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Berry Notes

Prepared by the University of Massachusetts Fruit Team

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CROP NOTES:

Strawberries: Drought conditions are the dominant concern for both June bearing and Day Neutral varieties this fall. Where possible, irrigating to keep the plants healthy is critically important. June bearing varieties set next year's flower buds at this time of year. A nitrogen application now can help plants store energy in crowns and set fruit buds. See more on this in the Strawberry section. Some leaf diseases and insect problems can linger and cleaning them up now will help plants enter dormancy in a healthy state. Also scout fields for weed problems that can be addressed in the fall. **Brambles:** Raspberry/Blackberry plantings will also need drought relief where possible. Drip irrigation can effectively deliver minimally adequate water when run for 4 hours twice a week until significant rainfall occurs. No fertilizer should be applied at this time. Floricanes should be removed from summer fruiting types. Monitor for two-spotted spider mite and control if necessary. Fall raspberries are still in production but are winding down. Spotted Wing Drosophila (SWD) populations are high now in many and require sustained control through frequent and thorough harvest, sanitation and weekly spraying of recommended materials. See [UMass Extension Fruitadvisor SWD page](#) for more details. Be sure to rotate materials and make sure to adhere to label restrictions when only a limited number of applications is allowed. Botrytis fruit rot infections are a concern where there is a lot of carryover inoculum as days shorten and evening dew periods lengthen or if wet weather returns. See [New England Small Fruit Guide](#) for recommended materials and rates. **Blueberries:** Drought conditions are particularly hard on blueberries because of their shallow root systems. Irrigation (through drip lines) and mulching are recommended where possible. Only non-nitrogen fertilizer applications should be made this late in the season if leaf tissue tests indicate deficiency. Scout fields for weeds to prepare for late season management strategies. **Grapes:** Harvest is complete for many table grape varieties and for some wine grapes, too. Mature grape vines can withstand drought conditions fairly well because of deep root systems. However, young vines will need water in order to enter dormancy in good condition. See more in the Grape section about late season disease and insect concerns. Fall is an important time to assess weed issues and take some corrective action.

ENVIRONMENTAL DATA

The following growing-degree-day (GDD) and precipitation data was collected for an approximately two week period, August 25 through September 7. Soil temperatures and phenological indicators were observed on or about September 7. Total accumulated growing degree days (GDD) represent the heating units above a 50° F baseline temperature collected via our instruments for the 2016 calendar year. This information is intended for use as a guide for monitoring the developmental stages of pests in your location and planning management strategies accordingly.

| Region/Location | GDD | | Soil Temp (°F at 4" depth) | | Precipitation (in inches) | Time/Date of Readings |
|-----------------|-------------|------------|-------------------------------|-------|------------------------------|--------------------------|
| | 2-Week Gain | 2016 Total | Sun | Shade | 2-Week Gain | |
| Cape Cod | 318 | 2,377 | 78 | 70 | 0.85" | 6:45 PM 9/7 |
| Southeast | 265 | 2,229 | 77 | 70 | 0.62" | 5:30 PM 9/7 |
| North Shore | -- | 2,323 | 66 | 64 | 0.26" | 9:00 AM 9/7 |
| East | 289 | 2,576 | 73 | 69 | 0.39" | 4:30 PM 9/7 |
| Metro West | 254 | 2,354 | 68 | 65 | 0.18" | 6:00 AM 9/7 |
| Central | -- | -- | -- | -- | -- | -- |
| Pioneer Valley | 296 | 2,504 | 71 | 69 | 0.09" | 10:00 AM 9/7 |
| Berkshires | 252 | 2,139 | 70 | 68 | 0.03" | 11:00 AM 9/7 |
| AVERAGE | 231 | 2,357 | 72 | 68 | 0.35" | |

n/a = information not available

(Source: UMass Landscape Message #20, Sept. 9, 2016)

STRAWBERRY

Strawberry Fall Check-List

Sonia Schloemann, UMass Extension

√ **General:** Flower bud initiation deep in the crown of the plants is happening now, determining next years' yield. So, maintaining good plant health into the fall is important. In addition to keeping up with the fertilizer program, suppressing leaf diseases improves the ability of the plant to carry on photosynthesis and store starch in the crowns. Don't let leaf spot or powdery mildew get ahead of you. Narrow the rows to about 12" and cultivate the alleys in fruiting fields and new plantings for the last time before mulching. Plant winter rye in plowed down fields as soon as possible in order to get good establishment and growth before winter.

√ **Nutrition:** Nitrogen fertilizer should be applied to bearing beds in early September to bring your seasonal total up to 100-120 lbs/acre. Most growers apply about 70-80 lbs of nitrogen on at renovation. The fall application should provide another 30-50 lbs (more on soils with low organic matter content). This stimulates good root growth in the fall and supplies nitrogen needed for flower bud initiation. New fields need to have a total of 80 - 100 lbs/acre of nitrogen with about 40 lbs applied in the fall. Ammonium nitrate (35% N) is a good fertilizer for the fall application. If your leaf tissue analysis shows deficiencies in magnesium or boron, early fall is a good time for foliar applications of Epsom salts (15lbs/100gal/acre) for magnesium and Solubor

(3lbs/100gal/acre) for boron. Don't make these applications on hot humid days, however, or phytotoxicity could result. Read the labels.

√ **Weeds:** Weed management in the early fall is limited to cultivation and hand weeding/hoeing. The only herbicides you should consider using are Poast or Select Max for controlling grasses postemergence. These will only work on relatively small grasses. Big clumps of crabgrass will have to be pulled by hand. However, quackgrass can be knocked down by cultivation or mowing and then treated when new growth is less than 6" high. One note of caution; Poast, which is used with a crop oil surfactant, can injure strawberry foliage in cold weather. I would recommend its use as a spot treatment at this time of year rather than a broadcast treatment of the whole field. Chateau can be applied as a preemergence material to row middles to control broadleaf weeds in the fall, but should not be allowed to contact strawberry foliage. Weed management later in the fall can include applications of preemergent materials such as Devrinol, Ultra Blazer, Prowl H20, Spartan and Sinbar.

√ **Diseases:** Clean up severe infections of leaf spot and powdery mildew. Rally, Cabrio and Pristine may be good materials for this use. Organic options for leaf spots include copper products such as Nu Cop 50WP but

consult label for sensitive cultivars. Organic options for powdery mildew include Oxidate, JMS Stylet Oil, potassium bicarbonate products and sulfur products (again, consult label for cautions on sensitive cultivars). Healthy leaves are important at this time of year to supply the plant with the energy to produce flower buds for next year's crop and to store energy in the roots for the first flush of growth next spring. Apply Ridomil Gold, Alliette Prophyt or Phostrol in September or early October in areas where Red Stele has been identified. Organic growers can use Actinovate AG but this is best used prior to disease onset. It is best to apply these materials when

the soil is beginning to cool but before heavy fall rains begin. This should not be considered an alternative to good site selection for strawberries.

√ **Insects:** Check fields for infestations of leafhopper, mites or aphids. Generally, plants can take a fair amount of feeding by these insects, but heavy infestations can be a problem. And, aphids in particular, can vector virus especially when they are in the winged form and can disperse and should not be allowed to build up disperse to other fields. **Dayneutral fields should continue to be treated for spotted wing drosophila until harvest ends.**

Runner Removal Increases Albion Yields

Becky Hughes, John Zanadstra, Toktam Taghavi and Adam Dale, Univ. of Guelph

Many growers in Ontario have planted dayneutral strawberries in recent years to take advantage of a longer marketing season. Dayneutral production systems are very different than those we have used for years to produce Junebearing strawberries. For dayneutrals, plants are set at a high density on plastic-mulched, raised beds. Cultural practices are used to produce large multi-crown plants for the greatest fruit production. In most of Ontario, fruit is usually harvested in the first year and the spring of the second year in a modified annual system.

Runner removal is a costly but recommended practise in dayneutral strawberry production. A trial was planted at Cedar Springs in southwestern Ontario and New Liskeard in northeastern Ontario in 2014 to examine the effects of runner removal on harvest distribution, harvest efficiency/recovery, yields and plant growth. Runners were removed weekly starting six weeks after planting, three times a season at six, nine and twelve weeks after planting, once a season at ten weeks after planting or not at all.

The effects of runner removal on yields and plant growth depended on the year, cultivar and site. Runner removal treatments were continued in 2015, however there were few treatment effects on yield in the second year at either site.

There were many effects of runner removal in the planting year. This article will concentrate on the effects on yields. At both sites, all fruit was harvested twice a week and sorted into marketable (no rot and regularly shaped with a diameter greater than 1.5 cm) and unmarketable. Fruit in each category was weighed and counted. Berry weights (g/fruit) were calculated for marketable fruit only.

Runner removal increased the yield of Albion in the planting year. Runner removal increased the total and marketable yields of Albion in the planting year at both sites. In Cedar Springs, the total yield of Albion was reduced by 30% when runners were not removed (Table 1).

Table 1. The effects of runner removal at different intervals on the total and marketable yields, and berry weights of Albion and Seascape in Cedar Springs in 2014.

| Runner removal treatment | Albion yields 2014 (kg m ⁻¹) | | Albion berry wt. (g/berry) | Seascape yields 2014 (kg m ⁻¹) | | Seascape berry wt. (g/berry) |
|--------------------------|--|------------|----------------------------|--|------------|------------------------------|
| | Total | Marketable | | Total | Marketable | |
| Weekly | 1.92 a ¹ | 1.72 a | 16.4 a | 2.33 a | 1.99 a | 12.7 a |
| 3 times | 1.81 a | 1.65 a | 15.4 a | 1.92 a | 1.60 a | 12.2 a |
| 1 time | 1.90 a | 1.60 a | 15.9 a | 1.96 a | 1.65 a | 12.3 a |
| Never | 1.32 b | 1.21 b | 15.6 a | 2.12 a | 1.83 a | 12.3 a |

¹ Numbers within a column with different letters are significantly different.

Seascope responded to runner removal only in the more challenging northern climate in New Liskeard. In the cooler climate, both Albion and Seascope produced

greater yields in the planting year with weekly runner removal but not with the less frequent treatments (Table 2).

Table 2. The effects of runner removal at different intervals on the total and marketable yields of Seascope, and berry weights of Albion and Seascope in New Liskeard in 2014.

| Runner removal treatment | Seascope yields 2014 (kg m ⁻¹) | | Berry wt. (g/berry) | |
|--------------------------|--|------------|---------------------|---------|
| | Total | Marketable | Seascope | Albion |
| Weekly | 1.52 a ¹ | 0.89 a | 13.2 a | 21.1 a |
| 3 times | 1.32 ab | 0.76 ab | 13.3 a | 19.4 ab |
| 1 time | 1.23 b | 0.60 b | 13.3 a | 19.7 ab |
| Never | 1.25 b | 0.64 b | 13.8 a | 13.8 b |

¹ Numbers within a column with different letters are significantly different.

The timing of runner removal was more critical at the northern site with early, more frequent runner removal giving the best results.

Removing runners weekly took almost twice as much time as the other two runner removal treatments at both sites. However, the amount of plant material removed by the once-a-season runner removal treatment was six times that of the other two runner removal treatments. The time

recorded for runner removal was the time to cut the stolons from a metre of row and didn't include the time to remove the plant material from the field. This would be necessary with once-a-season runner removal given the amount of material present. As the work crew also preferred removing younger runners with less plant material, removing runners every week or two may be the best compromise from a labour and yield point of view.

(Source: *The Ontario Berry Grower*, Sept. 2016)

Fall Herbicide Applications for Strawberries

Bruce Bordelon, Purdue University

A number of pre and post emergent herbicides can be used on strawberries during late summer and fall to prevent weed germination, kill emerged weeds, and provide residual control through next spring. The key set of weeds you need to control during this period are fall germinating winter annuals such as chickweed, henbit, and shepherds purse. You may also need to prevent germination of wheat, oats, or rye seeds that come in the straw mulch you apply for winter protection. Carefully read the labels to minimize risk of damage to your strawberries. Below is a list of herbicides registered and comments about each.

Chateau (flumioxazin) is primarily a pre emergent herbicide but has some post emergent activity against small susceptible weeds. Fall applications of Chateau should only be applied after the strawberries are completely dominant. If Chateau is applied to actively growing strawberries, injury can occur. Add 1% crop oil or 0.25% nonionic surfactant to improve post emergent control of small weeds.

Dacthal (DCPA) is a pre emergent herbicide that can be used in new plantings, immediately after renovation or in

fall. It provides good control of many grasses and some broadleaves such as purslane and lambsquarter. It must be applied before weeds emerge.

Devrinol (napropamide) is a pre emergence herbicide that can inhibit rooting of daughter plants so it should be applied after early forming daughter plants have rooted. Late forming (after late August) daughter plants do not contribute to yield and Devrinol can be applied before these runners root. Devrinol must be applied before winter annuals and small grains emerge. Devrinol provides excellent control of small grains and some winter annuals such as chickweed. Devrinol must be moved into the soil by cultivation or water (rainfall or irrigation) after application.

Prowl H20 (pendimethalin) is a pre emergent herbicide that can be applied in fall after strawberries are completely dormant. Rainfall or irrigation following application provides best results.

Sinbar (terbacil) is primarily a pre emergent herbicide but it has some post emergent activity against small susceptible weeds. Fall applications of Sinbar should only be applied after the strawberries are completely dominant.

If Sinbar is applied to actively growing strawberries, injury can occur. Cultivars differ in tolerance to Sinbar. In general, less vigorous cultivars have greater injury. Applications are most effective when applied to the soil and activated by rainfall or irrigation. Sinbar provides excellent control of many winter annual weeds.

Spartan (sulfentrazone) is a pre emergent herbicide with good activity against annual broadleaf weeds, grasses and nutsedge. It should be applied after strawberries are dormant. Some cultivars may be sensitive. The amount of rainfall or irrigation required for activation depends on existing soil moisture, organic matter content, and soil texture.

Poast (sethoxydim) is a post emergent, grass specific herbicide. The grasses must be actively growing, thus Poast should be applied in late summer or early fall before plants become dormant. Summer annual grasses, such as foxtails and crabgrass, will be killed by fall frosts, and do not require Poast applications for control. Poast is more effective against annual than perennial grasses. Poast can be used in the fall to suppress perennial grasses such as quackgrass, control early emerging small grains, and kill winter annual grasses such as wild oats and downy brome.

Select Max (cletodim) is a post emergent, grass specific herbicide that provides good control of most annual and perennial grasses. Like Poast, grasses should be actively growing for best results.

Ultra Blazer (acifluorfen) is a post emergent herbicide that provides good control of annual grasses and broadleaves. It can be applied when strawberry plants are dormant during fall or early spring.

2,4-D amine, a post emergent broadleaf herbicide, can be applied when strawberries are dormant to control some winter annuals. 2,4-D provides good control of many mustards and shepherds purse, but is not very effective against chickweed. The herbicide should be applied to actively growing weeds. Be careful of 2,4-D drift causing injury to non-target plants. Check the label as only a few formulations are labeled for strawberries. 2,4-D is typically used during renovation rather than in fall.

Gramoxone Inteon (paraquat) can be applied as a directed spray between strawberry rows, using shields to prevent contact with strawberry plants. Gramoxone is a nonselective herbicide, so it will kill or severely injure strawberries it contacts. Gramoxone is a restricted use pesticide and is extremely toxic to humans. It provides excellent control of annual grass and broadleaf weeds. Gramoxone does not translocate in plants so it does not control perennial weeds. Weeds should be actively growing when Gramoxone is applied. (*Source: Facts for Fancy Fruit, Vol. 15, Issue 10, Sept. 14, 2015*)

RASPBERRIES/BLACKBERRIES

Raspberry Fall Check List

Sonia Schloemann, UMass Extension

√ **General:** Encourage hardening off of canes in summer bearing varieties of red and black raspberries and blackberries by avoiding nitrogen fertilizers and supplemental watering at this time. Fall bearing raspberries can still benefit from irrigation in dry weather to help maintain fruit size.

√ **Nutrition:** Based on soil and tissue test results, apply non-nitrogen containing fertilizers and lime as needed. For example, Sul-Po-Mag or Epsom Salts can be applied now so that fall rains can help wash it into the root zone for the plants.

√ **Weeds:** Now is a good time to do a weed survey and map of problem areas, so that you can use this information to develop an effective management strategy. A late fall application of Casoron®, Devrinol®, Surflan®, or Princep® for preemergent control of broadleaf weeds next spring should be made. Apply Casoron® only when temperatures are below 40°F, preferably just before rain or snow. Most of these materials should only be used on established plantings, not newly planted fields. See the *New England Small Fruit Pest Management Guide* for

more specific information.

√ **Diseases:** Fall bearing raspberries can suffer fruit rot problems due to increased moisture present in the planting (more frequent precipitation, longer dew retention, longer nights) late in the growing season. The majority of this fruit-rot is *Botrytis cinerea*, gray mold. Captan 80 WDG is labeled for use on brambles. In addition Elevate®, Switch®, Pristine® and Rovral® are materials available for this use. Frequent harvesting and cull-harvesting are the best practices for keeping fruit rot levels low. Thinning canes in dense plantings can also help. Scout summer bearing brambles to look for powdery mildew and treat if necessary. See the *New England Small Fruit Pest Management Guide* for recommended materials and rates. If Phytophthora root rot has been identified in a field, treat the affected area with Ridomil Gold®, Alliette®, or Phostrol® in September or early October. This timing is important to get the material in place in the root zone before the onset of cool wet weather (and soil) in the fall.

√ **Insects:** Now is the time to check plantings for crown borers. Adults of this pest look like very large yellowjackets, but is actually a moth. They are active in the field in August and September laying eggs. Scout the fields for crown borer damage by looking for wilting canes. This symptom can also indicate Phytophthora root rot, so when you find a plant with a wilting cane (or two),

dig up the plant and check the roots for brick red discoloration in the core of the roots (phytophthora) or the presence of a crown borer larvae in the crown. Rogue out infested crowns and eliminate wild bramble near the planting, since they will harbor more of this pest. **Fall bearing fields should continue to be treated for spotted wing drosophila until harvest ends.**

Cane Blight at the End of the Season?

Gina Fernandez, North Carolina State Univ.



Cane blight infection at tip of cane where it had been pruned as a primocane.

As the blackberry season winds down, there are several reports of loss of crop and cane death before the crop ripens. This is often occurring in plantings that are low or no spray such as homeowners and small commercial plantings. The canes become infected when they are primocanes as tipping or pruning occurs in the summer.

In at least one instance, samples sent into the NCSU Plant Insect and Disease Clinic have confirmed that Cane Blight caused by the fungus, *Leptosphaeria coniothyrium*. This disease is common in roses and some ornamentals.

Here is a link to the disease.

<http://extension.uga.edu/publications/detail.cfm?number=C894>

Here is a link to the IPM manual that has control methods:

<http://www.smallfruits.org/SmallFruitsRegGuide/Guides/2016/2016BrambleSprayGuide.pdf> and an article on the disease

http://www.smallfruits.org/bramble/pestinformation/cane_blightfactsheetii.pdf

Please send in samples to [your states disease clinic](#) to confirm any diagnosis.

Phil Brannen, UGA also sent these comments on fields with infected canes:

"On the current canes, there is nothing to be done to prevent it from spreading. After harvest, I would immediately cut out the old floricanes. The most full-proof approach to wiping out old inoculum would require complete removal and burning of the old canes. Some producers hesitate to do this, so complete flail-mowing of the canes may work. However, I would be careful to say that we don't have research information to say that this completely destroys the inoculum. I would tip or pinch prune where possible on the new primocanes, as opposed to large pruning cuts, and I would apply Pristine or Rally (make sure they are labeled for your state) after each day of



Cane blight symptoms in entire canes. Dead canes are silvery/gray in appearance. Photo Phil Brannen. UGA

pruning to prevent infection on the pruning cuts. Hopefully, this will break the cycle." (Source: Team Rubus Blog, Aug. 3, 2016).

BLUEBERRY

Highbush Blueberry Fall Check-List

Sonia Schloemann, UMass Extension

√ **General:** Blueberry plants should be encouraged to harden off for the winter. This means no nitrogen fertilizer at this time. Flag bushes that show premature reddening of leaves compared to others of the same variety. This can be an indicator of infection with virus or other pathogens. If you haven't done it already, make some notes on observations from this year that might be helpful in coming years (e.g., variety performance, sections of the field that did well or poorly, how well some practices worked, or didn't, etc.). Relying on memory isn't always accurate enough. Nothing can replace a detailed field history when trying to diagnose problems.

√ **Nutrition:** Hold off on any nitrogen fertilizers. Based on leaf tissue tests and soil tests, sulfur, lime, and some fertilizers can be added now. Apply these before fall rains begin and also before adding any supplemental mulch to the plants.

√ **Weeds:** As with other small fruit crops, now is a good time to do a weed survey and map the weed problems in your planting. This information will be very useful in tailoring your weed management plan so that is effective and not wasteful. A late fall application of Casoron® for preemergent control of broadleaf weeds next spring should be made only when temperatures are below 40°F, preferably just before rain or snow. Devrinol®, Surflan®, and Kerb® may also be used in the fall according to label recommendations. See the *New England Small Fruit Pest Management Guide* for more specific information.

√ **Diseases:** Weak plants can easily be detected at this time of year because they tend to turn red earlier than healthy bushes. Upon finding weakened bushes, try to determine the reason for weakness. Is the root system damaged? If so, is it likely from disease infection or root damage by voles or grubs? If the roots are healthy, could a crown borer (Dogwood borer) be the culprit? Or is stunt disease the cause? Or Scorch? Accurate diagnosis is the first step in resolving the problem and avoiding spread. Enlist the help of specialists if you have trouble determining the cause of problems. See factsheet on Blueberry Scorch at www.umass.edu/fruitadvisor for help diagnosing this disease.

√ **Insects:** The main worry now is for sharp-nosed leafhopper which is the vector for stunt disease. If you have determined that you have bushes infected with stunt disease in your planting, an application of malathion to the infected bushes and any immediately surrounding bushes should be made to control leafhoppers BEFORE removing the infected bushes. Failing to do this will likely cause the spread of the disease to clean bushes even after infected bushes have been removed. In eastern areas of the state, growers are concerned about infestations of Winter Moth. Go to <http://www.umassgreeninfo.org/factsheets/defoliators> for more information on this new pest. For now, growers should know that any moths seen flying in their plantings now are NOT Winter Moth or Canker Worm moths. These moths do not emerge and begin flight until November.

GRAPE

Late Summer/Early Fall Grape Disease Control; 2016

Bryan Hed, Lake Erie Regional Grape Program

We're in the final leg of the season and it's time to size up our remaining challenges through the ripening period. Fruit are no longer susceptible to many of the major diseases like powdery and downy mildew and black rot that can cause crop loss during earlier stages of berry development. But for some grape varieties, particularly wine grapes that produce compact clusters, there is another major hurdle to work through to harvest; late season bunch/sour rot. I am referring to the rotting of fruit in clusters that occurs during the later stages of the ripening period, just a few heartbreaking days or weeks before harvest. Bunch rot can involve the colonization of fruit by a number of different

microorganisms, both fungi and bacteria. But the main culprit in most regions of the Northeastern U.S. is the fungus, *Botrytis cinerea* (Figure 1). Fortunately, we have a number of chemical control options that are quite effective against this fungus that I have listed below. I have organized them according to the FRAC (Fungicide Resistance Action Committee) group that each product belongs to. Basically FRAC groups are fungicide chemistries with the same or similar mode of action, so that pathogen resistance to one fungicide is going to confer cross resistance to another, within that same FRAC group. For example, notice that Vanguard and Scala are in the same FRAC group; 9. This means

that if a population of *Botrytis* in a vineyard has developed resistance to the active ingredient in Vanguard, then it will also be resistant to the active ingredient in Scala, even though the active ingredients may be different (cyprodinil in Vanguard and pyrimethanil in Scala). The mode of action (*the way in which the fungicide disrupts a specific metabolic pathway in the fungus, killing it*) of these two chemistries is the same, or similar enough that pathogen resistance to one chemistry will confer resistance to the other.

- FRAC group 2: Rovral, 7 day pre-harvest interval
- FRAC group 7: Endura, 14 day pre-harvest interval
- FRAC group 7 (and 3, which is not for *Botrytis*): Luna Experience, 14 day pre-harvest interval
- FRAC group 7 and 11: Pristine, 14 day pre-harvest interval
- FRAC group 9: Vanguard, Scala, 7 day pre-harvest interval
- FRAC group 9 (and 3, which is not for *Botrytis*): Inspire Super, 14 day pre-harvest interval
- FRAC group 9 and 12: Switch, 7 day pre-harvest interval
- FRAC group 11: Flint, 14 day pre-harvest interval
- FRAC group 17: Elevate, 0 day pre-harvest interval

No doubt many wine grape growers have already applied a bloom, pre-bunch closure, and veraison spray to bunch rot susceptible varieties. However, one or more applications may be necessary in some vineyards. Populations of the *Botrytis* fungus are quite adept at developing resistance to these fungicides; be mindful to rotate FRAC groups and limit the application of any one FRAC group to one or two per season to delay the development of that resistance. If you have to use a FRAC group more than once per season, it would be better to compose one of those two applications with a material that contains a second FRAC group for *Botrytis*. For example, if you already used Scala, it would probably be better to apply Switch (after you've already rotated to FRAC group 2, 7, 11, or 17) than to apply Vanguard or another Scala spray. Most of these materials are considered 'high risk' for resistance, so rotation is extremely important to maintaining the effectiveness of these products. Also, pay attention to pre-harvest intervals which range from 0 to 14 days. That said, you can't spray your way completely out of the damage that *Botrytis* and other microorganisms can cause; consistently effective bunch rot control programs must be integrated with a generous dose of cultural practices like fruit zone leaf removal, sanitation, canopy management, and vine balance. And, unfortunately, these chemistries listed above are specific for *Botrytis* and will not control many of the other microorganisms that may make up the bunch rot complex or that lead to the dreaded sour rot complex.



Figure 1. *Botrytis cinerea* sporulating on damaged grapes of *Vitis* interspecific hybrid 'Vignoles'. Such damage often occurs as a result of berry overcrowding in overly compact clusters. The damage leaves fruit open to colonization by the ever present *Botrytis* fungus and by many other fruit rot organisms.

I've already alluded to one of the major predisposing factors for bunch rot (including sour rot) in grape clusters, and that is cluster compactness. The compactness of clusters is responsible not only for initiating much of the fruit rot that occurs in clusters, but perhaps more importantly, for the rapid spread of rots throughout the cluster (Figure 2). Rots can be initiated in loose grape clusters as well (by bird or insect damage, for example), but generally do not spread beyond the damaged berry or berries. However, in compact clusters, a single damaged berry can spread rot to large sections of the cluster by virtue of the close contact between those berries. Contact between berries in compact clusters also reduces cuticle thickness, an important barrier to rot pathogens, and reduces pesticide penetration into clusters for protection of berry surfaces against *Botrytis* and damage by insects. Cluster compactness also increases the effects of retained bloom trash (dead flower parts) inside clusters that can provide a substrate for *Botrytis*, increasing fruit rot by harvest. Taken together, this generally makes berries in compact clusters much more susceptible to invasion by fruit rot pathogens than berries in loose clusters.

A series of greenhouse experiments we conducted years ago also suggested that latent (dormant) infections of *Botrytis* can be activated by the kind of berry injury that occurs in compact clusters. Latent *Botrytis* infections are infections that occur during bloom and the early fruit development period for which you apply that bloom and pre-closure spray. Years ago, we monitored the incidence of latent infections in our block of Vignoles and found that even though the incidence appeared to increase throughout the berry development period, most of these infections did not lead to fruit rot by harvest. In fact, when we inoculated clusters of potted, greenhouse grown Chardonnay vines with *Botrytis* shortly after bloom, generating high levels of latent infection in berries, the berries did not rot during ripening *if they remained intact in the greenhouse*, unexposed to weather, birds, insects, or compactness

(the clusters were thinned after inoculation and thinned berries were used to determine latent infection levels). However, when we surface sterilized the berries (to eliminate any *Botrytis* on the outside of berries) and created small injuries at the berry/pedicel interface of ripe berries (the kind of injury that commonly occurs in overcrowded clusters) the vast majority of the inoculated berries quickly rotted compared to berries that were not inoculated with *Botrytis* (checks).

By loosening clusters, damage from berry overcrowding can be minimized and bunch/sour rot development can be greatly alleviated. Unfortunately, loosening clusters in a consistently effective AND cost effective way is not always an easy thing to accomplish. Over the years we have examined a number of potential methods for cluster loosening with varying levels of success. Treatments such as pre-bloom fruit zone leaf removal have provided the most consistently significant reductions in cluster compactness and fruit rots in most years. The pre-bloom timing of fruit zone leaf removal simply combines the benefits of an open, sun lit fruit zone (which has been well documented by many investigators over the past several decades) with a reduction in cluster compactness and rot susceptibility. In our experiments, this treatment has typically been applied by hand, but the technology exists to mechanically remove leaf tissue around inflorescences (pre-bloom) without serious damage to them, and trials are being conducted to evaluate the mechanization of the pre-bloom leaf removal on a number of grape varieties. So far, results have been mixed depending on variety and trellis training system. In vineyards where we were able to compare pre-bloom mechanized leaf removal with pre-bloom leaf removal by hand and post-bloom mechanized leaf removal, the effects of pre-bloom mechanized leaf removal (increased light exposure of clusters, looser clusters, less rot, yield reduction) generally fell somewhere between the two latter treatments. The hope of this research is to expose growers to some new possibilities for fruit rot control and increase the potential for its adaptation to commercial vineyards and adoption by growers. We've examined other technologies with potential for cluster loosening and improved fruit rot control, but unfortunately their adoption is more problematic. For example, we have found that inexpensive gibberellin sprays around bloom have also been effective at loosening clusters and enhancing rot control on Vignoles and Chardonnay with little or no serious negative side effects. But they are currently 'off label' and are very unlikely to ever become legal applications in the United States. Also, the effects of gibberellin sprays are variety specific and therefore *must* be examined and defined for each variety: in our experience, low rates (5-20 ppm) can have serious negative side effects on *Vitis vinifera* Riesling, whereas

rates as high as 100 ppm have had little or no effect on *Vitis* interspecific hybrid 'Chancellor'.



Figure 2. Botrytis bunch rot. The compactness of these bunches has contributed to rapid and severe rotting of large portions of these clusters (left). Loose clusters of the same variety are far less affected by the spread of rot within the bunch (right).

More recently, work conducted by Megan Hall, a grad student of Wayne Wilcox at Cornell University, has shown that additional pesticide applications during the latter stages of ripening can significantly reduce the development of sour rot. Her work has shown a close connection between fruit flies and sour rot development; the presence of the flies is important to the accumulation/generation of acetic acid in rotting fruit. Treatments composed of weekly, tank mix applications of an insecticide (to control the flies) and an antimicrobial (to kill bacteria) have been found to reduce sour rots by 50-80% over unsprayed vines. So far, the best results appear to occur when weekly sprays are initiated before sour rot symptoms are observed (preventive sprays before about 15 brix). This exciting work should provide yet another effective option for sour rot control in the wet, humid parts of the eastern U.S. and we are looking forward to hearing more about this rot control option in the near future.

LATE SEASON LEAF DISEASE CONTROL

Beyond the management of bunch rot on susceptible wine varieties, there is also the matter of keeping canopies (leaves) as clean and functional as possible, for as long as possible. Diseases like powdery and downy mildew can continue to be of concern into late summer and early fall, especially for growers of *Vitis vinifera*. The mildews can greatly reduce leaf function if allowed to spiral out of control. The ability of the canopy to continue to photosynthesize is crucial to the ripening of the crop and canes and the storage of sugars (starch) in trunks, arms, and roots, which relates to winter hardiness. The winters of 2014 and 2015 are harsh reminders of just how important this can be. Allowing grapevines to go into winter dormancy with less than optimal preparation can leave them more

susceptible to damage by severe cold and another plague of crown gall to have to deal with for years to come.

Good control of powdery mildew up to about Labor Day can also go a long way to reducing overwintering inoculum and disease pressure the following spring. This finding was the result of some excellent research conducted by Wayne Wilcox, Dave Gadoury and graduate students at Cornell University. When powdery mildew infected leaves die by that first hard frost in fall, the mildew on those leaves stops developing and also dies...unless it has had time to form fully mature, winter resistant resting structures called chasmothecia. If the chasmothecia in a powdery mildew colony do not have time to fully mature before the grape tissue dies (as from infections that were roughly initiated after early September), they will not survive the dormant period (winter) and will not contribute to the bank of primary inoculum that infection periods draw upon the following spring. Knowing this, a grower can get a better handle on the 'size' of the powdery mildew problems he/she will potentially face next spring. If, for example, you had heavy mildew development earlier in this season (on clusters and/or leaves), expect to have to deal with powdery mildew early next season and take appropriate action during early shoot growth stages with preventive fungicide sprays. This is particularly important if you are growing *Vitis vinifera* and much

less important for growers of native varieties like Concord and Niagara.

Downy mildew appears to be much less a widespread problem this year. In fact, in our 'neck of the woods' along the southern shore of Lake Erie, droughty conditions have prevailed throughout most of the season, and only now are we even beginning to see a few downy mildew infections on leaves close to the ground. At this point in the season regular scouting for this disease is the first line of defense, and in areas that remain relatively dry, perhaps the only control measure needed (?). However, in areas where the disease has remained active throughout the season, be vigilant about keeping it under tight control. Late season epidemics of this disease can quickly strip susceptible wine varieties of their leaves, effectively bringing an early halt to ripening.

For further reading on this and many other disease management topics, refer to the [2016 New York and Pennsylvania Pest Management Guidelines for Grapes](#) [or the current [New England Small Fruit Management Guide](#)]. If you don't have a copy, you can get one through Cornell University press. Every commercial grape production operation should have one! (*Source: PA Wine & Grapes U Blog, Sept. 9, 2016*)

Grape Berry Moth – A fourth generation?

Tim Weigle, NYSIPM, Cornell Univ.

The saying goes that the average adult learner needs to hear something 7 times before it "clicks". So, here is basically a repeat of last week's Crop Update. The basic theme is if you have vineyards that are at very high or severe risk of grape berry moth you should continue to check out the GBM model info for the NEWA station(s) near you. If you did not read last week's Crop Update, or would like a refresher, please read the following. The phenology-based degree day model for grape berry moth management shows we are well past the timing for treatment of the third generation. But what about a fourth generation?

The current reports from the model are;

Pest Status: Reduced egg-laying after this time, most pupae enter diapause (overwintering stage) after 1700 GDD.

Pest Management: With the exception of extremely warm years no further action is required.

So what is an extremely warm year? Looking at the GDD chart found in Luke's article this week you can see that as of September 7, 2016 we have accumulated

a couple of hundred extra growing degree days over the 30-year average. Although we started the growing season on the cool side, once we started to accumulate GDD for the GBM model (wild grape bloom) the weather rebounded with warmer than average temperatures to provide what would be considered to be an extremely warm year.

The grape berry moth model on NEWA is based on the fact that it takes 810 DD (Base temp 47.14 F) for the GBM to complete a single life cycle from egg to egg-laying female) So, for a fourth generation to occur according to the model a station would need to record 2430 DD.

What does this mean for your management strategy? Look at your scouting records over the year. While we found GBM damage in severe risk vineyards, it was harder to find significant damage in low, intermediate and even some high risk vineyards this year. One of the suggestions for this was the hot, dry growing season that we experienced. The first instar larvae of grape berry moth typically have a short amount of time to feed their way into a grape berry. The

hot, dry conditions of this summer made the microclimate outside the egg much less friendly for these larvae and may have stopped a number of them from successfully entering the berry before they died. So while we say scouting is important every year, this year it will definitely pay to know what type of damage you have going into a potential fourth generation.

To spray or not to spray...

The Pest Status for the model states that there is reduced egg-laying after this time and most pupae enter diapause (overwintering stage) after 1700 DD so why do we worry about a fourth generation? The key word here is most. If there is a lot of grape berry moth in a vineyard at 1700 DD and most pupae enter into

diapause, there are still at least some that will continue on to complete their lifecycle and potentially lay more eggs – creating a fourth generation. So again, scouting is critical to know if most pupae entering diapause leaves the potential for a small or large fourth generation.

At this point in the season canopies are at their maximum density and make getting an insecticide into the fruiting zone very difficult. If you own vineyards with a history of grape berry moth damage, develop a harvest strategy that will allow you to get those grape off as early in the season as possible. (*Source: LERGP Crop Update, Sept. 9, 2016*)

Fall Weed Management

Joe Fiola, University of Maryland

Many of you are still busy with winemaking but a quick reminder that fall is a critical time for vineyard weed management. It is critical for controlling pesky perennial weeds and preemergence of winter annuals.

- The 3 main types of weeds:
 - Annuals - Plants that live for less than one year
 - * Winter annuals germinate in the late fall and winter, grow, and go to seed during the following spring and summer
 - * Summer annuals germinate in the spring, grow, and go to seed during that spring and summer.
 - Biennials - Plants that live for more than one year, but less than two years
 - Perennials - Plants that live for more than two (2) years
 - * Can be herbaceous or woody
- To insure optimal efficacy of herbicides always remember:
 - Use the correct herbicide for the specific weed pest.
 - Use the correct herbicide rate for the time and soil type.
 - Use the proper application technique.
 - Apply at the appropriate time.
- Sprayer calibration is important with pre-emergence herbicides. If you have been using a ‘Roundup only’ program and haven’t calibrated lately be sure to do so before making the pre-emerge application.
- Perennial weeds such as Canada thistle, nutsedge, poison ivy, mulberry, and many perennial grasses are especially susceptible to glyphosate (Roundup) at this time of year.
 - Fall applications are very effective because these plants are strongly translocating down so they will take the herbicide to underground storage structures which will greatly improve their activity.

- Spring applications of glyphosate are less effective on most perennials since movement of stored energy is upward and away from storage structures.
- An application after grape leaf drop but while the weed foliage is still intact is ideal. Glyphosate can be absorbed by any green tissue, so waiting until grapevine leaf drop or use of shielded sprayers is important. In any event, avoid contact with grape foliage or green stems or damage may occur. See labels for complete instructions.
- This is also the time to include (tank mix) a pre-emergence herbicide with the glyphosate.
 - A pre-emergence herbicide will control winter annual weeds (e.g. chickweed and henbit)
 - * Residual grass herbicides include: Devrinol, Gallery, Kerb, Prowl, Sinbar, Solicam, and Surflan.
 - Kerb, Sinbar, and Solicam may be used but only be on vineyards established 3 years.
 - * Residual broadleaf herbicides include: Casoron, Gallery, Goal, Karmex, Princep, Sinbar.
 - Casoron, Karmex, Princep, and Sinbar may be used but only be on vineyards established 3 years.
 - * Again, these are only meant as suggestions – always see labels for complete instructions.

Fall herbicide applications are the first step in a successful weed management program. You can follow up in early to control the summer annual weed pressure. (*Source: Univ. of Maryland Timely Viticulture, Post Harvest Fact Sheet Series*)

GENERAL INFORMATION

Tree Assistance Program (TAP); an FSA Program to help replace trees, vines, bushes lost to the 2016 drought

Tom Smiarowski and Paul Russell, UMass Extension

Orchardists, small fruit and nursery tree & shrub growers who experience losses from natural disasters during calendar year 2016 may be eligible for assistance under TAP, which is administered by the USDA - Farm Service Agency (FSA). Producers must submit a TAP application either 90 calendar days after the disaster event or the date when the loss is apparent.

TAP was authorized by the Agricultural Act of 2014 as a permanent disaster program. TAP provides financial assistance to qualifying orchardists and nursery tree growers to replant or rehabilitate eligible trees, bushes and vines damaged by natural disasters.

Eligible tree types include trees, bushes or vines that produce an annual crop for commercial purposes. Nursery trees include ornamental, fruit, nut and Christmas trees that are produced for commercial sale. Trees used for pulp or timber are ineligible.

To qualify for TAP, orchardists must suffer a qualifying tree, bush or vine loss in excess of 15 percent mortality from an eligible natural disaster. The eligible trees, bushes or vines must have been owned when the natural disaster occurred; however, eligible growers are not required to own the land on which the eligible trees, bushes and vines were planted. If the TAP application is approved, the eligible trees, bushes and vines must be replaced within 12 months from the date the application is approved. The cumulative total quantity of acres planted to trees, bushes or vines, for which a producer can receive TAP payments, cannot exceed 500 acres annually.

Interested growers should contact the FSA Office that serves their farming operation. Questions regarding eligible trees, vines and bushes should be directed to the FSA Offices. See the [UMass Fruit Advisor](#) website for more information and a fact sheet on this program.

UPCOMING MEETINGS:

September 12, 2016 - *Plant Quarantine (Ribes) Regulation changes open for public comment.* 1:00 – 3:00pm. Division of Fisheries and Wildlife, 1 Rabbit Hill Road, Richard Cronin Building Room 110, Westborough, MA.

September 14, 2016 - *Vegetable Research and Food Safety Twilight Meeting.* 4:00 – 6:00 pm. UMass Research and Educational Farm, River Rd. So. Deerfield. For more information see: <http://ag.umass.edu/events/twilight-meeting-umass-vegetable-research>.

September 14, 2016 - *Hops Twilight Meeting,* 5:00. The Hop Yard in Gorham. 26 Hamblen Drive, Gorham, Maine 04038. Please gather near the first field (on your right), and park on the edges of the road. The phone number is [207.838.6850](tel:207.838.6850). The email address is ryan@thehopyard.com, and the web address is: <http://thehopyard.com/>. Cost for the meeting is free and no registration is required. For more information, please contact David Handley at [207.933.2100](tel:207.933.2100) or david.handley@maine.edu.

September 28, 2016 - *UNH Agriculture Research Field Day,* 4:00 – 6:00pm. NH Agricultural Experiment Station's Kingman Farm, Madbury NH. For more information click [here](#).

Oct. 16, 2016 - *Basic Tractor Skills for Aspiring Young Women Farmers.* 8:30am – 3:30pm. Cerridwen Farm, Green Mountain College, 436 Grandville, Poultney, VT. \$25 Click [here](#) for more information or to register.

November 2, 2016 - *Managing Phosphorus in Organic Residuals Applied to Soils* 8:45-4pm. Holiday Inn, 265 Lakeside Ave. Marlborough, MA 01752. Approval has been requested for the following professional certifications: CGCS, CSFM, MCH, MCLP, and AOLCP. For more information contact: Kelly Kraemer, 413-545-5221, kkraemer@umass.edu or visit: <https://www.regonline.com/phosphorus>

November 9-10, 2016 - *Northeast Greenhouse Conference & Expo.* Holiday Inn, Boxborough MA For more information and to register see www.negreenhouse.org or contact: Delaney Meeting & Events, 802-865-5202.

November 17, 2016 – *Growing in Tunnels Conference.* Tolland County Extension Center, Vernon CT. For more information contact MacKenzie.White@uconn.edu, 860-875-3331.