful effects of high pH by incorporating sawdust into the soil in which Rabbiteye blueberries were grown. Black plastic has been successfully used as a mulching material in establishing plantings (Bell and Kroon, 1979). Care must be taken when fertilizing under black plastic since fertilizer placed close to the plant crown can cause severe burning. It is probably preferable to work the required fertilizer into the soil before laying the plastic. (Mainland and Lilly, 1984) concluded that black plastic mulch offers a practical

method for controlling weeds and encouraging fruiting at an earlier age. They found that a single application of 925 Kg/ha of a 10-10-10 fertilizer incorporated into the soil before laying the plastic provided adequate nutrition for two years, the effective life of the plastic.

A blueberry mulch research plot was conducted over five years by the Extension agent in Southeast Pennsylvania. The plot was replicated three times with three mulches: corn cobs, wood chips and sawdust. The plot had four cultivars: Bluejay, Bluecrop, Patriot and Spartan. After five years it was determined there was no significant yield difference. The best mulch of the three is the one you can obtain at the lowest cost. Remember sawdust or wood chips from red maple and beech should not be used. Sawdust or wood chips from those two trees may injure or retard blueberry plant growth. (*Source: Vegetable & Small Fruit Gazette, Vol. 7, No. 5, May 2003*)

Grapes

Grape Fungicide Review (Part 1 of a 2 Part Series)

Alice Wise and Wayne Wilcox, Cornell University

Now that harvest is just about over, take the time to mull over pest control strategies. The more common fungicides are reviewed below. Note to vineyard managers: please feel free to voice your opinion on these materials. As in past newsletters, PM=powdery mildew, DM=downy mildew, BR=black rot, PH=phomopsis, BOT=botrytis.

Protectants – Material must be present on the plant tissue before the fungus starts infecting the plant.

- Quintec – Newly labeled in 2004, protectant, no post-infection or eradicant activity for control of PM. Used in 2004 with great success. The possibility of resistance means it should be used wisely – no more than 2 consecutive applications, no more than 3 apps per season, do not apply to existing infections and use 14-day intervals. There are hopefully one or two additional new PM materials on the horizon.
- Sulfur – For PM only. Efficacy greatly influenced by formulation, rate, frequency of application, weather. Much of its activity is due to vapors that form in response to temp, hence activity greatly reduced <65F. Generally, commercial growers favor liquid or dry flowable (DF) formulations over WP's. Several formulations used locally are OMRI approved (organic). Recent research suggests that sulfur may also have some eradicant activity when thoroughly applied to existing infections. Resistance is not a concern.
- Copper – Primarily for DM, slight control of BR, PH, PM. Both DF and liquid formulations are easy to handle. Tank mixable with sulfur, making it an attractive option for summer. Many products still recommend the addition of spray lime as a safener to minimize phytotoxicity. Phyto is most likely after a prolonged rainy or dewy period or when applied under extremely humid (slow-drying) conditions. Both liquid and DF formulations are commonly used. There is an OMRI approved WP formulation.
- Mancozeb/maneb – The standard broad spectrum protectant for BR, DM, PH. Its use is limited to the first half of the season due to a 66-day preharvest restriction. Often tank mixed in spring with either sulfur or JMS Stylet Oil. Relatively inexpensive and usually very effective. The length of residual activity (effective spray interval) is influenced by the application rate and amount of rain that falls after the spray.
- Ridomil – Primarily a protectant for DM. Does provide postinfection control though use of Ridomil in this mode – particularly on sporulating lesions - will hasten the development of resistance. This has happened elsewhere in the world. Considered one of the best options for DM control when the pressure is on. A 66-day preharvest interval has traditionally limited use to the first half of the season. The PHI has recently been reduced to 42 days on the federal label, we're currently checking on NYS acceptance of this change.

- Captan – Primarily for DM, with modest control of BR. Research and field observations have shown Captan to be as good as or slightly better than manozeb for PH control. Some growers use captan early season for this reason. However, it cannot be tank mixed with Stylet Oil, or phytotoxicity will occur. Captan is typically used postbloom for DM control.
- Ziram – For BR and PH, modest control of DM. Chemically related to ferbam, it is used primarily on juice grapes upstate, where processors do not allow postbloom applications of mancozeb products.
- Topsin-M – Chemically similar to Benlate but not labeled for the uses that Benlate was labeled for. Therefore, this product is of little or no use to the local industry.

Sterol Inhibitors – Systemic materials with good PM and BR (some products) control. Though in most vineyards they still work for PM, they are very much at risk for PM resistance. Resistance is characterized by a gradual decline in performance, rather than the sudden loss of control experienced with strobilurin resistance. Many growers throw in sulfur as cheap insurance when using SI's. Resistance management guidelines are detailed in the *NY/PA Pest Mgt Rec's for Grapes*.

- Nova - Very useful as a postinfection BR material, has several days forward protection as well. No DM or PH control.
- Elite - Equivalent to Nova.
- Rubigan – Only for PM. Has provided good control though resistance is still a risk. Has not provided commercially acceptable control of BR.
- Procure – Similar to Rubigan.

(*Source: LI Fruit & Vegetable Update No. 30, Oct. 2004*)

General Information

Fall Small Fruit Care

Bruce Bordelon, Purdue University

Grapes- Grapes should be encouraged to harden off for winter by avoiding nitrogen fertilizers at this time. Apply non-nitrogen fertilizers and lime, as needed based on soil and tissue test results. It is especially important to maintain healthy leaves through fall to promote proper hardening. Downy and powdery mildews often build to epidemic levels on susceptible cultivars in fall. Both can cause defoliation and reduce winter hardiness so it's important to maintain protection against these diseases throughout the fall until leaves drop naturally.

Blueberries- Blueberry plants should be encouraged to harden off for the winter. However, growers should continue to irrigate if dry weather persists. Fruit buds are developing now for next year's crop so it is important to avoid water stress on the plants during this time. Apply non-nitrogen fertilizers and materials for soil pH adjustment based on foliar analysis and soil tests. Apply these before fall rains begin and also before adding any supplemental mulch to plantings.

Strawberries- Flower bud initiation occurs during late summer and fall, so maintaining good plant health into the fall is important for high yield potential next year. Dry conditions can significantly reduce fruitfulness next year. Irrigate to provide at least 1 inch of water per week through October if rainfall is not adequate. We mentioned the importance of an application of

nitrogen fertilizer in the last issue of this newsletter. If it hasn't been done yet, it's not too late. If tissue analysis shows deficiencies in magnesium or boron, early fall is a good time for foliar applications of Epsom salts (15 lb./100 gal./acre) for magnesium and Solubor (3 lb./100 gal./acre) for boron. Phytotoxicity can be a problem with these materials so read the labels. In addition to fertility, controlling leaf diseases improves the ability of the plant to carry on photosynthesis and store starch in the crowns. Check fields for infestations of leafhopper or aphids. Generally, plants can take a fair amount of feeding by these insects, but heavy infestations can be a problem.

Brambles- Encourage hardening off of canes in summer bearing varieties of brambles by avoiding nitrogen fertilizers and supplemental watering at this time. Spent floricanes can be removed now, or later during fall, winter or early spring. Fall bearing raspberries can still benefit from irrigation in dry weather to help maintain fruit size. Apply non-nitrogen fertilizers and lime as needed based on soil and tissue test results. If Phytophthora root rot has been identified in a field, treat the affected area with Ridomil Gold EC, Alliette or phosphorous acid in September or early October. This timing is important to get the material in place in the root zone before the onset of cool wet weather in the fall. (*Source: Facts for Fancy Fruit, vol. 04, no. 10, Sept. 13, 2004*)

The Organic Way- Use of Compost and Manure in Small Fruit Production

Elsa Sanchez and Kathy Demchak, Penn State University

Compost

Compost can be an important part of small fruit nutrient management. In addition to adding nutrients to the soil, compost can improve long-term soil health. Composts are best when used in combination with other nutrient management strategies including raw manures, green manures, fertilizers and crop rotations. According to the National Organic Standard, compost can be applied as necessary provided the compost meets carbon to nitrogen (C:N) and temperature requirements and has not been treated with prohibited substances. When using compost it must have a C:N ratio between 25:1 and 40:1. In addition, when using an in-vessel or static aerated pile system for composting the pile must reach a temperature between 131°F and 170°F for a minimum of three days. If using a windrow system for composting, the pile temperature must be maintained between 131°F and 170°F for a minimum of 15 days and turned a minimum of five times during that time. A compost log should be used to document that the composting procedure meets protocol. If the compost used is purchased, it must also have been produced in adherence with these requirements.

The nutrient content in compost varies depending on source materials and composting protocols used; therefore, it is recommended that compost be tested to determine the amount of nutrients it contains (kits are available through local county Extension offices). Finished compost typically has 0.5 to 2.5 percent total nitrogen. Most of the nitrogen is in an organic or slow release form. As a general rule, about 10% of the organic nitrogen in the compost will be available to the plant per year. This percentage is referred to as the availability coefficient. Phosphorus in composts, like nitrogen, is in an organic form that is not immediately available for plant use. As phosphorus is changed to a form useable by plants, some of it binds to soil particles and is again unavailable for plant use. Because of this, compost generally contains very little phosphorus for plant use and phosphorus from alternate sources is typically needed to meet plant requirements. Potassium in composts is in a form that is readily available for plant use, but it is also water-soluble and therefore can leach out of compost piles. Placing a cover over a compost pile can help reduce the amount of potassium lost to leaching. In addition to determining the nutrient content of compost, it can be useful to determine the pH because it can be unsuitably high for small fruit production, particularly for blueberries, which grow optimally in low pH soils.

When using composts, it is best to apply it based on crop needs rather than on a depth basis for long-term

soil health. Studies have shown that this is especially the case when growing in high tunnels. The environment within high tunnels excludes factors that assist in the breakdown of compost (for example, rain). Applying compost on a depth basis in high tunnels can increase soil nutrient and soluble salts to well above optimum levels and compromise yields. Compost can be applied based on the amount of nitrogen, phosphorus or potassium the crop needs. Most commonly compost is applied based on the nitrogen requirements of the crop because nitrogen most often is limiting for plant growth.

To calculate how much compost to apply based on the nitrogen needs of a crop, first determine the total amount of nitrogen contained in the compost. Generally this is given in units of pounds per ton or as a percent. If total nitrogen is given as a percent, multiply this number by 20 (2000 lb/ton X 0.01 to change the number from a percent to a proportion) to determine the pounds of nitrogen per ton of compost. Next, determine the availability of the nitrogen in the compost. A general rule is 10% of the organic nitrogen will be made available to the plants in the first year. Finally, determine the amount of nitrogen needed by the crop. Remember to subtract nitrogen added from other sources (e.g., green manures or fertilizers) from the amount of nitrogen needed by the crop. To calculate the application rate of the compost, multiply the total amount of nitrogen in the compost by the availability coefficient of the nitrogen. Then divide that number by the amount of nitrogen needed by the crop. For example, a compost has 1.1% total nitrogen on a wet weight basis and analysis has indicated that a June-bearing strawberry planting needs 30 pounds of nitrogen per acre.

Step 1: Convert the 1.1% total nitrogen to units of pounds per ton by multiplying 1.1% by 20. The result is 22 pounds of nitrogen are contained per ton of compost.

Step 2: Determine how much nitrogen will be made available to the plant and multiply it by the amount of total nitrogen in the compost. The result is 2.2 pounds of nitrogen per ton (22 pounds per ton X 10%).

Step 3: Determine how much nitrogen needs to be applied to meet the needs of the crop and divide it by the amount of nitrogen available from the compost. The result is 13.66 tons per acre (30 pounds of nitrogen needed per acre ÷ 2.2 pounds of nitrogen per ton) of compost needs to be applied to supply the plants with 30 pounds of nitrogen per acre.

Timing the application of compost is different than for adding chemical fertilizers because nutrients are generally slowly made available to plants. When applying compost, timing must be adjusted to account for decomposition and the subsequent release of nutrients. For example, June-

bearing strawberries have a high nutrient demand in the fall as they produce flower buds for the crop the following season. Compost may need to be applied in the summer so it will have sufficient time to decompose and release nutrients in time to meet plant needs in the fall. Applying compost at improper times can result in vigorous plant growth late in the season. This delays hardening off of the plants and can lead to winter injury. Additionally, when compost is applied to raspberry plantings, use a fine compost because primocanes have difficulty emerging through large clumps.

Raw Manures

As with composts, raw manures can be used as a part of a nutrient management system. They also are best when used in combination with other nutrient management strategies. However, for reasons outlined below, manures are better suited for use during soil preparation prior to planting small fruit crops rather than after the crop has been planted. Composted manures are a better option for application after the small fruit crop has been planted.

According to the National Organic Standard, raw animal manures can be used anytime when needed on fields planted with crops not intended for human consumption, such as on green manures or cover crops. When raw manures are used on fields that are planted in crops for human consumption with the edible part of the crop not in contact with the soil (e.g., trellised brambles, highbush blueberries, gooseberries, currants), the manure must be soil incorporated a minimum of 90 days before harvest. When raw manures are used on fields that are planted in a crop for human consumption with the edible part of the crop in contact with the soil (e.g., strawberries), the manure must be soil incorporated a minimum of 120 days before harvest. The use of sewage sludge is prohibited in certified

organic production. Even non-organic growers should be aware that there are site- and crop-specific restrictions that limit sewage sludge application to cropland, as outlined in state (and possibly local) regulations.

Tables listing the nutrient contents of different manures are available, however nutrient content varies depending on several factors including the feed the source animal was provided, presence of bedding in the manure and manure handling. Also, nutrient availability decreases as the manure ages. Therefore, as with composts, it is recommended that manures be tested for their nutrient content. Manure is typically applied based on the nitrogen needs of the crop. Fact sheets are available through cooperative Extension with detailed calculations for determining application rates for manures (for example, Estimating Manure Application Rates, Penn State Publication CAT UC151).

Nitrogen contained in manures is in the form of ammonia or ammonium, which can be quickly lost, through volatilization, to the atmosphere. To avoid this nitrogen loss, raw manures are soil incorporated. Soil incorporating manures can be a challenge for small fruit crops because the plants are perennial and have shallow root systems that can be damaged during incorporation. Applying manures to the small fruit crop can also damage the plants because of potentially high nitrogen and salt levels in manure. Additionally, manures can be contaminated with human disease causing organisms, which can be transferred to fruit. Manures can also have high weed seed levels, which can complicate production. It has been documented on vegetable crops that as manures decompose they can release compounds which when taken up by plants can lead to vegetables with off-flavors and odors. This may or may not be the case for small fruit crops. However, for these reasons, manures are recommended for use during soil preparation prior to planting small fruit crops rather than after the crop has been planted. (*Source: The Vegetable and Small Fruit Gazette Vol. 8, No. 10- October 2004*)

Funding Now Available for Improving Natural Resources on Massachusetts Farms

Susan Phinney, Massachusetts Dept. of Ag. Resources

The Request for Response (the application) for the Agricultural Environmental Enhancement Program (AEEP) is now available. There are TWO (2) due dates for the response/application - November 26, 2004 and April 1, 2004. The program has expanded this year to include funding activities that improve air quality in addition to funding water quality and conservation measures on Massachusetts' farms. Eligible growers include all commercial agricultural operations in the Commonwealth including shellfish growers. Funding is made available for installing best agricultural practices. Examples of installations include: pesticide storage

shed, trickle irrigation, flumes and manure storage areas.

This year \$250,000 is available with a maximum of \$24,000 per farm. All projects must be completed by June 30, 2004.

For more information or to get an application, look on the DFA website www.state.ma.us/agr (and search under Programs for AEEP) or by searching "view solicitations" at www.mass.gov/comm-pass. You can also get an application at the county USDA offices or by calling the Coordinator, Susan Phinney at 617-626-1772 or via email, at susan.phinney@state.ma.us.

Berry Farming: Key Questions to Consider Before You Begin

Lori Bushway, Cornell University

Perhaps you are considering diversifying your current operation or starting a new venture and are considering small fruits as a possibility. How can you determine if small fruit farming may be right for you or if a new crop will be a profitable addition to your existing venture? The following checklist, developed by Lori Bushway, will assist you in your decision-making process. Get the ball rolling by asking yourself the following questions:



1) What is your market?

- What berry products are produced already in adequate supply in your area?
 - Would the market support additional suppliers of the same products?
 - Are there unique market opportunities available that your berry products might fill?
- How will you market your crop?
 - Pick your own (PYO). What's the population within a 20-mile radius?
 - Direct Market. Location, Location Location!
 - Wholesale. Do you have a cooler? Sell all before a single berry is picked.
- How much can you reasonable expect to sell to this market?
 - 4,000 pints of raspberries?
 - 3,000-7,000 quarts of strawberries?
 - 6000 lbs of blueberries?
- How much will it cost to transport your product to this market?

2) What is your budget?

- Consider the costs of site preparation, establishing planting, irrigation, managing planting, labor...
- Your plant material cost per acre might run:
 - Blueberries - 870 to 1,090 plants/acre about \$5200 to \$6500
 - Raspberries - 1,452 plants/acre about \$1,900
 - Strawberries - 5,000 to 14,000 plants /acre about \$1,250 to \$3,500
- You might expect positive cash flow:
 - Blueberries: 10th -13th fruiting year, life of planting could be > 40 years
 - Raspberries: 2nd or 3rd fruiting year, life of planting is about 10 fruiting years
 - Strawberries: 1st fruiting year, life of planting about is 3-5 fruiting years

3) Will these new crop(s) fit your growing schedule without serious conflicts?

- What else are you growing? When do you not want to be busy with berry crops?
 - Blueberries - early spring pruning then harvest peak mid-Aug
 - Summer Raspberries - early spring-prune & trellis then harvest July
 - Strawberries – early winter mulch, early spring remove mulch, frost protection, harvest June peak then renovation
- For all – planting late spring, worrying about late spring frost during bloom, irrigation, weed control, spring peak in disease management, insect management, late summer leaf analysis...

4) What is your proposed planting location like?

- Very few sites are naturally ideal. When evaluating a site consider:
 - Where will you access water for irrigation?
 - What are winter temperatures? Frost pocket? Microclimate?



- Diseases & insects? Wildlife & weeds?
- Is there adequate sun? Is the soil well drained?
- What did your soil test say? pH? organic matter? phosphorus?...
- What the history of that site? The past & future crop rotation?
- Adequate parking for PYO?

5) What will you face in the way of weeds, diseases and pests?

- Control measures are not plentiful in berry crops. Minimize potential problems at the outset:
 - Plant resistant or tolerant cultivars (varieties).
 - Plant only healthy nursery material.
 - Thoroughly consider your site choices and promote healthy soil.
 - Plant to provide adequate room for growth.
 - Properly manage water & nutrients.

- Develop regular scouting routines to monitor pest presence and development
- Deal with pest problems proactively whenever possible and appropriate

6) Where can I find more information?

<http://www.fruit.cornell.edu/berry.html>

(Source: *New York Berry News*, Vol. 3, No. 10)

Beach Plum Production and Marketing

Richard Uva, Cornell University

Beach plum (*Prunus maritima* Marsh.) is a shrub native to the Atlantic coast with most populations occurring in sand dunes from southern Maine through Maryland. The fruit is a small plum (purple-blue and rarely yellow) with a flavor that varies from astringent to relatively sweet when ripe. The tart fruits gives jam and jelly a distinctive and sought after flavor. The tradition of beach plum collection and processing persists today as a small but thriving cottage industry in coastal communities, with hotspots on Cape Cod, Eastern Long Island and the Jersey Shore's Island Beach State Park.

Fruit of this native plum is being wild-collected to make preserves and jellies that are sold to summer tourists and the gourmet preserve niche market. Uncooked plums are only rarely eaten.

With funding from Northeast SARE (www.sare.org), Cornell Horticulturists together with Massachusetts Cooperative Extension and several growers from around the Northeast have lead a program to develop cultivation methods for beach plum.

Successful orchards have been established and approximately 40 farms are experimenting with beach plum in the Eastern U.S. The typical participants are small farms, many of which produce berries, fruits and vegetables. At this point, less than 10 growers have plantings of 1/2 to 1 acre in size, others are growing fewer plants on a trial basis. Most orchards have been established in the last 3 years and many will bear their first crop in 2005.

Research Results-At Cornell, we have evaluated the effects of irrigation, mulch, and fertilizer on the growth and yield of beach plum at a test orchard on sandy soil. Growth and yield were significantly greater in fertilized than in unfertilized treatments, while irrigation and

mulch had no effect. The most serious problem for fruit production was brown rot fungi (*Monilinia* sp.) for which controls are available.

We have found that beach plum has similar cultural requirements and pests as other commercially grown plums.

However, beach plum's flowers are not borne on spurs, but on new wood as with peach. While beach plum can be grown well inland, it is important that it is planted on well-drained soil.

Expanding Markets - In September of 2003 we conducted a series of interviews with 6 gourmet chefs in the New York City area. Each chef was given 5 pounds of beach plum fruit to experiment with and to share their results with us. The chefs were excited about beach plum in general. One chef requested

to purchase additional fruit from us and added a beach plum sauce to his restaurant menu for the holiday season. Another chef plans to put on a beach plum dinner in late winter of this year, where every course contains beach plum in some part of the recipe. This upscale restaurant market is always looking for something innovative and could possibly be a lucrative outlet for beach plum and other specialty fruits.

Horticulturally speaking, beach plum is in an interesting position. While still primarily a wild collected fruit, it is on the verge of becoming a cultivated crop. The fruit is in high demand by a limited audience and cannot be purchased through regular distribution channels. There are opportunities for those interested in growing beach plum who are willing to pursue niche marketing and for those doing value added preserves. Additionally, because growers are currently using plants grown from wild-collected seed, there

is great opportunity for crop improvement. Superior types could be easily selected from wild stock. At Cornell Orchards, and several other orchards across the northeast, we are evaluating beach plums grown from a range-wide seed collection. We plan on screening the plantings for



disease resistance, fruit quality, yield and antioxidant content.

For more information on the project, our website (www.beachplum.cornell.edu/) includes photos,

management information, goals of the project, contact information, news and research updates. (*Source: New York Berry News, Vol. 3, No. 10, Oct. 2004*)

Identifying, Building, and Selling the Value in *Your* Business

Bob Weybright, Cornell University

In a previous article (*MBN Vol. 16, No. 14*), I discussed the issue of selling based on value rather than price in one's business. Admittedly, this concept is easier to discuss than implement. In this article, I will take a closer look at "value" - its attributes, what constitutes value, and how value can be identified.

Value itself is not a new concept in the business world. In fact, it has been recognized by the accounting profession in a term called "good will." "Good will" can, in fact, be assigned a numeric value and accounted for on financial reports.

When a business is sold, it is not uncommon for the buyer to pay more for "good will" than the tangible assets of that business. A critical and key task is to assign a financial value to this "good will" that is believable by the rest of the world.

This has been and will most likely continue to be an issue of much discussion in the financial world as it is based primarily on individual beliefs and opinions.

While it might be beneficial to determine a dollar figure associated with a business's "good will," we must first understand what characteristics are in place, and how they increase the value of a business to a point where they could be classified as "good will." To keep things simple, rather than getting into a dollar valuation of "good will," I will focus on identifying attributes that might create value and influence the buying decision. The assistance of a good financial advisor would be required to properly assign a dollar value to "good will."

To briefly summarize a key point from last month's article: Value is a combination of benefits, both tangible and intangible, that must be present in order for a buyer, whether a corporation or an individual, to feel that the purchase contained an appropriate level of benefits to satisfy the need that drove the desire to purchase in the first place.

Essentially, what this means is that attributes of value are industry, company, and situation specific.

This is not to say that attributes of value are random. There must be reasons behind each and every value attribute. Some common value attributes one can consider include:

- Product safety • Price • Package material
- Personal safety • Order method • Seasonality

- Curiosity • Order convenience • Family ties
- Convenience • Delivery method • Emotional ties
- Variety • Pack size • Product story
- Quality • Color

The list of possibilities is not finite. Essentially, value attributes are anything that could separate you, your product, or company from direct competition or anything that could serve as a substitute for your product or service.

However, determining what attributes to consider for providing value to a particular business is done individually.

Knowledge of one's customers and market will guide which attributes to be considered. One important and key attribute not to be dismissed is one's reputation. An example found in the recent press is that some poor business decisions of a private nature caused a drastic decrease in company worth of an established company owned by a certain household maven. This example demonstrated how personal reputation could raise or ruin one's business. What this means is that awareness of personal relationships as well as past business relationships must be considered in determining what value might be present.

To maximize the success when selling based on value, one needs to understand that value is an internal and variable feeling. When assessing one's business, and what value is provided, there are some key considerations to keep in mind:

- Value varies by individual or demographic group – The methods and styles of marketing specialty vegetables, meats, and cheeses demonstrate the depth of this concept. Other more common categories would include convenience foods, organic and natural foods.

- Value can vary from year to year – Remember the olive green appliances from the early 1970s? What would a consumer pay for an appliance in that color today?

- Value can change across the year – Would you want to be selling jellybeans in July? Maybe if you were a wholesaler taking spring shipment orders. Large retailers have clearly identified the seasonal value factor. Look at when you can buy snow blowers in the store. Now consider when they are put on sale and the associated price reductions to sell them quickly.

- Economic climate affects the value decision – Gourmet products are in much more demand when the economy is doing well.

- Regional consumer taste shifts – Look at the styles of barbecue sauce and how strongly attached to them the people of the region are. Ask a person from the South East (vinegar based sauce region) how much they would pay for a bottle of tomato based barbecue sauce from the north, and vice versa.

- Geographic region determines what is perceived as having greater value – How much value is there in earthquake insurance in New York versus California? The value is minimal even though the Hudson River is a fault line.

In short, when looking at how to price one's services or products by value offered, three factors – customer, product and environment – need to be considered and balanced against each other. However, by far the most important area of understanding lies around the

customer. Learning who they are, where they are from, and what brings them to be your customer will provide insight into learning what attributes you should have or strengthen, and those that need work. You will also learn what value customers place on your product or service to determine whether you are pricing correctly or need to adjust your price up or down. One more thing to keep in mind – once you have completed this analysis it is then time to start over, as time never stops and customers never stop changing.

As you continue to work at and adjust the value proposition of your business the process will become easier, you will increase your sales success, and your customer base will continue to grow. The net and ultimate benefit of all this is differentiation from the competition and a sales advantage that makes your business the one to beat.

(Reprinted from: [Smart Marketing](#), September 2004.)

Upcoming Meetings

November 6 -7, 12 – 4:00 p.m. New Wine Festival, Chester Hill Winery

Wine lovers will be treated to wines, hors d'oeuvres, and live music to celebrate the New Wine Festival. Featured will be dry dinner and port style Blueberry Wines made from locally grown blueberries. Visit www.blueberrywine.com/Events.htm for more information.

Nov. 8, 2003 - MUMMY BERRY WORKSHOP lead by Dr. Annemiek Schilder, Michigan State University Plant Pathologist. Sponsored by UNH Cooperative Extension - Hillsborough County Office, 329 Mast Road (Route 114), Goffstown, NH. This seminar is being partially funded through the New Hampshire Department of Agriculture, Markets and Foods - Integrated Pest Management Grant Program. For more information contact George Hamilton at: (603)641-6060 or: george.hamilton@unh.edu

November 15, 2004: Fireblight and Crop Insurance Seminar, 6:00 - 8:30 PM, UNHCE Hillsborough County, 329 Mast Road, Goffstown, NH 03045. An IPM Approach of Understanding Fire Blight for Apples and Pears Seminar, and An Update on the USDA-RMA Apple Crop Insurance -- New Provisions. Two pesticide recertification credits. Free, but pre-registration by November 8 required. For more information contact George Hamilton, 603-641-6060. Or see: <http://www.umass.edu/fruitadvisor/pdf/2004/2004ipmfireblightnh.pdf>.

November 16th, 9 a.m. - 1 p.m., Planning for the Future of the Farm, Shelburne Grange Hall, Shelburne MA. \$10 per person, please register in advance

With complicated tax and inheritance laws, development pressure, and a struggling farm economy, transferring a farm to the next generation is not easy. This workshop is designed to offer specific information and practical advice to farmers about these tough topics. Creative methods of finding and supporting new farmers, the tax implications for incorporating and passing on a farm, and conservation strategies to protect the land from development will be addressed by expert speakers. This half-day workshop will also offer opportunities for farmers to share their experiences in planning for the future of their farm. Please register by calling (413) 268-8219 or emailing jchristensen@ttor.org.

December 15-16, 2004: New England Fruit and Vegetable Conference, Manchester, NH

The New England Fruit and Vegetable Conference (NEFVC) will be held December 15-16, 2004 at the Center of New Hampshire Radisson Hotel in Manchester, NH. Concurrent morning and afternoon education sessions by researchers, extension specialists, industry personnel, and growers will present the most up-to-date production, integrated pest management (IPM), and marketing information to an audience of commercial and hobby fruit and vegetable growers in the Northeast. Pesticide recertification credits for certified applicators in New England and New York will be available for all sessions. In addition, a trade show with over 60 exhibitors will feature the latest products and services for fruit and vegetable growers. There is no pre-registration, however, a registration fee of \$20 per person per day will be collected at the door.

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The NEFVC is co-sponsored by the Massachusetts Fruit Growers' Association and other New England states fruit and vegetable growers' associations, the New England Vegetable and Berry Growers Association, and New England University Cooperative Extensions.

For further information, contact the Program Chairperson, Dr. Duane Greene, University of Massachusetts, 413-545-5219, or the Trade Show Manager, Mr. Robert Smiley, 978-422-6595. For program information and updates, see the Massachusetts Fruit Growers' Association website, <http://www.massfruitgrowers.org>.

January 20 & 21, 2004 – Long Island Ag Forum 2005. The 2005 Long Island Agricultural Forum will be held on January 20 & 21 at Suffolk County Community College in Riverhead, NY. Sessions will include: Vegetable, Potato, Viticulture, Agricultural Issues, Pesticide Issues, etc. Programs will be mailed in late November/early December. Contact Linda Holm at Suffolk County Cooperative Extension, 631-727-7850, lml10@cornell.edu.

February 11-12. North American Farmers' Direct Marketing Association conference Park Plaza Hotel in Boston. The theme of the 20th annual North American Farmers' Direct Marketing Convention is "Start a Revolution." The convention is one of the premiere farm direct marketing events in the world. Past attendees have come from as far as England, Ireland, Japan and Australia. In addition to the conference, the convention will feature pre- and post-conference bus tours and a full-day workshop. The entire event runs from Feb. 7-14, 2005. A trade show with more than 80 vendors will be held in conjunction with the conference; it will be held across the street at the historic Castle at Park Plaza.

For convention information, visit www.nafdma.com. Or, e-mail info@nafdma.com. Call (413) 529-0386. Registration will be available on-line around Nov. 1. The pre-registration deadline is Jan. 6.

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