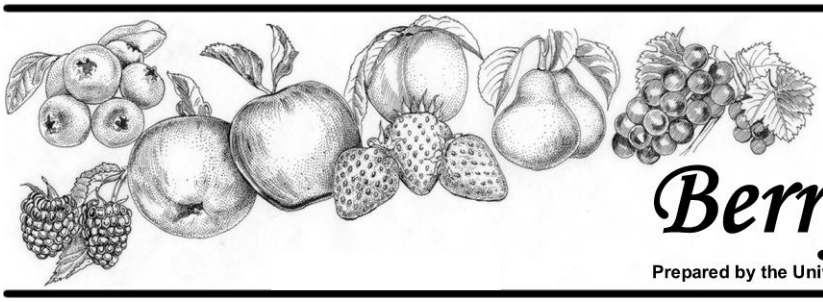

Berry Notes
Prepared by the University of Massachusetts Fruit Team

MASSACHUSETTS BERRY NOTES

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IN This Issue

Message from the Editor:

Spring Chores: Cool weather has dominated so far this spring. However, warmer weather will soon be hear to kick off the growing season. Included in this issue of Berry Notes is information on Spring chores for your berry plantings. Among these are removing mulch from strawberries, setting up irrigation for frost protection, applying dormant or delayed dormant control measures for insect pests and diseases in berry crops. Hopefully pruning activities are complete now but, if not, these can still be finished up in the coming weeks.

2003 – 2004 New England Small Fruit Pest Management Guide: This publication will be available soon, however, the release date is not yet available. It will be accessible on the UMass Fruit Team website prior to being available in print. Please check http://www.umass.edu/fruitadvisor/ in the coming weeks to view it as soon as it is up.

Section 18 Label Update: Massachusetts has submitted a petition to EPA for an Emergency Exemption in 2003 for the use of Indar 75 WSP fungicide in highbush blueberries to control mummyberry disease. This is the same material for the same use pattern that we petitioned successfully for in 2002. We have not been informed yet about EPA's decision, but should be hearing very soon. It is very likely that we will have our petition approved and I will inform you as soon as I hear.

Getting Started in 2003

Starting the Berry Production Season

Marvin P. Pritts, Cornell University
[Edited by Bill Turechek, Cornell University]

As the strawberry season gets underway, growers are thinking about marketing their berries. One of the major limitations for northern growers is the short harvest season for most berry crops. Supermarkets, in particular, prefer to work with suppliers that can provide them with product on a year around basis, if possible. Even if one markets directly to consumers, e.g. PYO, short harvest seasons are undesirable because one or two rainy weekends during a three week strawberry harvest can be disastrous. A number of approaches are available to extend the season, and while they offer the opportunity to expand markets, the economics may not be favorable depending on costs and prices. A few of them are covered here; however, growers should carefully consider the additional costs and likely returns *before* implementing a new technique.

Planting dates: Berry crops are perennial, so one typically does not consider the effect of planting date on season extension. However, where summers are cool, it is possible to stagger the planting date of strawberries, allowing them to fruit in the planting year, and harvesting them throughout the summer. Plants are specially grown in the nursery the year before transplanting so they will attain an adequate size for fruiting the following year. This usually involves higher rates of fertilization and runner removal. Plants are cold-stored after excavation from the nursery bed, and transplanted into production fields at high densities from May through July. Plants produce fruit within about 60 days. This technique is called the "waiting bed." These plantings revert into a matted row in subsequent years. Unfortunately, when the summer is hot, waiting bed plants perform poorly.

Environmental modification in the field: Modifying the climatic environment of a field of plants can be challenging, and there are a limited number of techniques available to achieve this. Two of the most common are mulches/groundcovers and row covers.

Straw Mulch: Delaying straw mulch removal in early spring will also delay flowering and fruiting in strawberries, but it will also reduce yields. We do not recommend this practice in New York.

Row Covers: Row covers are perhaps the most effective method of accelerating flowering and fruiting in strawberries and primocane-fruiting raspberries. For strawberries, the straw mulch is removed from the plants early and replaced with row cover. As a general rule, March is an appropriate time to remove straw and apply the row cover. If snow still covers the planting, then obviously it is best to wait until melting has occurred. Similarly, if unseasonably cold weather persists in early March, then one should wait for warmer weather before removing the straw. The covers should be removed soon after flowers are observed. Without wind or bee activity, pollination will be reduced and fruit will be deformed. If cold temperatures (<30F) occur when the covers are still in place and flower trusses have emerged, water can be applied directly over the covers for frost protection. 'Earliglow' will fruit as much as 10 days earlier when rowcovers are used, especially when spring is cold and sunny.

For primocane-fruiting raspberries, rowcovers are applied in early spring as soon as snow melts and last year's canes are removed from the planting. Allow room under the covers for cane growth. Remove covers when canes are 18 inches tall. This practice accelerates harvest of Heritage from 10 - 14 days, and offers some degree of frost protection for new canes in early spring.

Various companies manufacture covering materials. The most useful have been lightweight (0.5 to 1.2 oz. per square yard), spunbonded materials with sewn seams. The cost ranges from $800 - $1700 per acre. Although this may seem expensive, if prorated over several years, the cost is not that great. A higher price for early berries and generally higher yields make row cover use a profitable choice for many growers on at least a portion of their acreage.

Black Plastic: Strawberries can be planted through black plastic mulch to achieve earlier fruiting in spring. However, runnering presents a problem because they cannot root through the plastic. Runner removal is expensive and this represents a loss of energy for the plant. Some growers in warmer climates are experimenting with late summer planting on black plastic to avoid the runnering which occurs during early summer. However, this technique is riskier in more northern areas because the weather may not be conducive for fall growth and the probability of early spring frost is greater. (***Source**: The New York Berry News, Volume 02, Number 03, March 22, 2003*)

Early Season Berry Calendar

Cathy Heidenreich and Bill Turechek, Cornell Univ., Geneva, NY

Many small fruit growers produce more than 1 crop. In doing so, it can be difficult to keep track of what needs to be done and when; particularly if growing berry crops is new to you. The calendar below is an attempt to organize the necessary chores by month for each listed crop. One must consider, however, that some of the activities are phenology and/or weather dependent. e.g., removing the straw mulch. In situations such as these, the activity is classified in the month when it most likely to occur in New York. Lastly, where additional information is available within past issues of the New York Berry News, reference is made to the issue.

	March	***April***	***May***
Strawberry	1. Remove straw mulch in late March or early April. 2. If desired, you can cover your planing with a spun-bound row cover to promote earlier cropping after straw removal. 3. Set up sprinklers prior to bloom for frost protection.	1. Replenish bare or lightly-covered spots with straw mulch. This is necessary in plantings with a history of anthracnose. 2. Scout for the foliar diseases leaf spot, leaf scorch, and leaf blight on over wintered leaves. Consider an early season fungicide application for fields with a history of heavy disease pressure (see NYBN vol. 1, no. 1 for more detail). 3. Scout for strawberry clippers when temperatures routinely exceed 65 F.	1. Scout for tarnished plant bug. 2. Apply gray mold fungicides. Elevate, Switch, and Rovral are excellent gray mold choices. However, if anthracnose or foliar disease are of concern, you will want to tank-mix with Captan. Next month's issue of the NYBN will provide more detail on managing berry rots in light of several new fungicide registrations.
Raspberry	1. Scout for cane diseases anthracnose, spur and cane blights. In late March or early April, apply a "delayed dormant" spray of lime-sulfur for control of these disease if necessary (i.e., this is at budbreak). 2. Delayed dormant sprays are not needed on fall bearing raspberries if previous year's canes were removed from the planting and thoroughly shredded.	1. Complete pruning. 2. Apply Ridomil for Phytophthora root rot if necessary. 3. Scout for orange rust on the under surfaces of new leaves of black and purple raspberries, and blackberries. Remove rust-infected plants. 4. Apply pre-emergent herbicides (see NYBN vol. 1, no. 3 for more detail).	1. Apply nitrogen fertilizers to both summer- and fall-bearing raspberries. Calcium nitrate should be used on new plantings; urea or ammonium nitrate on older plantings. Applications can be split between May and June if desired. 2. Apply Sevin for fruitworm and sawfly control where necessary.
Blueberry	1. Complete pruning. 2. Apply a "delayed dormant" spray of lime sulfur for phomopsis 3. An application of oil may be needed at this time if scale insects were a problem. However, this spray should not be applied in the same 14-day period as the lime sulfur spray because oil and sulfur when applied next to each other is extremely phytotoxic.	1. If additional mulch was not applied, lightly rake or disk soil beneath bushes just prior to bud break to disturb production of mummyberry spores. 2. Green tip sprays: Mummy-berry, botrytis blossom and twig blight (see NYBN vol. 1, no. 2 for more detail). 3. If you are clean cropping (no mulch) consider making a pre-emergent herbicide application.	1. Split application of ammonium sulfate or urea fertilizer between May and June. Do not fertilizer newly planted blueberries.

(**Source**: *The New York Berry News, Volume 02, Number 03, March 22, 2003*)

Strawberries

Straw Removal on Strawberries

Bruce Bordelon, Purdue University

Studies done in Illinois indicate that proper time to remove straw from matted row strawberries is when the bare soil temperature at 4 inches averages about 40-43sF. This usually coincides with mid to late March in central Indiana. According to data from the Purdue Applied Meteorology Group bare soil temperatures have climbed quickly from the high 30s a week ago, to well into the 40s this week. Soil temperatures should rise steadily through the month, so the straw should be raked off the tops of the beds and into the row middles if it hasn't already been done. Leaving some straw on top of the beds for plants to grow up through provides a clean surface for fruit.

Straw should be removed from strawberry beds before the plants grow enough to cause yellowing of foliage. Allowing the leaves to become etiolated (yellowed with long petioles) due to late straw removal can reduce yields by as much as 25%. However, uncovering the plants early may promote early growth and increase chances of frost or freeze injury. The Illinois research found that the difference between early removal and late removal increased first harvest by only 3 days, so there is no real advantage. After the straw is removed the frost protection irrigation equipment should be set up. (***Source**: Facts for Fancy Fruit 03-01, March 27, 2003*)

Strawberry Plant Establishment

Marvin P. Pritts, Cornell Univ., Ithaca, NY

Getting plants off to a good start will pay big dividends later when strawberry plants must deal with the stresses of weather and pests. Among the most important steps in site preparation is the elimination of perennial weeds. Few herbicides are labeled for use in established strawberries, and their activity on perennial weeds is limited. Therefore, weeds are most effectively controlled before planting.

Weeds. Weeds cause a greater economic loss than diseases and insects combined. In addition, weeds also encourage the establishment of other pest populations. Eliminating weeds the year before planting is much easier than controlling them later. Too many growers plant directly into a site in which perennial weeds were not eliminated the previous summer, and then spend the next several years trying to find the right combination of herbicides to undo the damage.

Rotation, coupled with the use of a broad-spectrum post-emergent herbicide the summer before planting, is an effective approach. Cover cropping the site again after the herbicide application will further suppress weed growth. Repeated cultivation or covering a site with black plastic for several months are also effective approaches. Growers should begin site preparation 2 or 3 years before the crop is planted to eliminate perennial weeds, especially if organic methods are to be used.

Fumigation at high rates will suppress weeds, although its use worldwide will likely be restricted because of environmental concerns, availability and expense. In some situations, nematodes, soil diseases, soil insects or intense weed pressure may justify fumigation. The soil should be friable, warm (>50F) and without decomposing plant material for fumigation to work properly. The best time to fumigate a strawberry field is late summer or early fall of the year prior to planting.

Nutrient amendments. Test the soil for pH, potassium, phosphorus, magnesium, calcium and boron. Sample soil in a V-shape pattern within the field, collecting from at least 10 locations. The sample should represent the profile of the top 10 - 12 inches. Plow the site, add the recommended amount of nutrients, then disc. Because soil testing procedures are not standardized across the region, follow the recommendations from the laboratory where the samples were analyzed. Do not use the test results from one laboratory and the sufficiency ranges from another.

pH. It takes one year for lime to raise, and for sulfur to lower the soil pH, so it is necessary to apply these one year in advance of planting. The more finely ground the sulfur or lime, the faster it will react with the soil.

If the soil pH must be increased, a liming agent such as calcite or dolomite should be applied. Liming agents differ from one another in two important characteristics which influence their effectiveness: 1) chemical composition which affects acid neutralizing potential and fertilizer value and 2) particle size which determines liming efficiency and ease of application. Consider the relative importance of these when selecting a liming agent. For example, even though dolomite has a lower neutralizing value than calcite, it is often used at sites which require supplemental magnesium for adequate fertility. Moreover, finely ground lime is more difficult to apply than coarse particles, but it changes the soil pH more quickly.

Sulfur is effective at lowering soil pH, but time is required for bacteria to oxidize the sulfur into a usable form. Sulfur comes as a wettable powder or prills, with the former reacting faster top lower the soil pH. Aluminum sulfate is sometimes recommended for acidification because it provides an already oxidized form of sulfur, but it is expensive and six times as much is required to do the same job as sulfur. Also, aluminum toxicity can occur with large amounts of aluminum sulfate, so we do not recommend it.

Nitrogen and Phosphorus. Certain nutrients, like phosphorus, are very insoluble in water and move very slowly through the soil. It may take years for phosphorus applied to the soil surface to reach the root zone of the plant and be taken up. For this reason it is imperative to apply a sufficient amount prior to planting and mix it into the root zone. Animal manures and legumes offer a good source of

slowly released nitrogen when incorporated prior to planting. Animal manures are a potential source of weed seeds, however. Manure applied to fields should be well-composted and worked into the soil prior to planting to minimize any risk of fruit contamination from pathogenic bacteria.

Irrigation. The irrigation system should be in place prior to planting because transplants probably will require immediate watering. Any preemergent herbicide applied after transplanting will need to be watered in by rain or irrigation to be effective. For these reasons, the irrigation system should be operational prior to planting. Also, in early spring, the irrigation system will be a necessary tool for frost protection.

Preplant cover crops. Seeding a cover crop on the site the year before planting is an excellent way to improve soil structure, suppress weeds, and if the proper cover crop is grown, suppress nematode populations. Benefits of a cover crop are greatest when the soil is sandy and/or the soil organic matter content is low. Most cover crops grow under the same soil conditions as strawberries. Except for additional nitrogen (40 lb/A prior to seeding) and perhaps phosphorus, other amendments are not likely to be required.

Minimum seeding rates are used when the objective is to supply an acceptable stand for harvesting the grain or straw. But when a vigorous, dense stand is desired for weed suppression and organic matter, higher seeding rates are recommended.

Preplant cover crops are usually plowed under in the late fall or early spring prior to planting. Those with low nitrogen contents (grains and grasses) should be plowed under early in the fall to allow adequate time for decomposition, unless the soil and site are prone to erosion. Legumes contain more nitrogen and decompose quickly, so they can be turned under within a month of planting. Many plant species are suitable as preplant cover crops, and each has certain advantages. In some cases, mixtures of crops are used to realize the benefits of both.

The Strawberry Production Guide (NRAES-88) provides many details on site selection and preparation, and on suitable preplant cover crops for the strawberry planting. (**Source**: *The New York Berry News, Volume 02, Number 03, March 22, 2003)*

Brambles

Nitrogen Fertilization of Berry Crops: Part 1: Raspberries

Bernadine Strik, Oregon State University

We have been studying uptake and use of fertilizer nitrogen in red raspberry and strawberry, and are presently looking at blueberry. I will report here and in the next issue, on N fertilizer uptake and needs of all but blueberry, because we are not yet done with the blueberry work. Thanks to professor Tim Righetti at OSU, student Hannah Gascho Rempel, and Research Assistant, Gil Buller, for assistance in these projects. We appreciate the support of the Oregon Strawberry Commission, the Oregon Raspberry and Blackberry Commission, the Agricultural Research Foundation, and the NCSFR. If you would like more information on any of the following please contact Bernadine at strikb@science.oregonstate.edu

Red raspberry:

We studied the uptake of fertilizer nitrogen (FN) in a mature summer-bearing 'Meeker' planting. The treatments were: 1) no added nitrogen; 2) 80 lb N/a in mid-March; 3) 40 lb N/a in mid-March; and 4) 40 lb N/a mid-March + 40 lb N/a in mid-May (we followed the uptake of FN in the second half of this split application only). No primocane suppression was done in either year and floricane prunings were removed from the field. Fruit was machine harvested. The soil type was a clay loam with a 3 to 4% organic matter content.

Nitrogen rate or timing had no effect on plant growth (dry weight) or total plant nitrogen content over the two-year study.

There was a trend for the unfertilized plants to have the lowest yield and for the split, 40+40, plants to have the highest yield. This was likely because, primocanes were longer in the fertilized plants than in the unfertilized plants – 20 to 31" longer.

From 36 to 37% of the fertilizer nitrogen applied in the spring (80 and 40 lb N/a in March) was taken up by the plants. When 40 lb N/a was applied in May (second half of the split application), 26% of this fertilizer was taken up by the red raspberry plants.

We found that plants treated with higher rates of FN relied more on FN, while plants in the lower fertilizer rate treatments probably took up a higher percentage of their N from the soil and from recycled or stored N from the previous year.

When fertilizer was applied in mid-March, more of the fertilizer initially went to the fruiting laterals and fruit. Later in the season, fertilizer that was taken up went primarily to primocanes. Fertilizer applied in mid-May went primarily to primocanes – in the last half of a split application, most of the

value of the fertilizer is thus for the following year, not for the current season.

The peak total nitrogen in the plant was 100 lb N/a. About 16 lb N/a was lost in harvested fruit, 16 lb N/a in leaf fall, and 14 lb N/a in removal of floricanes at pruning time in September. The remaining nitrogen in the plant overwintered in the above- or below-ground portion of the plant.

Based on our study, if pruning or removal of dead fruiting canes is done in mid-September, on average, 13 lb N/a are lost (assuming prunings are taken out of field). However, if pruning is done in mid-August, on average 25 lb N/a are lost in the prunings. Prunings left in the field would slowly recycle their N back into the system.

Data on soil nitrate and ammonium levels indicated that soil nitrate was available through mineralization in late summer, but this was not enough for plant needs. Thus, yield of the unfertilized plants declined over the two-year study. Higher rates of N fertilization led to levels of nitrate in the soil beyond plant needs; some of this may have been tied up in the organic matter fraction of the soil rather than leaching out of the root zone.

Our study showed that red raspberries require annual applications of fertilizer nitrogen to maintain growth and yield. Lower rates (40 to 50 lb N/a) than previously recommended here in Oregon would likely provide the best balance of improving efficiency of fertilizer uptake, providing for plant needs and reducing risk of nitrate leaching. Less nitrogen per acre is "lost" if growers delay pruning of dying floricanes until September rather than in August. (***Source**: The All Ontario Berry Grower, Volume #0.04, April 2003*)

Raspberry Anthracnose

Paul Pecknold, Purdue University

The most important spray you will apply this season for control of anthracnose on brambles is the delayed dormant spray of lime sulfur. DON'T FORGET IT! Liquid lime-sulfur at 20 gallons per acre should be applied when new leaves are exposed 1/4 to 3/4 inches; if you are late in your application and don't spray until a few leaves have unfolded, cut the rate to 10 gallons per acre. NOTE: There is greater risk of lime-sulfur burn, when applied at this later time. (***Source**: Facts for Fancy Fruit 03-01, March 27, 2003*)

Blueberries

Blueberry Facts that Affect Crop Management

Pam Fisher, Ontario Ministry of Agriculture and Food

Blueberries are adapted to low pH and nutrient-poor soils. They grow reasonably well at soil pH 4.0 - 5.2, but the optimum pH is 4.3 - 4.8 . Soils should be amended with sulphur before planting blueberries to reduce pH (see publication #360, Fruit Production Recommendations, page 100). Elemental sulphur reacts with the soil to form sulphuric acid, thus reducing soil pH. This is a slow reaction, taking a year or more. Iron sulphate is faster acting, but more expensive.

Blueberries are susceptible to iron deficiency (Figure 1). This nutrient becomes less available for uptake when soil pH increases. In fact, iron deficiency symptoms on blueberries are a good indication that pH is too high. Iron deficiency symptoms will disappear with foliar application of iron chelate sprays. However, soil pH should be reduced to correct the problem in the long term.

Figure 1: Iron chlorosis on highbush blueberry leaves. Reducing soil pH will prevent this problem. Foliar sprays of iron chelates provide short-term control.

Source: Michigan State University Extension
http://www.msue.msu.edu/vanburen/e-2011.htm

Blueberry roots do not have root hairs. They have a small surface area for nutrient absorption, and are relatively inefficient. They are very sensitive to waterlogging and to drying out. However, blueberry roots are associated with naturally occurring, very specialized fungi, called mycorhizae, which improve nutrient uptake.

There is little lateral translocation of water and nutrients within the plant. This means that irrigation should moisten entire root zone, not just a portion. Spread fertilizer

evenly on both sides of the bush.

Blueberries are picky eaters. Roots are sensitive to nitrate fertilizers and chlorides. Ammonium sources of N, such as ammonium sulphate or urea are preferred over nitrate forms. Avoid using muriate of potash (KCl) on blueberries. Choose sul-po-mag or potassium sulphate instead.

Blueberries respond to organic matter and mulch. These improve soil structure and buffer against drought stress. Research by Dale and Ricketson (Figure 2) confirms this in Ontario.

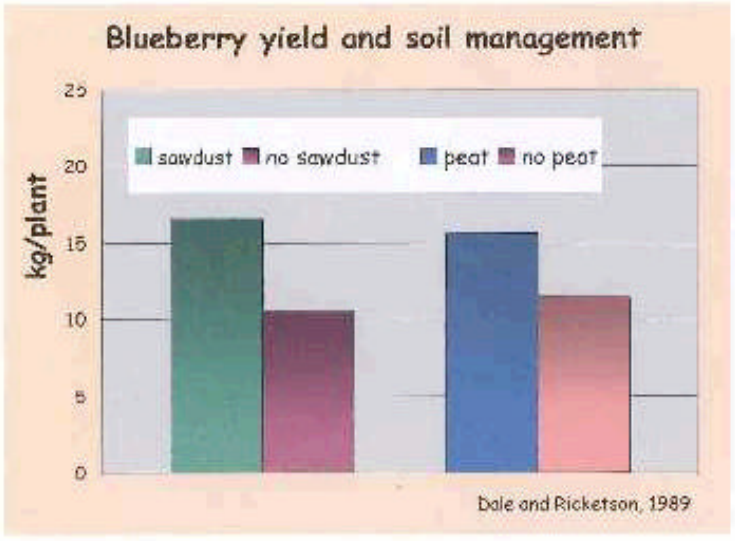

Figure 2: Blueberry yield (6 year total) increased when peat was incorporated at planting and when the planting was mulched with sawdust.

Blueberries do not take up nitrogen until leaf tissue is present. Early spring applications of nitrogen are not used by the plant. Nitrogen applications should be split 3 ways, coinciding with bud break, bloom and early July. Very little nitrogen is required in the early years of the planting. See Publication #360, page 101, for recommended N rates.

Use leaf analysis and plant growth to adjust N rates. Increased rates will be required if the planting is mulched

References on blueberry crop management:

Managing the Nutrition of Highbush Blueberries, Extension Bulletin E-2011 Eric Hanson and Jim Hancock

A Year in the Life of a Blueberry Bush, Mark Longstroth, District Horticultural and Marketing Agent, Michigan State University Extension

http://www.msue.msu.edu/vanburen/fbbgrow.htm

(***Source**: Soil Management and Irrigation studies with Highbush Blueberries, Dale, Cline and Ricketson, Acta Horticulture 241, 1989; by way of The All Ontario Berry Grower, Volume #0.04, April 2003*)

Grapes

Weed Control In Vineyards

Alice Wise and Andrew Senesac, Cornell University Cooperative Extension of Suffolk County, NY

Weed control in the 2 - 3 ft. swath under the trellis is one of the major challenges in vineyard management. There are no silver bullets but good judgement and good timing go a long way. Identifying weeds is important in determining a weed control strategy. Weeds of the Northeast, co-authored by CCE weed specialist Dr. Andy Senesac, is a great reference for weed ID. Order from Cornell University Press, phone 607-277-2211. On-line book vendors sell this; retail sellers should also be able to order copies.

Well established weeds provide competition for water and nutrients. Young vines or vines compromised by other stresses have a lower threshold for this competition vs. healthy older vines. In addition, tall weeds such as horseweed and goldenrod can contaminate mechanically harvested fruit. While this seems picky, it is a valid concern for wineries trying to optimize wine quality. While exact thresholds have not been established (difficult research to do given the variability in sites and management), it is safe to say that some weeds under the trellis in the latter part of the season do not constitute a crisis. It is not viticulturally necessary to maintain an absolutely pristine strip under the trellis, particularly later in the season.

Hand hoeing is useful but an impossibility for long-term weed control in a commercial vineyard. Mechanical weed control (with a weed badger, grape hoe or other cultivating implement) can be effective if done properly; however, timing is everything. Mechanical weeding becomes much more difficult with lignified, well-rooted weeds. Using a cultivating implement requires a skilled tractor driver to avoid vine trunk and root damage and trellis destruction (it has happened). Mechanical weeding long term may adversely

affect soil structure, soil erosion and soil microbial populations. Alternating cultivation with timely postemergent herbicides may be one way around that concern.

Herbicides are divided into two groups: those that prevent weed seed from germinating (emerging), known as preemergent materials, and those that are applied to existing weeds, known as postemergent materials. Preemergent materials have both advantages (long term control with a single application) and disadvantages (some materials may leach, some may adversely affect soil microbial populations). Postemergent materials generally provide a shorter period of control and thus may require more frequent application. They also may or may not affect soil microorganisms, depending on which reference material you believe. Generally, leaching into groundwater is not a major concern with postemergent materials.

While growers endeavor to reduce pesticide use, it remains financially and viticulturally difficult to totally eliminate the use of herbicides in Long Island vineyards. Advances have been made in terms of applicators, namely the controlled droplet applicator. This shielded sprayer uses low gallonage and a spinner type nozzle. A higher percentage of the material hits its target and off-target drift is reduced, both potentially allowing use of reduced rates of herbicide. One difficulty with the CDA sprayer is that dry formulations, certain viscous liquid formulations and materials requiring a high volume of water cannot be used successfully. Another application device uses an infrared sensor to turn on the sprayer only when a weed is sensed. This has seen limited use on Long Island and would be most successful (i.e. reduce total amount of herbicide used while providing good weed control) with postemergent materials used in vineyards with moderate to low weed populations.

If planning on using preemergent materials for both broadleaf and grass control, it is usually necessary to combine two materials. If weeds are existing in the vineyard, a postemergent material may also be included. Be aware that only Prowl, Devrinol and Surflan are labeled for non-bearing vineyards. For established vineyards, preemergent grass herbicides include Devrinol, Surflan and Karmex. Broadleaf herbicides for established vineyards include Princep, Goal and Karmex. Some points about each one follow. This is not a substitute for reading the label - read the label thoroughly for complete information.

- ⇒ **Devrinol**: Necessary to have 1/4" to 1" " of rain within 48 hours of application. Under warm summer conditions, significant loses can occur if water incorporation does not occur. In the cooler early spring, this is not so much of a concern.
- ⇒ **Surflan**: Although Surflan by DowAgrosciences not widely available, Oryzalin 4AS from farmsavers.com has a NYS registration. It is the same active and formulation as Surflan.
- ⇒ **Karmex**: Considered to be tricky on Long Island because of the high risk of damage on sandy soils. However on mature vines, the labeled rate for our soil types does provide good broadleaf weed control for most of the season.
- ⇒ **Goal**: Must go on before bud swell, can cause burning of foliage close to ground due to volatility and 'splash up' of treated soil onto green tissues.
- ⇒ **Princep**: Kills weeds by inhibiting photosynthesis after they emerge so it needs incorporation with rain though less time restricted vs. Devrinol.

Postemergent herbicides will be covered in a future newsletter. (***Source**: Long Island Fruit and Vegetable Update, No 4, April 4, 2003*)

Grape Flea Beetle

Bruce Bordelon, Purdue University

The Grape flea beetle can be a serious pest of grapes because they feed on developing buds after final pruning. Lost buds can relate to a direct loss of yield. Grapes will be in early swell to budbreak across the state over the next two weeks and these are the stages most likely to be damaged from flea beetles. Scout vineyards for these insects or their damage and control if more than 5% of the buds have been damaged. Damage appears as holes eaten into the sides of buds. The insects are small (1/8 inch long) and shiny green, blue or black in appearance. They crawl quickly along the canes and tend to drop to the ground if disturbed. Incidence often occurs in outer rows adjacent to fence rows or woods, making spot spraying an option. Scout the planting carefully and apply insecticides only if needed. Damage from flea beetles usually decreases as buds break and shoots become 1/2 inch or longer. Sevin will provide excellent control of this insect. Refer to the label or ID-169 for complete recommendations. (***Source**: Facts for Fancy Fruit 03-01, March 27, 2003*)

General Information

The Value of Manure

Anne Verhallen and Pam Fisher, Ontario Ministry of Agriculture and Food

Manure can be a valuable tool in berry crop production. It adds nutrients and micronutrients. Manure applications can increase or stablilze soil pH, increase organic matter content and improve soil structure. Indirectly, the addition of manure into a berry crop rotation can improve yields by improving soil moisture holding capacity, and soil structure.

There can be some down sides to manure application as well. Manure is sometimes considered a risk and a bother because of the hauling, the spreading, application timing and the question of when and how much nitrogen will be released. Applied improperly, manure can cause environmental contamination. Manure can be a source of pathogenic microbes, and if used too close to harvest, can increase food safety risks. Growers should follow best management practices for manure application to minimize these risks. Knowing the true value of a manure application can help you justify the extra management around making it work for you.

Manure adds nutrients and micronutrients: Nitrogen values vary greatly with the type of manure, the bedding used if any,

how it has been stored and handled and when it is applied. The following chart adapted from the Agronomy Guide, OMAF Publication 811, gives some sample values for solid manure. Keep in mind that manure will continue to release some nitrogen for several years.

Table 1. Average amounts of dry matter, nitrogen and available phosphorous and potassium. Adapted from Table 2-16, Agronomy Guide for field crops OMAF Pub 811

Manure type	% dry Matter	Total N	Ammonium N	Available P2O5	Available K2O	N- P2O5- K2O Value $/ton *
	Solid manure, kg/tonne (lb/ton)					
Beef	28	7.2	0.8	2.1	6.1	4.95
Dairy	20	5.7	1.3	1.5	4.8	4.15
Poultry, layers	20	11.5	6.3	4.7	4.6	11.20
Poultry, broilers	>50	30	3.8	12.4	15.9	22.65
Sheep	30	10.6	4.5	5.4	7.5	10.45
Horses	50	3.2	0.4	2.4	6.6	4.35

* approximate value based upon spring applied, immediately incorporated and on a N-P2O5- K2O value/lb of $0.40-0.35-0.17.
Source: OMAF NMAN 2001 software

In addition to N, P and K, manure can be a source of sulphur and micronutrients. Research indicates that micronutrient levels of 0.02 (Mn, Zn) to 0.005 (B) per cent of dry weight occur in some manures. This isn't a lot. For example, a 10 ton per acre application of solid beef manure has 28 % dry matter. This translates to about 1 lb. each of manganese and zinc and less than half a pound of boron. Plant availability of these micronutrients may vary.

Manure applications can have a liming effect. The manure can help to maintain or increase pH levels even when acid forming nitrogen fertilizers were used. An eleven-year project in Vermont involving manure application on continuous silage corn saw pH levels rise 0.2 and 0.3 pH units after annual applications of 10 ton/acre and 20 ton/acre dairy manure.

Manure adds organic matter. Manure applications as part of a berry crop rotation add organic matter to the soil. After years of intensive production many sandy loams have organic matter levels of less than 2 per cent. This increases the risk of herbicide injury and has other negative impacts. For example on a loamy sand a 0.5 per cent reduction in organic matter will result in a 15% reduction in nutrient holding ability and a 12 % reduction in water holding capacity (or 1 to 2 fewer days between irrigations). You can reasonably expect the reverse to happen if you can raise the organic matter level by 0.5%, although this will take time and a continued effort at soil building.

Manure improves yield: Research in the UK suggests that manure applications improved the water holding capacity of a sandy soil for potato production to an estimated yield improvement of 2.5 t/ha. Long term rotation work in Maine indicates that rotation with manure can improve yields by 20% under dry weather conditions. Yield gains were not due to additional nitrogen from the manure because the fertility program was adjusted for the manure application. The explanation for the yield increases is the soil structural changes, improvements in water intake and release and changes in the soil life that may have reduced the influence of disease organisms.

Best Management Practices for berry growers using manure:

⇒ Maximize the period between when manure is applied and when the crop is harvested. Incorporate manure into the soil before planting, and do not harvest berries in the same year that manure is applied.

⇒ Do not use manure for side-dressing.

⇒ If animal manure is stored on the farm, ensure that contamination from wind drift to adjacent crops or harvested produce cannot occur. Ensure there is no potential runoff into irrigation water sources.

Other best management practices for manure can be found in "Keeping Berries Safe, a Grower's Guide to Preventing food Borne Illness from Berries Crops" (call 1-877-424-1300 for a copy), and in the Best Management Practices

Publications at http://www.gov.on.ca/OMAFRA/english/environment/index.htm.

Using manure can be a valuable production practice for growers who have an available supply and follow best management practices for storage and application. (***Source**: The All Ontario Berry Grower, Volume #0.03, March 2003*)

Grants Awarded to Northeast Farmers

Helen Husher, University of Vermont

Fifty-two farmers in the Northeast were recently awarded $268,744 in grants under the Northeast Sustainable Agriculture Research and Education (SARE) Farmer/Grower program.

Awards ranged from $1,555 for a new marketing effort for local, additive-free pork in Maryland to $10,000 to see if certain delicate varieties of lettuce can be grown successfully in New York. The average grant was about $5,200. Projects are chosen for their relevance, innovative design, and potential impact on the sustainability of farms across the region.

Northeast SARE supports projects in sustainable agriculture for farmers, researchers, and educators, and is a program of the USDA. The region includes Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, West Virginia, and Washington, D.C. Details on each of the funded projects can be found at http://www.uvm.edu/~nesare/news_FNE02.html or by contacting Helen Husher at 802/656-0554 or 802/223-7923.

Spray Water Quality: A Debasing Exercise

Art Agnello, Cornell University

The first measurable snowfall of spring provides us a chance to slow down in our race to get the earliest of the early season sprays applied, and a good opportunity to review some useful advice about the effect of spray water pH on pesticide activity. To review, there may be times when you don't observe the results expected from a pesticide application, even though you used the correct concentration of the recommended material and applied it in the same way that has given acceptable control at other times.

Although one may suspect a bad batch of chemical or a buildup of pesticide resistance, poor results may in fact be due to alkalinity -- that is, a solution with a pH higher than 7.0. A close inspection of the pesticide label will often reveal a caution against mixing the chemical with alkaline materials such as lime or lime sulfur. The reason for this is that many pesticides, particularly insecticides, undergo a chemical reaction under alkaline conditions that destroys their effectiveness. This reaction is called alkaline hydrolysis, and it canoccur when the pesticide is mixed with alkaline water or other materials that cause a rise in the pH.

Hydrolysis is the splitting of a compound by water in the presence of ions. Water that is alkaline has a larger concentration of hydroxide (OH-) ions than water that is neutral; therefore, alkaline hydrolysis increases as the pH increases. Insecticides are generally more susceptible to alkaline hydrolysis than are fungicides and herbicides, and of these, organophosphates and carbamates are more susceptible than pyrethroids.

A survey of fruit-growing areas in N.Y. some years ago showed that water from as many as half of the sites in western N.Y. had pH values above 8.0. Water at this pH could cause problems for compounds that will break down in only slightly alkaline water, such as ethephon (Ethrel). Compounds that break down at a moderate rate at this pH, such as Carzol and Imidan, should be applied soon after mixing to minimize this process in the spray tank.

A smaller number of sites (less than a quarter of them) had pH levels greater than 8.5. Above this level, the rate of hydrolysis is rapid enough to cause breakdown of compounds such as Carzol and Imidan if there is any delay in spraying the tank once it is mixed. In a few sites having a pH above 9.0, compounds such as Guthion and malathion, which would not break down in most situations, may have problems. It is also important to note that in any one site, ground water pH can vary substantially (by nearly 2 pH units) during the season.

To prevent alkaline hydrolysis, you should:

Determine the pH of your spray solution; because of seasonal variability, this should be done more than once during the growing season. Measuring your spray water pH before mixing can be misleading, because the chemicals you use can raise or lower the pH of the overall spray solution. It makes more sense to take the time to run some bottle tests of your most-used spray materials after they have been mixed with your spray water. The most accurate method is by using an electronic pH meter; however, these are expensive and not very practical. Another, less accurate method uses dyes that change color in response to pH. These are available in the form of paper strips, or in solution for use in soil pH test kits.

In general, the indicator is mixed with or dipped into the water, and the resulting color is compared against a standard color chart.

To minimize loss of chemical effectiveness from hydrolytic breakdown in the tank, it is a good practice to make the application right after it is mixed (as quickly as allowed by the weather and other factors). If a delay occurs, a buffering agent may be added to the tank if the pH is high and the chemical you are using is susceptible to alkaline hydrolysis; these agents work by lowering the pH and resisting pH change outside of a certain range. A pH in the range of 4-6 is recommended for most pesticide sprays. Buffering agents are available from many distributors; some examples are: Buffer-X (Kalo, Inc.), Buffer P.S. (Helena), Spray-Aide (Miller), and LI 700 (Wilbur Ellis). Some sources for pH testing materials are (pH Indicator Paper): Ward's Natural Science Est., PO Box 1712, Rochester, NY 14603; VWR, PO Box 1050 Rochester, NY 14603; Fisher Scientific, PO Box 8740, Rochester, NY 14642; (Soil pH Test Kits): Agronomy Soil Test Lab, 804 Bradfield Hall, Cornell Univ., Ithaca, NY 14853.

Growers may add technical flake calcium chloride to the tank when spraying cultivars such as McIntosh, which is susceptible to storage disorders related to inadequate levels of fruit calcium. However, research done in Massachusetts indicates that, although calcium chloride does not itself affect pH, a contaminant present as a result of the manufacturing process does increase the pH of the solution; this could in turn encourage alkaline hydrolysis. There are a few pesticide materials that should not be acidified under any circumstances, owing to their phytotoxic nature at low pH. Sprays containing fixed copper fungicides (including Bordeaux mixture, copper oxide, basic copper sulfate, copper hydroxide, etc.) and lime or lime sulfur should not be acidified. But if the product label tells you to avoid alkaline materials, chances are that the spray mixture will benefit by adjusting the pH to 6.0 or lower.

For further information on water pH and pesticide effectiveness, refer to N.Y. Food & Life Sci. Bull. No. 118, "Preventing decomposition of agricultural chemicals by alkaline hydrolysis in the spray tank," by A. J. Seaman and H. Riedl, from which much of this information was adapted (available from Communications Services Bulletins, Jordan Hall, N.Y.S. Agric. Expt. Sta., Geneva, NY 14456; 315-787-2249, FAX: 315-787-2276). (***Source**: Scaffolds Fruit Journal, Volume 12, No. 3, March 31, 2003 by way of Ohio Fruit ICM News, Volume 7, Issue 12, April 3, 2003*)

Meetings

Apple Twilight Meetings for April (orchard tour followed by speaking program; 1.5 hrs. pesticide recertification credit offered; $10 fee):

April 15, 2003 from 5:30 – 7:30 Rice Fruit Farm, 757 Main Street, Wilbraham, Massachusetts

Directions: I-90 to Exit 7 (Ludlow) or 8 (Palmer). Route 20 east or west to North Wilbraham. South on Main Street through Wilbraham Center, approximately 2.5 miles, orchard store is on right. If these directions are not clear, call Wes Autio at 413-545-2963 or Jon Clements at 413-478-7219.

April 16, 2003 from 5:30 – 7:30: Carlson Orchards, 115 Oak Hill Road, Harvard, Massachusetts (www.carlsonorchards.com)

Directions: I-495 to Exit 28, Route 111 west 0.4 mile up hill and turn at first right, follow signs for 1.2 miles to orchard. If these directions are not clear, call Wes Autio at 413-545-2963 or Jon Clements at 413-478-7219.

April 17, 2003 from 5:30 – 7:30: Sylvia Farm, 2621 County Street (Rt. 138), Dighton, Massachusetts

Directions: Silvia Farm is approximately one mile north of the Dighton/Somerset town line on the east side of Rt. 138. Rt. 138 can be accessed either from Taunton or Fall River. If these directions are not clear, call Wes Autio at 413-545-2963, Jon Clements at 413-478-7219.

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.