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Berry Notes

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Strawberry

IN THIS ISSUE:

Fall Foliar Nitrogen Fertilization in Strawberries

Lori Bushway, Cornell University

Applying nutrients to the foliage is widely practiced in many fruit crop production systems. Nutrient foliar sprays have been proven effective in correcting deficiencies of micronutrients such as zinc. Macronutrients such as nitrogen applied to the tree fruits' foliage have received mixed reviews.

Foliar urea fertilization has been reported to have no measured benefit or increase in leaf nitrogen levels in peaches and grapes. However, foliar urea fertilization is practiced in apples and citrus where once urea is absorbed, the nitrogen derived from it has effectively increased nitrogen reserves and positively impacted yield.

In regard to berry crops, Cornell University researchers Laura Acuna-Maldonado and Marvin Pritts recent preliminary results indicate that foliar applications of urea can be of value in strawberry plantings. They found that foliar application of urea to strawberries in September of planting year:

- Increases nitrogen reserves
- Increases vegetative growth of strawberry plants the following spring
- Increases fruit yields the following June

These increases were reflected not only on nitrogen deficient strawberry plants but also in sufficient and high nitrogen strawberry plants. However, additional spring application of nitrogen did not improve growth or yield.

In strawberry plantings, fall foliar application of urea may be used to complement summer nitrogen applications and effectively increase future nitrogen reserves and productivity. (***Source**: New York Berry News, Vol. 3, No. 8, Sept. 21, 2004*)

Brambles

North American Bramble Growers Association Invitation

Sonia Schloemann, UMass Extension

The North American Bramble Growers Association (NABGA) invites you to the 2005 North American Berry Conference on February 16-19, 2005 in Nashville Tennessee. This combined conference of NABGA and the North American Strawberry Growers Association (NASGA) will feature full a full schedule of bramble-specific sessions, strawberry-specific sessions, and sessions of interest to growers of both fruits, along with an extensive trade show, a farm tour, a berry-product tasting, and lots of opportunities to learn and share with other growers.

What is NABGA? NABGA is a membership association of growers and professionals united in their interest in commercial bramble production and the advancement of the bramble industry. . Members include blackberry and raspberry growers both small and large, nursery operators, extension workers, processors, marketers, breeders, researchers, educators, and suppliers across the North America. NABGA's activities include a quarterly newsletter, funding of bramble-related research, this annual conference, regional events, and more—and we welcome your suggestions about what would best help you.

For more information: To be added to the mailing list to receive more information about the conference, as well as information about joining the Bramble Growers Association and a sample newsletter, send your name and address (and email) to nabga@mindspring.com or 1138 Rock Rest Road, Pittsboro, NC 27312. (***Source****: New York Berry News, New York Berry News, Vol. 3, No. 8, Sept. 21, 2004*)

Ontario Raspberry Update

Pam Fisher, Ontario Ministry of Agriculture and Food

Raspberries: A flea beetle has caused widespread injury raspberry leaves. Leaves have long, whitish or silvery holes (Figure 1, Figure 2) . In most cases plants will easily recover from the damage, and the flea beetles have moved on.

Figure 1: A flea beetle feeding on raspberry foliage.

Raspberry crown borer adults could be flying now. The

Figure 2: Leaves chewed by flea beetles have a silvery appearance.

adults emerge from damaged raspberry crowns and lay eggs on the underside of raspberry leaves. The adult crown borer is a clear-winged moth that looks a lot like a wasp (Figure 3). The attached photo was sent to me by Dr. Donn Johnson in Arkansas, who observed the adults resting on raspberry leaves between 11am and 1 pm, but not later in the afternoon. We are collecting samples of raspberry crown borer, in the larva or adult stage.

Fall bearing raspberry growers should promptly harvest all ripe fruit to prevent problems with sap beetles, wasps, and Botrytis grey mould.

Harvest fruit every two days and drop all damaged or mouldy fruit to the ground. The fungicides Elevate 50 WDG (1 day to harvest) can be used if necessary for Botrytis control. (***Source**: Ontario Berry Bulletin for September 17, 2004*)

Figure 3: Raspberry crown borer adult. Adults can be seen in August and September.

Blueberries

A Picture is Worth a Thousand Words, Part II: Blueberries

Cathy Heidenreich, Cornell University

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

Blueberry Diagnostic Tool
(http://www.hort.cornell.edu/department/faculty/pritts/BerryDoc/Berrydoc.htm)

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 blueberry fruit to be re-directed to the blueberry section that holds images of various blueberry diseases, pests and disorders, organized according to symptom appearance on various plant parts.

Blueberry Diseases in Michigan
(http://www.msue.msu.edu/vanburen/e-1731.htm)

This is an on-line Michigan State University Fruit IPM Extension Bulletin by 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.

Blueberry Pest Management: A Seasonal Overview
(http://ipm.ncsu.edu/small_fruit/blueipm.html)

This guide, an on-line North Carolina State University Bulletin by John Meyer and William Cline, includes both disease and pest descriptions. Images are linked within the body of the text describing each disease. The insect sections include both adult and juvenile stages as well as damage images.

Wild Blueberry Fact Sheets-Insects and Diseases
(http://www.nsac.ns.ca/wildblue/facts/insects.htm),
(http://www.nsac.ns.ca/wildblue/facts/disease.htm)

Provided by the Wild Blueberry Information Network, these fact sheets contain information and images of various insect pests or diseases of wild blueberries from the New Brunswick, Nova Scotia and Maine areas. (***Source**: New York Berry News, Vol. 3, No. 8, Sept. 21, 2004*)

Eliminate Troublesome Weeds in Blueberries in Late Summer and Fall

Eric Hanson, Michigan State University

Late summer and fall are good times to assess your weed control program and work on eliminating some troublesome perennial weeds. If you are not familiar with weed species, an excellent reference book is "Weeds of the Northeast," by Uva, Neal and DeTomaso (Cornell University Press).

First, walk the rows and note where annual weed control was inadequate. Identify the primary weeds and consider why your spring-applied pre-emergent herbicides may have failed. Did you choose the best materials and apply them at the right time and rate? If the primary annual weeds are late-season grasses such as crabgrass and fall panicum, consider using a stronger grass herbicide next spring, such as Sinbar, Solicam or Surflan. If one of these materials was used last spring with poor results, perhaps it was applied too early and lost strength by the time the grasses germinated in July. Identify the broadleaf weeds so you can choose the proper herbicides next spring. If marestail (conyza canadensis) is a problem, Sinbar is relatively effective. If pigweeds (amaranthus sp.) are widespread, Karmex and Princep may be good choices next spring.

Consider other reasons for poor annual weed control. Higher rates of pre-emergent herbicides are generally needed to control weeds on heavier soils higher in organic matter; consider increasing rates in these areas. If you are using off-center (OC) nozzles, herbicides may not be applied uniformly under the bushes. Note whether weeds grew in certain areas under the row that may indicate irregular spray pattern. In some cases, spray deposition may have been disrupted by old weed stalks and plant debris, causing poor control in some areas.

We have found populations of marestail and ladysthumb (polygonum persicaria) in Michigan blueberries that are resistant to triazine herbicides such as Princep. Triazine-resistant pigweed and lambsquarters have been found in other Michigan crops. These weeds will not respond to Princep and may by more tolerant of some other herbicides. If you suspect herbicide resistance, specimens can be tested at Michigan State University (contact your local Extension Office).

Late summer and fall are excellent times to control hard-to-kill perennial weeds that infest many plantings. Perennial weeds have underground parts that sustain them from year to year. When these weeds are treated with glyphosate in late summer or early fall, the herbicide moves into the below ground parts to kill the whole plant. If you sprayed brambles with glyphosate in June, you may have found that the canes are injured, but they grow back. Treatment in August or September can kill the entire plant. Of course, blueberry bushes are also perennials, so it is also easy to kill blueberries at this time of year. Be very careful to avoid coming in contact with blueberry leaves or green bark. Glyphosate can be absorbed directly by the green bark on one-year-old shoots. Some of the most troublesome perennials in Michigan blueberries and optimum times for glyphosate treatment are listed in the chart.

After harvest, walk the rows and carefully treat weeds with spot applications of glyphosate. Spray shields can be purchased or fabricated to control drift. Several glyphosate products are labeled for use on blueberries. Use two- to four- percent solutions for spot treating with a backpack sprayer, or 20% to 30% solutions for wiper applications. Addition of ammonium sulfate (one to two ounces per gallon) or a nonionic surfactants labeled for use with herbicides may improve penetration and control. Dyes that are registered for agricultural sprays may help show where spray droplets land. If weeds grow up into blueberry bushes, pull them down so they can be safely treated.

A particularly troublesome perennial is Virginia creeper, or five-leaved ivy. This woody vine covers the ground beneath bushes and grows up into to bushes. I have found that spot spraying one-foot swaths between bushes with glyphosate provides effective control. The herbicide is translocated beyond the treated areas and controls much of the vine in the bushes. Virginia creeper drops its leaves early in the fall, so treat vines before they develop fall color. Other vines, such as wild grape (vitis sp.), greenbriar and bindweed are best controlled by pulling portions out of the bush and treating them on the ground. Absorbed herbicide moves from the treated leaves into the rest of the plant. This technique also works for most tree seedlings such as sassafrass.

Walking rows and spot spraying perennial weeds takes time, but it should be a routine task when harvest is done. There is no better way to control many of these species. It is much easier to prevent them from becoming established than to clean up heavy infestations. (***Source***: *Blueberry Bulletin Vol. XX, Vol. 21)*

Specialist to Lead Mummy Berry Workshop Nov. 8, 2004

George Hamilton, University of New Hampshire Extension

Due to the increasing occurrence of blueberry mummy berry disease on farms in the region, growers may be interested in attending a workshop with a nationally-recognized expert in small fruit diseases. Dr. Annemiek Schilder is an Assistant Professor in the Department of Botany and Plant Pathology from Michigan State University. She has conducted extensive field research and trails on blueberry diseases. On November 8 at 6:00 p.m, she will present an overview of mummy berry disease management strategies and fungicide options to blueberry growers. The program is intended to train growers on disease development, disease monitoring, cultural and managerial practices to control the diseases along with proper pesticide use and timing of applications in order to reduce the disease occurrence. The meeting will take place at the 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. (***Source:*** *VERMONT VEGETABLE AND BERRY NEWS, October 1, 2004*)

Grapes

Recap of Grapes, Wine and Environment symposium: Part 1

Tony Wolf, Virginia Tech

Approximately 200 persons attended the "Grapes, Wine and Environment" symposium held in Roanoke Virginia, 14-16 July 2004. The symposium was held in conjunction with the 29th Annual Meeting of the American Society for Enology and Viticulture's Eastern Section (ASEV-ES). Speakers from Canada, USA, France and Australia headlined the three mornings of symposium, with morning sessions followed by technical presentations of the ASEV-ES. A goal of the symposium was to provide a conceptual and practical framework for matching sites and varieties and for adapting viticultural and enological practices to the constraints imposed by site soil and climatic constraints. We have, for Virginia (http://www.ext.vt.edu/pubs/viticulture/463-020/463-020.html), a reasonably good definition of site selection from the standpoint of crop production hazards (e.g., winter cold, spring frost, Pierce's Disease, etc.). We have not, however, fully explored the climatic and soil variables that contribute to grape and wine quality. I believe that significant advances in grape and wine quality for our region will be realized as attention is focused on better matching of varieties with soil and climate features. Fortunately, many of the vineyard site features that minimize biological and environmental hazards to vines and crop are consistent with the pursuit of increased grape and wine quality.

In this and subsequent Viticulture Notes I will review Symposium presentations. The symposium presentations are posted on the ASEV-ES web site (http://www.nysaes.cornell.edu/fst/asev/) in pdf format. I encourage you to browse these informative files, as my notes only touch on some of the points made by the Symposium speakers.

Zelma Long, of Zelphi Wine opened the symposium with a discussion of the climate indices that are routinely if not inadequately -- used to define a site's grape growing potential. Reviewed were the University of California system of "growing degree days", the Australian "mean temperature of the warmest month", the "latitude/temperature index" developed in New Zealand, and the "sum of average temperatures" used in Bordeaux. Zelma contends that more attention needs to be given to radiation (sunlight) and humidity, relationship of climate indices to vine development stage (phenology), and greater integration of key variables into predictive models. As an example, the "heat index" provided in weather reports, integrates both temperature and humidity to describe the relative degree of human discomfort to be expected on hot, humid days. Similar integrative indices should be explored to fully understand what the vine "feels"; or, more aptly, how the vine responds to the total climate.

Zelma thought that wines produced from grapes grown in humid areas should have "softer" phenolics than if the grapes were grown in more arid climates. She described a project wherein "Natural Terroir Units" were defined for 24 specific grape growing areas of South Africa. The work was done by Victoria Carey of the University of Stellenbosch. A Natural Terroir Unit is "an area with a relatively homogenous topography, climate, geology & soil". NTUs provide a rational basis for defining the environmental factors that affect wine quality and style.

Zelma focused attention on sunlight and heat effects on grape quality and reviewed work of Sara Spayd and others at Washington State University, who provided a good separation of light and temperature effects on Merlot fruit secondary metabolite formation. The underlying problem with these two variables is that sunlight, which is needed for optimal color and flavonol formation in berries, also tends to heat the berry. There is an optimal temperature range for the synthesis of these same compounds, above which the concentrations may be reduced. Spayd's study showed that higher temperatures, independent of sunlight, reduced anthocyanin content of fruit. Furthermore, sunlight, independent of heat, increases monomeric anthocyanins and flavonols. The results - which have applicability in our mid-Atlantic climate - are consistent with a generally accepted notion that all fruit clusters should receive some (or intermittent) sunlight during some portion of the day (the so-called "dappled sunlight" effect). An interesting sidebar to this discussion is the fact that sunlight levels measured in our eastern US grapevine canopies can be greater than light levels measured in a similar density canopy in Washington State. The difference is due to the presence of more diffuse, reflected light that occurs with hazy, humid conditions of the East.

Zelma provided additional suggestions for defining how soil temperature may affect vine phenology, giving an example from vineyards at different elevations in the Golan Heights region of Israel (maximum soil temperature was greater than air temperature during the period of interest in late-September). In conclusion, she reiterated the recommendation that vineyard managers and researchers start paying more attention to climate and soil variables that impinge on grape and wine quality, particularly, (1) solar radiation, (2) temperature [air and soil and day and night], (3) humidity [day and night], and moisture [soil and air]. The data could be useful to better understand the specific terroir we are growing grapes in and, integrated, can be used to predict phenological events and grape and wine quality.

Greg Jones of Southern Oregon University described the use of multivariate regression models to show how climate variables interact to produce a predictable outcome. Using trend analyses from historical (1950 2004) phenological data from Bordeaux, Greg showed that the time to principal phenological stages of bloom, veraison and harvest have all been decreasing, or becoming more condensed. Importantly, years in which bloom, veraison, or harvest were delayed, were associated with lowered overall wine quality. Put another way, the shortening of key phenological intervals tended to increase wine quality. The number of days where air temperature exceeded 30F between flowering and harvest tended to decrease harvest date, whereas rainfall during the same period tended to delay harvest. We've seen a similar relationship in the mid-Atlantic our hot, dry years typically result in generally (across a wide geographic area and among many varieties) superior wine quality.

Climate change? Greg Jones presented long-term data from Germany, France, and western USA that has shown a decrease in harvest date and, in the case of western USA, an increase in the total length of the frost-free growing season. The North Coast region of California, for example, currently averages a 37-day longer growing season than it experienced 50 years ago. Warmer growing seasons in the western USA have been largely driven by increased minimum temperatures (night-time lows are warmer). Modeling of temperature change in the western US points to an anticipated 3.0F increase in average growing season temperature for all regions between 2000 and 2050. Similarly, a series of figures depicted grape growing potential of Europe, based on the Huglin index (a heat summation index), and changes that have occurred since 1950, projected through 2050. Interestingly, a cooling pattern was apparent between 1950 and 1970, but the principal, established grape production regions have all been exhibiting increased warming since 1970 and are projected to become still warmer by 2050. Translation example: for a "cool climate" location such as Geisenheim Germany, long recognized for quality Riesling and Muller-Thurgau, production of Merlot and Cabernet Sauvignon might be commonplace by 2045.

Greg also presented a comprehensive analysis of temperature trends and predictions of 27 established grape growing regions throughout the world. Of these regions, 17 have significantly increased in growing season temperature (almost 2.5F) over the past 50 years. The trends in warming have been more significant in the northern hemisphere than in the southern hemisphere, with the northern Rhone Valley showing the most pronounced increase (over 7F in past 50 years).

The consequences of global warming for the mid-Atlantic wine industries were not specifically discussed; however, the ramifications can be surmised from Dr. Jones' discussion. Increased night-time (and dormant season) temperatures may increase certain biological threats, an issue that has been considered with Pierce's Disease (http://www.ext.vt.edu/pubs/viticulture/463-020/463-020.html). Relatively cool areas (western Virginia and Maryland, parts of West Virginia) may have increased potential for quality wine production, although the increased variability of temperatures will still pose a challenge to winter survival. By nature, most of us tend to think in the near-term - the next year or the next five years. But I'm certain that viticulture in Virginia (varietal choice and where grapes are grown) will look much different in 40 years compared to the landscape of today, and part of that change

will be driven by both growing season and dormant season warming patterns. As a sidebar, the September 2004 National Geographic contains an engaging but sobering feature article ("Global Warning") on the observed and predicted ramifications of global warming.

Phil Freese of WineGrow (Sonoma Co., CA) reviewed how viticultural practices affect wine mouth-feel, or textural qualities. Besides textural (e.g., suppleness) quality, mouth-feel comprises a tactile response, including our response to tannins, alcohol, polysaccharides, and other carbohydrates. While it sounds like a 'pat' statement, desirable mouth-feel, particularly of red wine, is only achieved with mature vines and fully ripe fruit. Phil's discussion principally focused on the viticultural means of achieving ripe fruit.

Sources and characteristics of tannins, including those from seeds, grape skins, stems and barrels were described. For example, polymerization of tannins ("methylated chickenwire") can be accelerated or otherwise modified to improve wine quality; vegetative tissue (stems) can be intentionally retained in the must or fastidiously removed depending on the desired product, and greater or lesser barrel exposure can be used to modify tannin attributes. All of these techniques and inputs impact the scale of "hard" to "soft" tannins.

Phil reviewed the vine management, varietal, and environmental (climate and soil) interactions that have a bearing on our goal of achieving ripe fruit; a conceptual model that remains a cornerstone of sound vineyard management. Implicit in that model is a balance between the vine's vegetative production and its reproductive (fruit) development. Commonly used vine balance indicators (e.g., leaf area to fruit ratio, cane pruning weight to fruit ratios, shoot density, canopy leaf layer number, etc.) were listed, as were their desirable values.

Allow me to digress here: Practitioners of good canopy management techniques would be quite familiar with these vine balance indicators or parameters. We recognize that the holy grail of "balance" can be a frustrating goal in humid environments such as Virginia, where soil moisture is often at a surplus. One of the take-home messages for me from Phil's (and many of the other Symposium) presentations is that we should explore more novel means of approaching vine balance. While past efforts have focused on remedial means of reducing excess vegetation (e.g., shoot hedging), and on canopy division to accommodate vigor, it is past-time to consider more radical approaches such as:

- seeking more "marginal" soils; soils that have less readily available water stores
- use of unconventional rootstocks that provide long-term size limitation
- use of physical root restriction materials
- significant reductions in row width to allow more rapid exploitation of soil moisture reserves
- use of under-trellis vegetation (for same reason)
- use of sub-soil drainage systems

Hurricanes such as Frances remind us that we have limitations in our ability to deprive vines of moisture in the mid-Atlantic, but if we can do a better job with vine balance, our odds of consistently harvesting high quality grapes will be significantly improved.

Phil's discussion continued with a description of how vine water status can be modified to intentionally affect vine balance. Again, water management is an admittedly more predictable tool in an arid environment than in a humid region. Effects of canopy density and fruit exposure on fruit composition were also reviewed.

The remainder of Phil's discussion provided a roadmap for achieving balance, and many of these methods have direct applicability. Phil stressed the need to achieve uniformity of grape ripening -- a narrowing of the bell-shaped ripeness curve of our berry population at harvest. He advocated first looking critically at the spatial differences of our sites such as soil variability from the top of a slope to the bottom. Site differences can impart substantial differences in canopy density, crop level, and crop ripening rates. At minimum, those differences should be recognized and accommodated by altering the harvest date to reflect spatial differences in rates of crop maturation. More proactively, we can attempt to reduce variability of crop ripeness by adjusting vineyard management practices across the known lines of vineyard variance. At minimum, differences in soil depth or drainage capacity can and should be evaluated and factored into row spacing, choice of rootstock, and choice of training for a given variety. Variation in crop ripening can be reduced by "green thinning" of fruit that is retarded in development, thinning of crop from weak shoots and, again, conducting sequential or multiple harvests to "block" crops into similar ripeness categories.

I would comment that many of our more progressive growers are using all of these techniques, including the last, which requires a skilled picking crew to discern differences in grape ripeness.

The review of the symposium presentations will be continued in the September-October Viticulture Notes. (***Source**: Virginia Viticulture Notes, 8 September 2004*)

Grape Fall Check-List

Sonia Schloemann, UMass Extension

- ☑ **General**: Harvest evaluations are underway for early varieties and sparkling wine. Check fruit for sugar, acidity and pH twice weekly to keep track of ripening.
- ☑ **Nutrition**: Apply only lime and non-nitrogen containing fertilizers at this time according to soil and petiole analysis done earlier in the year. Contact me for more information on petiole analysis.
- ☑ **Weeds**: As with other small fruit crops, now is a good time to do a weed survey and map the seed problems in your vineyard. This information will be very useful in tailoring your weed management plan so that it is effective and not wasteful. A late fall application of Casoron (dichlobenil) for preemergent control of broadleaf weeds next spring should be made only when temperatures are below 40°F, preferably just before rain or snow. Should only be used on well established vines.
- ☑ **Diseases**: Powdery and downey mildew and Botrytis bunch rot can be problems at this time. Generally berries are less susceptible to black rot this late in the season. Don't forget to control the mildews even after harvest, if there is a significant level of infection in the vineyard. Failure to control it now can effect overwintering and productivity next season.
- ☑ **Insects**: Now is the time to assess the effectiveness of Grape Berry Moth management practices used this year. Evaluate each block for low, medium, or high levels of infestation this year, taking note of hot-spots within blocks. This will be the first step in your risk assessment protocol for next year.

General Information

Overview of Small Fruit Diseases During the 2004 Growing Season

Annemiek Schilder, Michigan State University

The 2004 season was challenging for small fruit growers, as frequent precipitation and relatively cool weather promoted many fungal diseases, especially those that rely on rain for spore dispersal and infection. At the same time, the inclement weather did not allow growers to apply fungicide sprays at the optimal time and also led to washing off of fungicides that were applied. Together, these factors made for a big challenge for fruit growers.

Blueberries

Snow cover over the winter provided an ideal habitat for overwintering mummy berries, with sufficient moisture for a relatively high proportion of mummies to germinate in the spring. Despite high inoculum pressure, mummy berry infections were not as severe as expected at several high-inoculum sites in the Grand Junction area, while serious outbreaks were reported in Ottawa County. It is possible that with the excess of rain in the spring, some mummies in the wettest sites in effect drowned or were more quickly killed by bacteria and other natural parasites.

Anthracnose was the predominant fruit rot at most sites and was moderate to severe in unsprayed plots and sites. Alternaria, Botrytis, and Phomopsis were also found affecting fruit in post-harvest rot tests.

Phomopsis continued to be a problem in many older fields, with flagging of canes recurring mid-season. Flagging and cane death is typically caused by girdling of stems by infections from the previous year or even the year before that, so they are not indicative of new infections. Some twig blight occurred this season, but did not appear to be rampant. While Bluecrop is considered somewhat resistant to Phomopsis, young green stems appear to be quite susceptible. In some fields, many of the green stems were infected. This resulted in a slow decline of the bushes, since many of the stems never made it past one or two years of age, and emphasizes the need to prune out diseased green canes and protect current-season growth from infection.

Virus and virus-like symptoms were more obvious in some bushes this year, which is typical in cool years.

Grapes

Due to the cool, wet spring and early summer, Phomopsis and black rot were particularly prevalent on leaves and clusters this year. Both the Phomopsis and black rot fungi need rain/wetness for dispersal and infection, so this season was very conducive to disease development. Incidence and severity tended to be higher in hedged vineyards than in manually pruned vineyards. This is attributed to the large amount of overwintered inoculum retained on the vines in this system. Dense foliage in some vineyards also likely increased disease incidence by creating a humid environment conducive to disease and shielding the clusters from fungicide applications.

Downy mildew on fruit clusters and leaves of wine and table grapes showed up early and were moderate to severe in vineyards with limited spray programs. Regular rain

events in the spring and early summer encouraged infection. Downy mildew also got an earlier start in many 'Niagara' vineyards than in recent years. Most growers did apply fungicides for downy mildew. Some growers that had missed the opportunity to apply Ridomil because of the long PHI, were still able to apply it when the PHI of Ridomil Copper was adjusted from 66 to 42 days.

Powdery mildew showed up relatively late in most vineyards, and no cases of berry infection were reported in' Concords.' Some rachis and berry infections were noted in wine grapes, but were not as severe as in prior years. Powdery mildew on 'Concord' leaves was late enough to be of little consequence. The reason for the low powdery mildew pressure is most likely weather-related. Powdery mildew prefers warm, humid weather, while frequent rains may actually lower disease incidence by washing powdery mildew spores off the leaves and causing bursting of spores in water droplets. While the humidity may have been adequate, the relatively cool temperatures during spring and summer were not conducive to powdery mildew development.

This has been a relatively favorable year for Botrytis bunch rot so far, especially in southwest Michigan. Frequent rains promote this disease. Any wounds created by insects or cracking of berries in tight bunches can encourage Botrytis development. Tight-clustered cultivars also provide a moist environment for infection and sporulation, which further spreads the disease. Botrytis bunch rot can be distinguished from sour bunch rot by the presence of grayish brown spore masses at the stem end or along wounds in the berries, and the absence of the vinegary odor associated with sour bunch rot.

A relatively rare disease of grapes in Michigan, anthracnose, caused by the fungus Elsinoe ampelina, was again observed at multiple sites and tended to be more severe this year than last year. The fungus primarily attacks table grapes, but can also infect 'Niagara,' 'Concord,' and wine grapes. Symptoms on the shoots somewhat resemble those of Phomopsis, but are typically more sunken with raised edges. On leaves, the center of older lesions drops out, giving the lesions a "shot hole" appearance. Lesions on green berries are reddish brown or grayish with darker margins, and do not expand much upon ripening. This disease is favored by cool, rainy springs, which probably explains its increased severity this year. The fungus overwinters in infected canes, which can appear heavily damaged with crater-like indentations. Be on the lookout for this disease while pruning this winter and make sure to prune out infected canes.

Strawberries and brambles

Cool, wet conditions favored foliar diseases (and cane diseases in brambles) and particularly Botrytis gray mold on the fruit. Several growers in Michigan and Ohio reported they were happy with the control that the fungicides Switch and Elevate provided against gray mold. One grower said that if it weren't for these fungicides, he would have stopped harvesting raspberries altogether because of the high gray mold pressure.

In strawberries, a puzzling leaf symptom showed up in late spring in several sites in northwest and mid-Michigan. The leaves were pale green, stunted, and curled, with reddish spots and streaks along the veins. Some cultivars were more susceptible than others, but typically the entire field would be affected. The same symptoms occurred on a new planting in late summer in the northwest region, which rules out the theory of a spring frost that affected leaves at an early stage of development. Herbicide injury was also ruled out, which leaves a (micro) nutrient deficiency as a likely cause. A deficiency is certainly plausible in a year with this much precipitation, especially on sandy sites. In addition, cool weather may have slowed uptake of needed nutrients. A virus- or other disease seems unlikely, because the distribution of the disease in the field was too uniform. The chance that all plants become suddenly and simultaneously infected with a virus without seeing symptoms during previous years is virtually nil.

The wet conditions also brought Phytophthora root rot to the forefront this year. Several cases were confirmed in Michigan raspberries by MSU Diagnostic Services, which now has a new, rapid technique to detect the fungus in infected root tissues. This disease primarily occurs on poorly drained sites and heavy soils, and manifests itself by canes wilting and collapsing in the middle of summer. A severe case of red stele in strawberries (also caused by Phytophthora) was also confirmed on a heavy soil site in west Michigan. Plants in a large portion of the field, particularly in the lower-lying areas, were collapsing rapidly in June. However, recovery of the plants was seen after an application of Ridomil, a very effective material against Phytophthora. (***Source**: Michigan Fruit Crop Advisory Team Alert, Vol. 19, No. 3, September 21, 2004*)

Food Safety and Produce

Betsy Bihn, Cornell University

A recent survey of New York growers highlighted some very important things about food safety. First, many growers are still not aware of what good agricultural practices are. As the National GAPs Program defines them, good agricultural practices (GAPs) are any operational or management practices that reduce microbial hazards to fresh fruits and vegetables during growing, harvesting, sorting, packing, storing, and transportation.

That is a very broad definition. It may be easier to ask yourself, "What am I doing, specifically, to reduce microbial risks on my farm?" Perhaps you have recently purchased portable field toilets or have installed a drip irrigation system because you were concerned about the microbiological quality of your water. The important things are that you realize produce food safety is something that you should be thinking about and GAPs are how you reduce microbial risks on the farm and in the packinghouse. As this goes on-line, it is the middle of September. As fall and winter approach it is a great time to start thinking about reviewing your farm practices and developing a farm food safety program.

Where to Begin-If the concepts of produce food safety and GAPs are new to you, consider contacting the National GAPs Program at Cornell University to receive a complimentary copy of *Food Safety Begins on the Farm: A Growers' Guide*. This 28-page booklet is a good introduction to produce food safety and can be viewed at www.gaps.cornell.edu if you would like to see it before requesting it.

If you know about produce food safety and GAPs, but are having a hard time getting motivated to start the process, perhaps the best place to start is to ask yourself this one question. **What is the most microbiologically risky part of my operation?** Are you concerned about the quality of your irrigation water or when you apply manure or that you have seen workers using the field for urination and defecation? You know your operation better than anyone and this knowledge is the key to reducing microbial risks.

If you are still having trouble getting started, consider purchasing *A Grower Self Assessment of Food Safety Risks*. This spiral bound document covers most aspects of growing, harvesting, sorting, packing, and transporting produce and allows you the flexibility to only review the sections that pertain to your operation. It is available at the GAPs website listed above and is a step-by-step evaluation of the farm and packinghouse.

Future Discussions-The next topic to be discussed will be worker training. The same survey that revealed growers do not know what GAPs are also revealed that less than half of the growers have a worker training program. The importance of worker training and how to get a program started will be addressed in the next produce food safety article.

One Last Thing-The key to produce food safety on the farm is grower commitment. Most obstacles can be over come if the desire and commitment to do so is there. The National GAPs Program is here to assist growers with implementing GAPs and if you have questions or problems, please contact us at http://www.gaps.cornell.edu/ or 315 787 2625. (***Source**: New York Berry News, Vol. 3, No. 8, Sept. 21, 2004)*

Sell Value - Not Price

Bob Weybright, Cornell University

Given the current "market winners" in the selling world, one would think that price is the primary reason people buy a product or service. Some evidence of this would be the phenomenal growth of such chains as Wal-Mart, Home Depot, Dollar Store, etc. To be able to sell at the lowest price, these chains are continually pushing, if not demanding, that their suppliers give them lower prices as well. Under this situation, one might conclude that selling at the lowest price is required to be successful in today's market. I would argue that unless you are without a doubt the lowest cost provider or producer, you cannot and should not sell merely based on price. This then raises the question of how can one expect to survive in today's environment if an increasing number of potential market outlets for our products and services are squeezing to get the lowest price possible? The premise of my argument is that all organizations and people will buy, and continue to buy, if they believe that value has been received as a result of the transaction. What this means is that in addition to price, there are other benefits, both tangible and intangible, which must be present in order for a buyer, whether a corporation or an individual, to feel they have received value. The purchase must contain an appropriate level of total benefits to satisfy the needs that drove the purchase in the first place.

Value-added marketing-To illustrate the concept, let's apply the concept to a simple, real life situation. Let's look at two different types of coolers widely used in the summer. When identifying what value is being delivered in a cooler, the obvious one is that it keeps food and drink cold when used as directed with ice or ice packs. More subtle is the unique and/or specialized value being delivered by the respective coolers beyond initial

purchase price. It is this deeper value that is a key element to identify and incorporate into the selling and pricing decision. For example, a widely available low-cost foam cooler does not cost much more than a couple of dollars, and buyers usually only expect them to last one, maybe two uses before they are ready for the trash can. A unique value is that when there is high risk of losing or damaging a cooler, a relatively low-cost cooler that is expected to be thrown away very soon will provide adequate value for the money spent. For basis of comparison, one could state that a $2 foam cooler used once and then thrown away would result in a $2 per use transaction fee. Now consider a high-end Coleman cooler with metal housing at a price range of $80-90. Who would ever buy an expensive cooler like that? This type of cooler has a much longer life expectancy. In fact, I have had one in use for over 19 years, with perhaps 45 uses total (a conservative 2.4 uses per year). This particular cooler has a per use transaction cost of approximately $1.66, based on a purchase price of $75 in 1985. Even at today's cost of $90, it would match the per use transaction cost of the lower cost foam cooler at $2. If one believes that low price is the only basis upon which buying decisions are made, it could be stated that I would not or should not ever consider using the foam cooler with it's per use transaction premium of more than 30 cents. So what does this comparison exercise tell us, since both types are widely sold today?

To sell simply by price, one would first need to define low price because, as in this example, it could be initial cost or per use transaction cost. An interesting paradigm is that while the foam cooler has a lower initial cost, it's per use cost ends up being higher than that of the metal-clad Coleman. To make the comparison even more interesting is the fact that the Coleman cooler with its lower transaction cost also keeps items colder for a longer period of time because of its superior insulation and construction. So, based on per use price and basic function, one could question why anyone would buy the lower-cost foam cooler. What becomes evident in this example is that there are different aspects of non-financial attributes that contribute to the value proposition for a particular product. Therefore, selling based on price alone would be a flawed tactic.

Other examples-While this is a simple example; there is evidence throughout the country that demonstrates this concept. Brands such as Rolls Royce, Jaguar, Lincoln, Ford, and Hyundai all demonstrate the ability to satisfy a broad range of value propositions in the transportation industry.

More relevant might be an example from the food industry's coffee category. Folgers, Maxwell House and Hills Brothers are working hard to maintain their sales, yet companies like Starbucks and Green Mountain Coffee are growing their sales leaps and bounds. The value being sold and delivered by Starbucks and Green Mountain Coffee, in addition to a quality coffee, is pampering in a complex and difficult world, cult membership, mental links to a scenic location (Vermont), and images of vacation and relaxing fun times. While the other national brands have a price advantage, their value is not equivalent to that of the newer premium brands in the eyes of the consumer.

While this might be a simplified example, the bigger question remains: How can I compete in today's environment? Simply stated, it means that one must look carefully at their product and service. Marketers need to assess the competitive climate in the region, country, and world to determine how it might affect the value of what they have to offer; learn to identify what the purchaser needs to see or experience that supports their sense of value while satisfying the needs that drove the purchase initially; and finally, apply what is learned when making a decision as to where products or services are to be sold, who (in the case of large organizations or commodity products) to sell to, and at what price.

Changing your value proposition and pricing-The key to success is that price and value must be a conscious decision on the part of the company. Wherever the price and value position is for your product or service in the market right now, it can be changed. An example of a large company working to move its products up the price and value scale is Subaru. They are actively and carefully working to change the value proposition of the brand. The Subaru Company has accepted that they will most likely alienate some of their existing customers, in fact losing them to competitors, but still believes the changes in value proposition and price is where they want the company to be to maximize its sales and viability. Is this concept easy to state on paper? Most certainly yes. Is this concept easy to implement? Most certainly not. It takes time and practice to develop an accurate picture of the value proposition. It is, however, a concept that can be worked on and applied over time to slowly improve the selling price and business position.

While the examples I have cited are not specifically from the food or agriculture sectors, they can be learned from. Sales, buyers, and customers share common attitudes across all aspects of business sectors. Looking to other industries to learn from their success and mistakes can shorten the learning curve and help us to improve our business practices in a shorter time period.

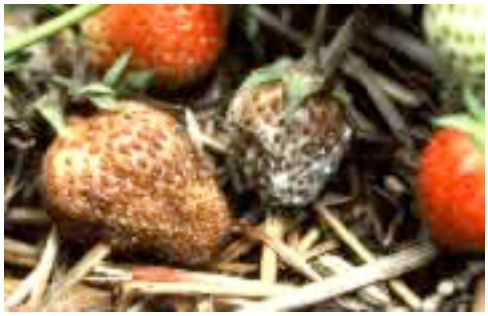
(Reprinted from: Smart Marketing, August 2004. **"Smart Marketing**" is a monthly marketing newsletter written by faculty members in the Department of Applied Economics and Management at Cornell University.)

(***Source**: New York Berry News, Vol. 3, No. 8, Sept. 21, 2004*)

Phytophthora Root Disease Management in Berry Crops Begins in the Fall

(Adapted from Michael Celetti, Plant Pathologist, Horticultural Crops/Ontario Ministry of Agriculture and Food, and 2004 Midwest Commercial Small Fruit and Grape Spray Guide)

The wet and cool conditions experienced earlier this year were ideal for infection and development of Phytophthora spp. root diseases in berry crops. Red stele of strawberries and Phytophthora root rot of raspberries are two diseases that thrive in cool, wet soils.



Strawberries infected with Phytophthora cactorum. Photo credit: Jim Travis, PennState University

Phytophthora spp. are sometimes referred to as water molds; however, they are not classified in the Moldfamily. They survive as resistant oospores (persistent sexual resting spores) in soil for long periods or as mycelium (mold) in recently infected plant debris. During favorable conditions, the mycelium and oospores germinate to produce a structure called a sporangium. Under moist but not wet conditions, roots can become infected if they come in contact with the sporangium. However, when soils become saturated for a sustained period of time (30 minutes to 6 hours), the sporangium produce and release many zoospores with tails that swim toward and infect the root tips of berry plants. This is why plants growing in heavy, wet, poorly-drained soils are at increased risk of becoming infected by Phytophthora spp.

Berry plants infected with Phytophthora spp. frequently appear stunted during the second or third year of growth. They wilt very quickly under hot weather conditions because the root systems have been compromised by the disease. Symptoms are first noticed in low areas of a field or row where water accumulates for extended periods after irrigation or a heavy rain. Eventually the disease moves along the row from the initially infected plants.

It is relatively easy to diagnose red stele (*Phytophthora fragariae*) in strawberries by digging up the roots of infected strawberry plants and slicing them longitudinally. The vascular tissue (sometimes called the stele) of infected roots will appear blood red surrounded by white cortex tissue hence the name red stele.

The secondary roots are often pruned significantly by the root pathogen, giving the root system a rat tailappearance. Healthy roots should appear white throughout, whereas other root diseases such as black root rot or Verticillium wilt will not cause the blood red core.

Raspberry plants infected with Phytophthora root rot may be a little more difficult to diagnose. Infected plants produce few primocanes. The few floricanes and primocanes that are produced often appear wilted with leaves looking scorched along the margins and between veins. Eventually the leaves turn completely yellow as the disease progresses over the seasons. Scraping the epidermis of infected raspberry roots will reveal a reddish-brown tissue with a distinct margin where diseased tissue meets the healthy white tissue. This reddish-brown tissue may also extend into the crown. For confirmation of the disease, suspected diseased plants should be sent to a pest diagnostic lab.

Managing root disease caused by Phytophthora requires an integrated approach including good site selection, growing resistant or tolerant cultivars, planting in raised beds, planting disease free nursery stock or transplants, and applying a registered fungicide when necessary. Ridomil Gold EC is labeled for control of Phytophthora root rot on raspberries. The label reads as follows: Apply 1/4 pt. per 1000 linear feet of row to the soil surface in a three-foot band over the row. Make one application in the spring and another in the fall, after harvest. Use the formula in the General Information section of this label to calculate the amount of Ridomil Gold EC needed per acre. Note: Do not apply Ridomil within 45 days before harvest or illegal residues may result. See the label for more detailed information.

Above-ground symptoms of Phytophthora root rot on a red raspberry primocane.

Aliette 80 WDG is registered for control of Phytophthora root rot on caneberries (raspberry and blackberry). The label recommendation reads as follows: Begin foliar sprays (5 lb./acre) in the spring after bud break (1-3 inches new growth) and continue spraying on a 45-60 day schedule, up to a maximum of four (4) sprays during the growing season. Do not apply Aliette within 60 days of harvest.

Phosphorous acid (Agri-Fos) is registered for control of root rot on brambles. It has essentially the same active ingredient as Aliette. See label.

For Phytophthora management in strawberries, Ridomil is labeled for control of red stele (caused by Phytophthora fragariae) and leather rot (caused by Phytophthora cactorum). The label for perennial strawberries reads as follows: Established Plantings: Apply Ridomil Gold EC at 1 pt. per treated acre in sufficient water to move the fungicide into the root zone of the plants. Make one application in the spring after the ground thaws and before first bloom. A second application may be applied after harvest in the fall. For supplemental control of leather rot, an application may be made during the growing season at fruit set. Use sufficient water to move the Ridomil into the root zone. For banded applications, a 12-inch band is recommended. Use the formula in the General Information section of this label to determine the amount of Ridomil needed per acre. Note: To avoid possible illegal residues, do not use more than a total of 1 1/2 qt. Ridomil Gold EC per acre on strawberries per year.

Aliette is labeled for control of red stele and leather rot. For red stele it is labeled for use as a dip (before planting) or as a foliar spray. Dip: Use 2.5 lb. per 100 gallons of water. Apply as a pre-plant dip to strawberry roots and crowns for 15-30 minutes. Plant within 24 hours after dipping. Foliar: Apply 2.5 to 5 lb./A. Apply as a foliar spray in the spring when plants start active growth. If disease conditions persist or reoccur, make additional applications at 30- to 60-day intervals.

For leather rot, apply 2.5 to 5 lb./A. Apply as a foliar spray between 10% bloom and early fruit set, and continue on a 7-14 day interval as long as conditions are favorable for disease development. Applications can be made the same day as harvest (PHI=0 days). Do not exceed 30 lb. product per acre per season.

Phosphorous acid (Agri-Fos) is labeled for control of red stele and leather rot on strawberries. This material has essentially the same active ingredient as Aliette, and the use recommendations for red stele and leather rot are very similar to those of Aliette; however, Aliette is a wettable powder and Agri-Fos is a liquid. Refer to the 2004 Midwest Commercial Small Fruit and Grape Spray Guide for spray recommendations.

For red stele, first treatment is made during spring growth flush, and treatment is repeated at 1 to 2 month intervals as needed. Several phosphorous acid fungicides are currently being registered for use on several crops in the U.S. and others will probably be registered for use on strawberry.

Although both Aliette WDG (Fosetyl-Al) and Ridomil Gold 480 EC (metalaxyl-M) are effective against root diseases caused by Phyphthora spp., they are very different in the way they control these pathogenic fungi and the way they move in plants. Ridomil was originally targeted to protect crops from foliar diseases; however, it is now widely used for controlling many soil borne diseases as well. Ridomil acts on susceptible fungi by inhibiting RNA synthesis. The end result is that Ridomil interferes with the development and germination of Phytophthora spp.

Ridomil is very soluble in water and moves systemically up from roots to stems and then leaves with the transpiration stream of plants. There is very little movement in the opposite direction in plants, and therefore it is important to apply this fungicide as a soil drench for best results against Phytophthora root diseases. Fall is the time to apply Ridomil to control red stele in strawberries and Phytophtora root rot in raspberries. For best control of red stele in strawberries, Ridomil 480 EC should be applied during early September and again at the end of October before freeze up.

Aliette WDG, on the other hand, is one of the first fungicides developed that can move both up and down in plants. On berries Aliette is only registered for foliar applications. Once inside the plant, the active ingredient is broken down rapidly into phosphorous acid, which is extremely soluble in water and toxic to many Phytophthora species. Aliette works in two ways. It acts directly on the invading fungus to stop its growth and sporulation. It also acts indirectly by stimulating the plant to activate its own defense system, thus helping preventing future infections from taking place. Plants that have their defense system already activated prior to invasion by a pathogen can defend much more effectively than plants that do not have their defense system pre-activated.

If making applications of Aliette in the fall, be sure the last application is made at least 30 days prior to leaf drop to allow the product to convert to the active phosphorous acid and move to the roots. In the spring, be sure to apply Aliette within 60 days of harvest. A maximum of four applications per season, 2 in the spring and 2 in the fall are allowed.

Regardless of the way these two effective fungicides work, they should never be used exclusively to control either red stele in strawberries or Phytophthora root rot in raspberries. Ridomil and Aliette should be alternated and included as part of an integrated disease management system to reduce the potential of resistance developing. As with any pesticide, always read and follow the product label carefully prior to use. (***Source**: Ohio Fruit ICM News, Volume 8, Issue 35, September 30, 2004*).

Upcoming Meetings

October 10, 2004 Potential of Old and New Fruit Crops. New Paltz NY (Ulster County). Lee Reich, grower, researcher, and author of six books on gardening and fruit growing, will lead a tour of his home orchard and discuss the commercial potential of the unusual and up-and-coming fruits he is studying.
Please contact the Regional Farm & Food Project at (518) 271-0744 or farmfood@capital.net (Subject: Farm Tours) for more details or to reserve your place.

October 12, 2004 - UMass Extension Vegetable Twilight Meeting 'Seeds of Solidarity'- Orange, MA Sustainable Production Methods, Farm Energy Saving, Farm to School Program Speakers
For more information and directions contact Ruth Hazzard 413-545-3696, rhazzard@umext.umass.edu

Oct. 18-20, 2004 - New England Greenhouse Conference Centrum Centre, Arena and Convention Complex, Worcester, Mass. (802) 655-7769
For more information: www.uvm.edu/~pass/greenhouse/negc.html

October 20 and 21, 2004, Setting the Table: Tools and techniques for a sustainable food system - The 2004 Northeast SARE conference will be held in Burlington, Vermont on October 20 and 21, 2004, with a thematic emphasis on regional food systems. There will be workshops on marketing, ecological production, policy and planning, learning from farmers, and sessions on communications in the agricultural community. A farm tour will precede the conference on October 19. Tours will cover sustainable horticulture, grass-based dairying, small ruminant farmstead cheese, commercial composting, and maple sugaring. **For more information, visit** http://www.uvm.edu/~nesare/conf.html

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

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