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UPCOMING MEETINGS

SHORTS:

Great new resource:

Midwest Strawberry Production Guide - www.oardc.ohio-state.edu/fruitpathology/Bulletins/Strawberry%20book%20v2%20S.pdf

Mass Aggie Seminar Series: The 2013 Mass Aggie Seminar Series has been announced. Eight hands-on workshops are being offered ranging from grafting fruit trees to native pollinator conservation. The workshops being offered include:

- Pruning Fruit Trees, A Hands-on Workshop
- Growing & Pruning Blueberries
- Grafting Apple Trees, A Hands-on Workshop
- Growing & Pruning Grapes
- The 100-Square-Foot, 25-Tree, 5-Variety Backyard Apple Orchard Fruiting Wall!
- Insect Pests & Diseases of Apples - and how to manage them
- Edible Forest Gardens - an introduction to permaculture principles for your yard
- Native Pollinator Conservation



Please go to <https://extension.umass.edu/fruitadvisor/mass-aggie-seminars-2013> for complete information about these workshops and how to sign up for them.

STRAWBERRY

Failing Fungicides for Gray Mold Control and What to do About It

Guido Schnabel, Clemson University and Frank Louws, North Carolina State University

Gray mold (**Figure 1**) is the most important disease of many small fruits, including strawberry and grapes. It is caused by the fungus *Botrytis cinerea*, which during wet weather and relatively cool temperatures, attacks the flowers and the fruit. To protect the crop from rotting, fungicides must be used during bloom and during preharvest fruit development. In recent years, the efficacy of fungicides has declined dramatically in experimental fields in North Carolina and Florida, which signaled for the first time the emergence of a problem. Follow up studies showed that years of exposure to modern fungicides selected for resistance to many fungicides in North Carolina and South Carolina fields rendering many applications ineffective.



Figure 1. Gray mold of strawberry

During the 2011/2012 growing season Clemson initiated an evaluation program and received and analyzed **gray mold** samples from about 80 commercial strawberry farms in 8 states (including Arizona, Florida, Georgia, South Carolina, North Carolina, Kansas, Maryland, and Virginia) and investigated the sensitivity of the causal agent to all 7 chemical classes (FRAC codes 1, 7, 11, 12, 17, 3, and 9) registered for the suppression or control of gray mold (**Figure 2**). Sensitivity assays were performed on fungicide-amended media containing specific discriminatory doses of fungicides that allowed the distinction of sensitive from resistant isolates. Discriminatory doses were largely described previously (3), but we made some adjustments due to assay-specific differences. Briefly, spores from 10 fruit per location were collected with cotton swabs (one swab per fruit), shipped to the Clemson lab, transferred with a toothpick to the center of amended medium in 24- well plates and incubated for 4 days. Growth was assessed visually and growth data were entered in a webapplication specifically developed for this purpose (2). The web application calculates a resistance factor that determines whether a

sample is sensitive, or has low resistance, medium resistance, or high resistance to a certain fungicide.

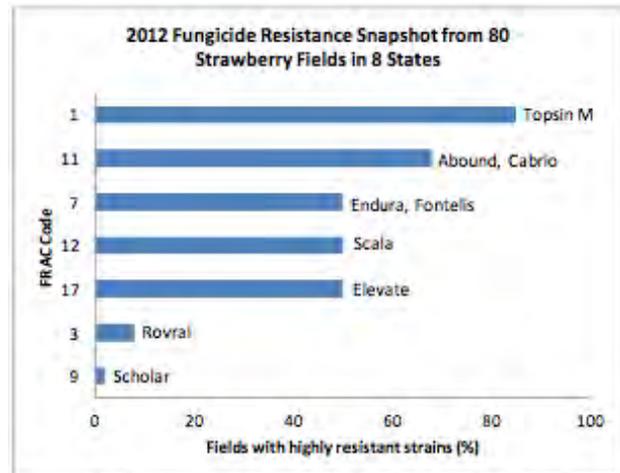


Figure 2. Average occurrence of resistance in samples from fields of 8 states. A sample was considered 'highly resistant' if at least 20% of the strains were resistant to a fungicide.

The monitoring indicated that the gray mold fungus from strawberry in many states had developed resistance to different classes of fungicides. The majority of all samples indicated resistance to Topsin M, Abound, and Cabrio fungicides. The latter two products are not exactly gray mold products, but according to the labels they have 'suppressive action'. To our surprise, about half of all samples revealed resistance to Elevate, Scala, and Endura. All of those products are commonly used for gray mold control. The newly registered Fontelis is listed in the figure together with Endura because these two products are more or less cross resistant. On the flipside, resistance to Rovral and fludioxonil (Scholar formulated product) was either rare or non-existent. Fludioxonil is a component of Switch.

The monitoring results indicated that resistance to various fungicides is present in the gray mold fungus, which might be surprising to many growers because pre- and postharvest gray mold has not been a tremendous issue in recent years. There may be several reasons for this apparent discrepancy:

-inoculum (=infectious forms of the pathogen) levels in plasticulture systems are generally low. The crop starts with new, mostly disease-free plants on fumigated soil with very little plant debris from the previous season. It likely takes a couple of infection periods for the fungus to gain in numbers for an epidemic.

-we have had relatively dry springs in recent years making it hard for the fungus to establish

-we have far fewer infection periods than previously thought. Two years of monitoring infection periods in SC has demonstrated that there were only 3 (during dry springs) to 6 (during wetter springs) infection periods per season. That is it. That means a lot of our sprays are applied in the 'off season'.

But it only takes a wet spring and the application of ineffective fungicides for gray mold to thrive. Therefore we must implement resistance management practices. Below are some suggestions on how producers can extend the productive life of a chemical class in their operation and save money by spraying smart.

-reduce inoculum levels. If there is little fungus, there is little problem. Conservative application of nitrogen fertilizer makes plants less susceptible to pathogens in general and allows water to evaporate quicker due to less luscious canopies. Also, increasing plant spacing could be considered for improved air circulation. However, growers should optimize plant spacing for yield and optimum plant spacing depends on soil type among other factors.

-moderate used of fungicides. The fewer sprays applied the less selection pressure there is for fungicide resistance. In other words, it is much better to spray only when needed than calendar-based. Applications should be done PRIOR (if possible) or soon after (using fungicides with kick-back action) to anticipated rain events of more than one inch or so of rainfall. Research has shown that

the focus of fungicide applications should focus on protecting the strawberry flowers.

-reduce the use of materials that are prone to resistance development. If growers want to spray prior to bloom, products like thiram and captan should be used exclusively. These products also provide effective control during bloom unless unusually high rainfall is experienced. Rovral is an effective botryticide and can be used once per season before bloom. In our experience, Rovral is the product of choice if growers encounter Botrytis crown rot due to early wet and warm spring conditions when plants are large. Products like Elevate, Pristine, Switch, should be used only during bloom and only when weather conditions such as extended rain favor disease development.

-perform sanitation measures. The majority of the Botrytis inoculum, that goes to the flowers, is believed to come from dead and dying leaves present in the beds after winter. Removing these leaves before bloom can help reduce the amount of Botrytis in the system. In our experience, sanitation increases yield slightly or has no effect. Many growers perform sanitation as part of their practice to remove weeds from holes, to lift plants from under the plastic and remove dead and dying leaves. If multiple tasks are

accomplished in one pass, then the practice may prove economical. However, sanitation does not pay for itself if gray mold management is the only purpose and if effective fungicide programs (if resistance is not a major problem) are implemented. (*Source: NC Small Fruit News, Vol. 13, No.1 January 2013*)

RASPBERRIES/BLACKBERRIES

Winter Caneberry Checklist Winter 2012-13

Gina Fernandez, North Carolina State University

This checklist was originally developed for blackberry growers in North Carolina. Many of the items apply to raspberry production as well. You may have to adjust your work activities either earlier or later depending on your location. For more detailed information, check the Southern Region Integrated Bramble Management Guide and the Southeast Regional Bramble Production Guide at: <http://www.smallfruits.org/SmallFruitsRegGuide/index.htm>.

Check the items off as they get done. This list is very general, but should help get you to think about what types of activities occur at various times of the year. If you would like other items to be added to this list, send them to me and I will add them next time.

WINTER

Plant growth and development

- ✓ Plant is not visibly growing during the winter months although many blackberries will retain their leaves through the winter
- ✓ Some differentiation is occurring in the flower buds
- ✓ Low chilling cultivars can break bud in January after adequate winter chilling. You can monitor chilling hours accumulated in eight states in the eastern US by accessing this site: <http://www.nc-climate.ncsu.edu/cronos/blackberry/index.php>

Pruning and trellising

- ✓ Pruning should occur in late winter. However, in some areas winter ice storms can do tremendous damage to plants and trellis systems. If you produce blackberries in one of these areas, pruning can take place early winter to help avoid severe damage.
- ✓ Make trellis repairs after plants have defoliated but before pruning and training.

Erect types

- ✓ Prune out the spent floricanes
- ✓ Tie canes to wires in a fan shape
- ✓ Cut lateral branches back to 8-12"
- ✓ Thin canes to 6-8 canes/ hill (4 ft spacing)

Trailing types

- ✓ prune out spent floricanes
- ✓ tie or weave canes to wire so that they do not overlap
- ✓ prune side laterals to 12-18"
- ✓ thin canes to 6-8 hill (6-8ft spacing)

Primocane fruiting raspberries and blackberries

- ✓ Prune (mow) primocane fruiting types to ground level

Weed control

- ✓ Many summer weed problems can be best managed in the fall and winter using preemergent herbicides. Determine what weeds have been or could be a problem in your area. Check with local extension agent for cultural or chemical means to control these weeds.

Insect and disease scouting

Check the [New England Small Fruit Pest Management Guide for Recommendations:

<http://extension.umass.edu/fruitadvisor/ne-small-fruit-management-guide>]

- ✓ To learn more about the spotted wing drosoplila and how it may impact your fruit in 2013, check out Hannah Burrack blog, she has lots of links in addition to her blog posts
- ✓ Scout fields for insect and disease damage and remove those canes
- ✓ Remove wild blackberries and raspberries by the roots if they are within 600 ft of your planting during the winter or treat with glyphosphate in the autumn
- ✓ Apply liquid lime sulphur or Bordeaux for disease control before new buds are 1/8"

Planting

- ✓ Take soil tests to determine fertility needs for spring plantings.
- ✓ There are some new raspberry and blackberry cultivars available in 2013. If you have not tried them or it is not know how they will do in your region, it is best to order a small quantity to see how well they will perform in your area
- ✓ For larger growers, prepare list of cultivars for 2014 plantings and order now. Smaller quantities of plants can be order in early 2013 for spring 2013 planting
- ✓ A commercial small fruit nursery list at <http://www.fruit.cornell.edu/berry/nurseries/>

Water management

- ✓ Make repairs to irrigation system (check pumps, lines, etc)
- ✓ Plants generally do not need supplemental water in winter

Marketing and miscellaneous

- ✓ Order containers for next season
- ✓ Make contacts for selling fruit next season
- ✓ Attend grower meetings:

The 2013 North American Raspberry & Blackberry Conference Meeting
 January 27-30, 2013 in Portland OR.

<http://www.raspberryblackberry.com/local.cfm?doc=webdocs%2FNorthAmericanBerryConference2013.htm>

2013 SE Regional Fruit and Vegetable Conference

Jan 10-13, Savannah GA

<http://www.seregionalconference.com/>

The North Carolina Commercial Blackberry and Raspberry Growers Association

Feb 19, 2013. Shelby NC.

For more information contact Daniel_Shires@ncsu.edu or Josh Beam <josh.beam@dole.com>

NOTE: NC Cooperative Extension will be taking over the Blackberry and Raspberry Information Portal in early 2013. The site will have essentially the same material, but a new look. Links will be provided from the old site to the new site. (*Source: NCState Team Rubus blog, Jan 8, 2013*)

Raspberry & Blackberry Varieties for New Hampshire Growers

Becky Sideman, UNH

This list was developed to help growers select among the many raspberry and blackberry varieties available. Growers in Northern areas should prioritize winter hardiness. We have indicated varieties that have been used widely for commercial plantings in New Hampshire, those that should be grown on a trial basis, and those best suited for home production. Information is not available for all varieties, particularly newer releases. Remember that flavor and preferences vary, and for any new planting, multiple varieties should be selected to increase the likelihood of success in your specific location.

		Variety	Hardiness	Flavor	Harvest Time	Pros	Cons
RED RASPBERRIES	RED	Algonquin	3	H	M/L	Yields, large fruit, firm	Not hardy
		^a Boyne	5	F	E	Very hardy, good yields	Fair flavor, dark and soft fruit
		Canby	3	E	M	Nearly thornless, flavor	Not hardy
		^b Encore	5	VG	L	Good quality, large fruit	
		K81-6	4	-	L	Large, firm fruit	History of winterkill in NH
		^a Killarney	5	VG	E	Flavor, very hardy	Suscept. to mildew, anthracnose
		Latham	5	F	M	Very hardy, vigorous plants	Crumbly, fair flavor
		Lauren	3	G	-	Large fruit, good quality	Not hardy
		^a Nova	5	G	M	Few thorns, hardy	Acidic fruits
		^b Prelude	5	G	VE	Very early crop, very hardy	
		Taylor	4	E	L	Excellent flavor, color, firm	Disease susceptible, semi-hardy
	Titan	3	F	M/L		Disease susceptible, semi-hardy	
	FALL-REDS	Polana	F	F	E	Early ripening, productive	Misshapen fruit, fair flavor
^c Fall Red		F	VG	E	Flavor, good for short seasons	Soft fruit, spiny	
^a Autumn		F	VG	E/M	High quality fruit		

RASPBERRIES-OTHER		Britten						
		Redwing	F	G	M/L	Large, earlier than Heritage	Soft fruit, not vigorous	
		^a Caroline	F	G	M/L	Vigorous plants, productive	Rough-shaped fruit	
		^a Heritage	F	G	VL	High yields, good flavor	Late, need long season	
		^b Prelude	F	G	L	Late crops on first year canes		
		Autumn Bliss	F	E	E	Flavor, early fruiting, productive		
		YELLOW	^a Anne	F	E	VL		Brittle canes, very late
			^c Fall Gold	F	VG	M/L	Vigorous, flavor	Soft, poor for freezing
			Kiwigold	F	G	VL		Very late
			Goldie	F	-	VL		Very late
			Golden Harvest	F	-	-		
		PURPLE	Brandywine	3	G	L	Excellent for jam	Tart fruit, crown gall susceptible
			^b Royalty	3	VG	L	Excellent flavor, productive	Soft fruit, crown gall susceptible
			^a Success	4	G	M/L	Hardest purple, yields	Not vigorous
		BLACK	^a Jewel	3	VG	M	Disease resistant, flavor	
			MacBlack		G	-		
			Haute	2	VG	E	Productive, flavor	May not be hardy
			Black Knight	F	-	-	Can be pruned for fall fruiting	
			Bristol	2	VG	E		May not be hardy
			Allen	2	F	E/M	Attractive fruit	Only moderately hardy
			^b Black Hawk	3	VG	-	Relatively hardy	
	BLACKBERRIES	^a Illini	4	VG	-	Moderately hardy		
		^a Darrow	3	VG	-	Moderately hardy		
		^b Prime Jim	F	F	VL	Primocane-fruiting	Fair flavor	
		^b Prime Jan	F	F	VL	Primocane-fruiting	Fair flavor	
		^b Chester	1	G	L	Quality fruit, vigorous	Hard to pick, not hardy	
		^b Triple Crown	1	VG	M/L	Quality fruit, vigorous	Need winter protection	

a Suitable for commercial growers	HARDINESS (1-5, low-high)
b suitable for trial	HARVEST (E-early, M-mid, L-late, VL-very late)
c suitable for home gardeners	FLAVOR (1-5, weak-excellent), - data not available

Information has been compiled from many sources including Cooperative Extension publications and specialists' expertise, research studies, and nurseries. For more information, please contact your local UNH Cooperative Extension Educator. (**Source:** *UNH Fruit and Vegetable Fact Sheets and Research Reports:* <http://extension.unh.edu/Agric/FactSheetsandResearchReports.htm>)

BLUEBERRY

Blueberry Varieties for New Hampshire Growers

Becky Sideman, UNH

This fact sheet was developed to help growers select among the many highbush blueberry varieties available. Growers in Northern areas should prioritize winter hardiness and only plant those classified as very hardy. We have indicated varieties that have been used widely for commercial plantings in New Hampshire, those that should be grown on a trial basis, and those best suited for home production. Information is not available for all varieties, particularly newer releases. Remember that preferences vary, and for any new planting, multiple varieties should be selected to increase the likelihood of success in your specific location.

		Yield	Flavor	Disease Tolerances	Susceptibility	PROS	CONS
Varieties							
EARLY	^a Bluetta	3	2	P	A	Early, hardy, good flavor	Small dark berries, large scar
	^a Duke	3	2	M	-	Productive, attractive firm fruit	Flavor, bush vigor
	^b Hannah's Choice	2	3	-	-	Flavor	Relatively new, hardiness?
	Earliblue	2	1	-	P, F	Early, upright	Productivity, flavor
EARLY-MID	^c Bluejay	2	3	M	-	Quality fruit, nice landscape plant	Less productive
	^a Blueray	3	3	-	M, B, A	Hardy, productive, flavor, large	Spreading bush
	Meader	2	2	M	-	NH release, flavor, quality	
	^a Patriot	2	3	RR	-	Early, productive, flavor	
	^c Spartan	3	4	M	A	Large, firm, flavor, nice fall foliage	Needs cross-pollination
	^b Reka	3	-	M	-	Tolerant of wetter ground	Relatively new release
MID-SEASON	^a Bluecrop	3	3	M	A	Yields, quality, widely adapted	Can't tolerate poor drainage
	^a Nelson	3	4	-	-	Productive, quality	
	Rubel	2	2	P, F	-		Flavor, small fruit
	^b Little Giant	-	4	-	-	Anthocyanins, lowbush flavor	Very small fruit, relatively new
	Sierra	-	-	-	M	Productive, large, firm	Less hardy
	^b Toro	-	-	-	-	Productive, large fruit	Upright, thick canes
	^b Caras Choice	-	-	-	-	Fruit quality	Relatively new, hardiness?
	Herbert	-	-	-	-	Fruit quality	Inconsistent in colder climates
	^a Chandler	-	-	-	-	Good for PYO	Long harvest window
	Bluegold	3	3	-	-	Quality	Twiggy bush, mummyberry
MID-LATE	Coville	2	3	-	M, F	Large, tart fruit	Yields
	Elizabeth	2	4	-	-		Quality, hardiness, productivity
	Berkeley	3	-	-	M, P, A	Productive, large firm fruit	Hardiness, large scar
	^a Bonus	-	-	-	-	Huge fruit	

	Legacy	-	4	A	M, P	High quality fruit	Hardiness, slow to produce
	^a Jersey	3	2	-	P, F	Productive, flavor	Shelf life
	Lateblue	3	3	M	-		May ripen too late
LATE	^a Elliot	4	2	M, P, A	-	Productive, large firm fruit	Flavor
	^b Aurora	-	3	-	-	Latest variety, flavor	New release, needs pollination
	Brigitta	2	3	A	-	Productive, large fruit	Hardiness
	^b Liberty	3	3	-	-	Late, firm attractive fruit, flavor	New release, needs pollination

Half-High Varieties (highbush x lowbush)

EARLY-MID	Polaris	2	4	-	A		
	^c St. Cloud	3	4	-	A		
	^a Northblue	3	3	-	-		
	^a North Country	2	3	-	-	Hardy	Med-small fruit, short bush
	^a Northland	4	3	M	G	Hardy, productive	Pruning, soft berries, Gibbera
MID	^a Friendship	2	4	-	-	Hardy	Quality
	Northsky	1	4	P	-	Hardy	Med-small fruit, short bush
	Chippewa	2	3	P	A		

^aSuitable for commercial growers

^bSuitable for trial

^cSuitable for home gardeners

Diseases: (A) Anthracnose, (M) Mummyberry; (RR) Phytophthora root rot,

(B) Botrytis, (F) Fusarium, (P) Phomopsis, (G) Gibbera blight

Yield (1-4, low-high); **Flavor** (1-4, weak-very good), "-" info not available

Information has been compiled from many sources including Cooperative Extension publications and specialists' expertise, research studies, and nurseries. For more information, please contact your local UNH Cooperative Extension Educator.

Blueberry production resources:

- **Highbush Blueberry Production Guide**, NRAES-55, 200 pages. Available at <http://www.nraes.org>
- **Growing Highbush Blueberries**. Available at http://extension.unh.edu/resources/files/Resource000009_Rep9.pdf

(Source: UNH Fruit and Vegetable Fact Sheets and Research Reports:

<http://extension.unh.edu/Agric/FactSheetsandResearchReports.htm>)

GRAPE

Warm Weather and Deacclimation

Joe Fiola, University of Maryland

Many fruit growers get understandably concerned in January and February when we get a run of "warm" weather like we [sometimes experience]. When a deciduous vine or tree experiences weather warm enough to start the deacclimation process, there is an increased risk of winter damage to buds and wood. Here is a simplified model of dormancy.

Dormancy

Deciduous vines go through various phases as part of their winter survival:

• **Acclimation** – As temperatures drop in the fall, the vine begins to "go dormant" and slowly become more and more tolerant to lower and lower temperatures.

- If you remember correctly, this past fall temperatures slowly went down and we did not have a hard frost until well into November in most locations in the state – that was premium acclimation conditions leading to good cold tolerance.

- Tony Wolf at VA Tech reported that the MLTE values he got from testing Traminette and Viognier were all very good, indicating very good acclimation in fall and early winter.

· **Dormant** - When vines have reached “full dormancy” they then need to experience a certain period of time of temperatures around 40 degrees Fahrenheit to satisfy their “rest.”

- This year December was colder than average, so most vines and fruit trees received enough cold to satisfy their rest requirement by the end of the year.

· **Deacclimation** - After their rest is satisfied, they then require another period of time with conditions above a specific temperature to come out of dormancy and begin a new growth cycle.

- During this period, grapevines in the Mid-Atlantic typically experience a series of deacclimation and deacclimation periods caused by periods of alternating warm and cold weather. This is what many refer to as the “fluctuating temperatures” of January and February.

· **Vines are more sensitive to cold damage when they have recently experienced a period of deacclimation, especially when temperatures drop very low and quickly shortly after the warm spell.**

- For example is a dormant vine can normally tolerate down to 0 degrees with no bud damage, after a period of deacclimation above 50, the vine may only be able to only tolerate +5 degrees with no damage and will experience a percentage of bud death at 0 degrees.

- If temperatures drop down gradually slowly after the warm spell, the vines have the capacity to “re-harden,” possibly even down to their previous low temperature tolerance (in this example back down to 0 degrees).

Let’s all hope for “reasonably cold” weather - for the vines and fruit trees at least. (*Source: Maryland Timely Viticulture Series – Dormant Season*)

GENERAL INFORMATION

Forcing Cuttings to Determine the End of Dormancy in Fruits and Other Plants

Woody plants may be ready to grow. Forcing cuttings can tell you when dormancy is completed.

Mark Longstroth, Michigan State University Extension

Since most plants do not grow during the winter, we say they are dormant. There are actually two types of winter dormancy. One is often called endo-dormancy and is when the plants will not grow even if the conditions are warm enough for growth. The other is eco-dormancy and is when the plant does not grow because the conditions are too cold. Endo-dormancy typically prevents plants from growing during winter warm spells.

During endo-dormancy, plants accumulate chilling units when air temperatures generally are above 35 degrees Fahrenheit and below 50 F. Temperatures below freezing or warm temperatures above 55 or 60 F have little effect on chilling hour accumulation. The chilling hours required varies for different plants from 700 to 1,300 hours or more. Chilling and endo-dormancy normally prevent plants from beginning growth during warm spells in the middle of the winter.

The mild weather we have had this winter makes me think that some plants may have already completed their chilling requirement and are ready to start growing. The return of seasonably cold temperatures may keep growth from occurring. Once growth begins, the plant cannot increase its ability to withstand cold and can be injured by very cold weather. In the deep winter when plants are in endo-dormancy, they can become cold hardy to -10 or -20 F or below. Once growth begins, they lose the ability to withstand these extreme cold events.



There is no doubt these buds are swollen and the plant is growing. Photo credit: Mark Longstroth, MSUE

According to [Michigan State University Extension](#), there is one very easy way to know if endo-dormancy has been completed. You can take cuttings from the plants you are interested in and bring them inside to see if they will grow under warmer conditions. Collect several healthy shoots from the plants and place them in a vase or glass of water to provide consistent warm temperatures. If the buds begin to swell and grow within a week to 10 days, then you know the plants have completed their chilling requirement and warm weather will cause them to grow. You may need to do this several weeks in a row. I usually start collecting shoots in early to mid-January and generally see growth here in southwest Michigan in mid- to late January. Often the first time I see growth, the growth is ragged and not all the buds break and start to grow. This indicates that not all the buds have completed their chilling requirement, but several have and are ready to grow.



It is hard to tell if these buds are swollen or not. Forcing them will give you an answer in a few days. Photo credit: Mark Longstroth, MSUE

Once the plants have completed their chilling and moved into eco-dormancy, growth depends on the heat units they accumulate. If we get warm temperatures and growth begins, then the temperatures falling into the teens or below might cause damage. If you force some cuttings, you will have a good idea of how worried about winter cold you need to be.

Related MSU Extension articles

- [“Winter dormancy and chilling in woody plants”](#)
- [“Winter cold hardiness in Michigan fruit crops”](#)
- [“Fall color show and winter dormancy in woody plants”](#)
- [“Freeze damage depends on tree fruit stage of development”](#)

(Source: Michigan State University Fruit Crop Alert Blog, Jan 16, 2013)

Impact of Cornell Soil Health Program on Soil Management Practices in New England

Bianca Moebius-Clune et al, Cornell University

Degraded soils in the Northeastern U.S. have become prevalent because management practices usually focus on directly “feeding the crop” with ready nutrients through fertilizers, and less so on “feeding the soil” so that it can feed the crop. Degraded soils become less resilient to more extreme temperatures and precipitation events brought on by climate change. Compaction, disease pressure, lacking resilience to droughts and intense rainfall, loss of organic matter, surface crusting, erosion, increasing inputs with stagnant or declining yields and other problems are common on Northeast farms, and result from ignoring physical and biological

soil properties and the need to manage these along with nutrient contents. As agronomically essential soil functions and processes are degraded, this significantly impacts agricultural productivity and the environmental sustainability of agriculture.

Standard chemical soil analysis has been hugely successful in helping growers manage nutrient constraints to cropping, but physical and biological soil constraints that impact crops had been largely ignored by soil testing services until the first version of the Cornell Soil Health Test (CSHT;

<http://soilhealth.cals.cornell.edu/>) became available to the public in 2006. It is available in its current form since 2007, and the team is working on making expanded packages available in the future. This test was developed in NY State (NYS) for use in the Northeast in response to increasing concerns from growers. The CSHT measures, rates and interprets an integrative set of 15 physical, biological, and chemical indicators that represent agronomically important soil processes. Growers receive a color-coded report that provides information about which soil processes are constrained. The grower can then adapt soil management to specifically choose management strategies that promise to alleviate identified constraints.

The following developments by the Cornell Soil Health Team will be discussed:

1. Interpreting a Cornell Soil Health Report
2. A four-step process to guide management
3. decisions based on a CSHT report
4. Impact in New England thus far
5. Manual, resources

1. Interpreting a Cornell Soil Health Report

The CSHT report (Figure 1.) identifies constraints in agronomically essential soil processes (indicators and 159rating is explained in our manual). A lower rating means the process is functioning less well. The rating

system is as follows: Each measured value receives a rating from 0-100. Ratings of 70 and above indicate optimal functioning (in green), while medium scores (>30, but <70, in yellow) indicate marginal functioning. Ratings below 30 indicate constraints in soil processes that need to be addressed. The constraints column shows what about the soil is not functioning properly when the indicator rating is red.

2. Four-Step Process to Guide Management Decisions Based on a CSHT Report

A key concept in soil health assessment is that indicators measured in the CSHT represent how well agronomically important soil processes are functioning in the soil. For example, when aggregate stability receives a low rating (Fig. 1), this means that soil crumbs fall apart easily in the rain, and this means that problems with aeration, infiltration, shallow rooting, surface crusting and erosion are likely.

The question then is – what can a grower do to alleviate such a problem? It is important to understand that a CSHT report is a guide to management, rather than a prescription (such as nutrient recommendations). Soil health constraints generally require a more integrated and long-term approach, and there are usually many different management approaches that can mitigate the same problem. Also one management practice can affect multiple indicators. What works on one farm is not necessarily feasible or ideal on another, and so report information must be adapted situationally. It is also important to remember that soil health changes slowly over time (on the order of several years to decades).

We have developed a four-step process, to help growers (often in collaboration with their extension educators or consultants) make management decisions that will alleviate identified soil constraints. Fig. 2 (below) shows an example of this process. The grower, in Step 1, lists the constraints identified in the CSHT report (Fig. 1) and then, in Step 2, lists potential management options for those constraints. Examples of such options, such as those listed in Fig 2, Step 2, can be found on page 52 of the Cornell Soil Health Assessment Training Manual (available online, see below). For example adding or growing fresh organic matter and reducing tillage will both improve low aggregate stability and low biological activity. In Step 3, the grower then, considers relevant opportunities (such as having access to diverse equipment, and being willing to try anything) and limitations of the farm and field (such as being far from a dairy farm, and thus having no access to manure, etc). Combining the agronomic science (Steps 1 and 2) with the realities on the ground (Step 3), the grower can

CORNELL SOIL HEALTH TEST REPORT (COMPREHENSIVE)				
Name of Farmer: GATES FARM RESEARCH TRIAL		Sample ID: _____		
Location:		Agent:		
Field/Treatment: †		Agent's Email:		
Tillage: PLOW TILL		Given Soil Texture: SILTY		
Crops Grown: SWEET CORN/BEANS/CORN GRAIN		Date Sampled: 06-May-08		
Indicators	Value	Rating	Constraint	
PHYSICAL	Aggregate Stability (%)	17	18	aeration, infiltration, rooting
	Available Water Capacity (m/m)	0.21	85	
	Surface Hardness (psi)	48	93	
	Subsurface Hardness (psi)	214	79	
BIOLOGICAL	Organic Matter (%)	2.6	25	energy storage, C sequestration, water retention
	Active Carbon (ppm) (Permanganate Oxidizable)	615	50	
	Potentially Mineralizable Nitrogen (µgN/gdsoil/week)	7.8	9	N Supply Capacity
	Root Health Rating (1-9)	6.6	38	
CHEMICAL	*pH	7.0	100	
	*Extractable Phosphorus (ppm) [Value <3.5 or >21.5 are downscored]	10.0	100	
	*Extractable Potassium (ppm)	58	72	
	*Minor Elements		100	
OVERALL QUALITY SCORE (OUT OF 100):		64.1	Medium	
Measured Soil Textural Class: => silt loam				
SAND (%): 41.4 SILT (%): 50.6 CLAY (%): 8.0				

Figure 1. Cornell Soil Health Test Report (usually in color), showing constraints (Rating < 30, in red) in a long-term moldboard-plowed corn grain field.

then plan short- and/or long-term management strategies that will be feasible on that field.

3. Impact in New England

The soil health lab has received over 700 samples from New England since 2007, most from VT (well over 400), over 200 from NH over the last two years, a few dozen from MA, and several from ME. Use of the Cornell Soil Health Test in New England has increased with almost 300 samples received this year from NH, VT and MA. The NH NRCS has integrated the soil health test in their high tunnel program and is making it available through other cost share programs as well. As part of the high tunnel program, soil health is assessed before the high tunnel is put in place, with the goal to tailor tunnel soil management to preventing degradation and improving identified constraints for sustainable

long-term tunnel use. We are currently in the process of assessing the impact of our program on New England soil management practices, and will provide a summary of our findings during the presentation.

4. Manual, Resources

a. Manual – the second Edition of Cornell Soil Health Assessment Training Manual is available on our website <http://soilhealth.cals.cornell.edu>

b. Another good reference is the new edition of the book “Building Soils for Better Crops” by Fred Magdoff and Harold van Es. It can be downloaded for free from the SARE website <http://www.sare.org/publications/soils.htm>

Cornell Soil Health Test Report Field Management Sheet

<p>Step 1. Identify constraints, prioritize</p> <p>Identified in the Soil Health Report</p>	<ul style="list-style-type: none"> • <i>Low aggregate stability (poor soil structure)</i> • <i>Low organic matter/low energy/C storage, low water retention)</i> • <i>Low Active C (hungry soil food web)</i> • <i>Low PMN (low biological activity)</i>
<p>Step 2. List management options</p> <p>Some suggestions found in Table 5 (page 52)</p>	<ul style="list-style-type: none"> • <i>Add/ grow fresh organic matter</i> • <i>Add stable organics (composts, biochar)</i> • <i>Reduce tillage intensity, Rotate with shorter season crop</i> • <i>Find window for shallow-rooted cover crop</i>
<p>Step 3. Determine site history/ farm background</p> <p>Note here any situational opportunities or limitations</p>	<ul style="list-style-type: none"> • <i>Far from dairy farm, Short growing season</i> • <i>Soil “addicted to tillage”</i> • <i>Diverse inventory of field equipment</i> • <i>Grower willing to “try anything”</i>
<p>Step 4. Management Strategy 2010</p> <p>The agronomic science of Steps 1 and 2 combine with the grower realities of Step 3 to create Field Management Plan</p>	<ul style="list-style-type: none"> • <i>Drill barley/ timothy/ clover mix in spring</i> • <i>Harvest barley, Mow timothy/ clover as green manure</i> • <i>Fall mow, rent ripper for strip till for corn 2011</i> • <i>Learn about strip tillage</i> • <i>(Build soil for transition to strip till)</i>

Figure 2. Completed management decision worksheet for the CSHT report in Fig. 2.

(Source: 2011 New England Vegetable & Fruit Conference Proceedings)

African Fig Fly: Another Invasive Drosophilid Fly Discovered in Pennsylvania

David Biddinger, Kathy Demchak and Neelendra Joshi, Penn State University

Zaprionus indianus Gupta (Diptera: Drosophilidae), commonly known in Brazil as the African Fig Fly (AFF), is an invasive species recently found in Pennsylvania for the first time. First discovered by the Pennsylvania Department of Agriculture in early October in Grape and Tomato Pest Survey traps, it was found immediately after by Dr. David Biddinger at the Penn State Fruit Research and Extension Center in Biglerville. Adult flies were found in apple cider vinegar traps used for the seasonal monitoring of Spotted Wing Drosophila (SWD), another recently introduced invasive pest of small fruit crops in Pennsylvania that Dr. Biddinger first detected in Pennsylvania and Maryland in July of 2012.



A. Spotted Wing Drosophila (SWD) male in comparison with the African Fig Fly (AFF). B. African Fig Fly (AFF) and its black bordered, white "racing stripes".

Reviewing SWD samples from 2011, Dr. Biddinger also found it had been present in Adams county in the fall of 2011, so it has been here for at least two seasons. For what is considered to be a tropical pest, this is important because they not only survive the extremely mild winter of 2011-12, but also the more typical previous winter. Of note, however, is that while SWD trap catches have greatly increased in the last two weeks despite heavy frosts, the same vinegar traps are no longer catching AFF. AFF is now recorded from Adams, York, Dauphin, and Clearfield counties according to the Pennsylvania Department of Agriculture.

Z. indianus adults are easily distinguished from all other fruit flies in our region because of a pair of silvery-white

stripes from antennae to thorax tip that are outlined along both sides by black stripes. A humorous nick-name given to the fly by PDA has been the "Speed Racer Fly" since it has prominent "racing stripes." Adults of this species are slightly larger in size than the Spotted Wing Drosophila and the background color of the body is lighter than most other drosophilid flies we commonly find in our SWD vinegar monitoring traps.

Native to Africa, the Middle East, and Eurasia, it is now found in much of South and Central America where it is mainly a pest of figs. It was first found in Florida in 2005, where it quickly spread and out-competed other fruit flies. New records were found for Michigan, North Carolina and Connecticut in September of this year and it appears to be spreading throughout the South as far west as Texas. *Z. indianus* is considered as a generalist insect feeding on various tropical fruits, but it has potential to damage small fruits (cherries, blueberries, blackberries, strawberries, and raspberries). In Pennsylvania, so far it has been found later in the season and mostly in grapes, but has also been found in SWD monitoring traps in cherry, raspberry and blackberry plantings. Its presence and damage potential in grapes and other crops is under investigation by Dr. Biddinger's lab and Penn State small fruit specialist, Kathy Demchak. Monitoring effort throughout the state will continue next season by PDA and Penn State and records for new hosts and new county records should be forwarded to either institution.

Since it does not have a large, sharp ovipositor like SWD females, AFF appears to only attack damaged and over-ripe fruit and the harsher winters of Pennsylvania may prevent it from establishing as aggressively here as it did in Florida. Indeed, so far numbers of adults collected in vinegar traps have been only a fraction the number of SWD collected. An exception, however, has been from net collected samples in a grape vineyard where numbers of AFF greatly outnumbered SWD. While it appears from our samples that grape is not a preferred host of SWD, it may be that grape is preferred by this new fruit fly. There is also concern in the South that it will become a pest of blueberries. (Source: Penn State Extension Fruit Production News @ <http://extension.psu.edu/fruit-production/news/2012/>.)

UPCOMING MEETINGS:

January 27-30, 2013 - *North American Strawberry Growers Associations*, Portland OR. More information: Kevin Schooley, 613-258-4587, info@nasga.org or www.nasga.org. Excellent program!!

January 28, 2013 - *Vt Vegetable And Berry Growers Annual Meeting*. Montpelier. Great program, details coming soon. Check for information at <http://www.uvm.edu/vtvegandberry/meetings/meetlist.html>.

January 28-30, 2013 - *North American Raspberry and Blackberry Growers Association*, Portland OR. More information: 919-542-4037, info@raspberryblackberry.com. Excellent program!!

January 29-31, 2013 - *Mid-Atlantic Fruit and Vegetable Convention*, Hershey, PA. More information: William Troxell, 717-694-3596, pvga@pvga.org or www.mafvc.com.

February 2, 2013 - *New England Vegetable & Berry Growers' Association Meeting*. Elks Lodge, 221 Baker Avenue, Concord MA. This is the second of three winter meetings of the New England Vegetable & Berry Growers Association. The Cost is Free for NEVBGA members, \$10 for non-members. Lunch cost is \$30. Pesticide Recertification Credits will be requested. For more information contact John Howell at howell@umext.umass.edu.

February 6-9, 2013 - *Pennsylvania Association for Sustainable Agriculture (PASA) Farming for the Future Conference*. Penn State Conference Center, State College, PA. For more information visit www.pasafarming.org.

February 12, 2013 – *Massachusetts Farm Winery & Grower's Association Annual Meeting*. 8:00am to 4:00pm. Publick House, 277 Main Street, Sturbridge MA, 01566. For more information see <http://www.masswinery.com/web/> or contact Kim LaFleur at masswinery@gmail.com

February 27 – March 1, 2013 – *US Highbush Blueberry Council Spring Meeting*, in Savannah, GA. More information: 916-983-0111 or www.blueberry.org.

February 27 - 28, 2013 - *2013 Harvest New England Agricultural Marketing Conference & Trade Show*, Sturbridge Host Hotel, 366 Main Street, Sturbridge, MA 01566. For more information and to register, go to: <http://www.regonline.com/builder/site/Default.aspx?EventID=1135517>

March 13, 2013 – *Cape Cod Cranberry Growers' Association Winter Meeting*, in Hyannis, MA. More information: 508-866-7878, info@cranberries.org, or www.cranberries.org.

If you know of an event that would be suitable for this list, please forward to sgs@umext.umass.edu

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