Cornell Cooperative Extension | Eastern NY Commercial Horticulture Program

Berry News

Volume 7, Issue 4
May 2019

Berry 'To Do' List

—All Crops—

This is a busy time of year that has been significantly hampered by weather. There are a number of pest issues mentioned in the checklist below. I try to include products appropriate for management, but am not always able to include all the different rates and timing for these materials. Please refer to the label before spraying. Additional guidance can be found in the 2019 Cornell Pest Management Guidelines for Berry Crops.

—Strawberries—

- ***Strawberry development*** ranges from buds barely emerging from the crown in the north to green fruit the size of half dollars in the mid and lower Hudson Valley. If we get some sun and more warmth we'll likely see ripe berries by the June 1st in several places. Planting has been delayed due to wet fields across the region. If this weather pattern ends soon, most growers will be able to get plants in the ground in a timely manner. I'd really like to see dormant crown plants in the ground by the end of May – that might not happen this year.
- ***Pre-plant herbicide options –*** While Prowl H20 or Chateau are great options for pre-plant herbicides, with all the rain we've had, if you did get these materials down you may not see much protection from them. Plan on applying Devrinol at 5 lb/A. You should wait until mid-June theoretically a few weeks post-planting, then cultivate and apply. Irrigate after application.
- ***Plan for frost protection*** – There has been at least one minor frost event in the Hudson Valley when most strawberry blooms were still in bud. Forecasts look good, but we aren't out of the woods yet.
- ***Phytophthora control –*** Red stele, the common name for root and crown rot of strawberry is caused by the fungus *Phytophthora fragariae* while Leather Rot of the fruit is caused by *Phytophthora cactorum.* Earlier in the season, Ridomil and phosphorus acid products were

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recommended as soil drenches in fields where flooding was a problem last fall. Likewise, those same products (ie Ridomil Gold and ProPhyt) can be added to bloom sprays if extended wet fields, or overhead irrigation because of frost were problems, or if leather rot has been a problem in past years. Add these products at first bloom. Straw mulch helps to minimize water splashing that will spread leather rot. There may be reason to put a second Ridomil application on the patch given our super saturated soil conditions.

- Pennsylvania is having a real problem with **anthracnose on strawberries** this spring as green fruit is appearing with infections. This despite cool, wet conditions that would typically be associated with botrytis. Anthracnose is caused by *Colletotrichum*, and has been affecting primarily plasticulture plantings and matted-row plantings of susceptible cultivars.

- ***Scout for strawberry clipper*** - The new threshold is more than one primary or secondary flower bud or more than two tertiary flower buds per truss, or more than one injured truss per foot of row. Treatment must take place when blossom buds first become visible in the crown and the temperature approaches 65° F. Since clipper weevils move into the fields from the wooded edges, border sprays may be effective for control in new plantings, or in older plantings without previous infestations. Molt-X, Brigade, Danitol and Lorsban are all labelled. There are no organic products labelled for this pest.

Angular peak spot lesions on back of leaf. Photo Courtesy of Rutgers

- ***Look for angular leaf spot –*** Small water-soaked spots appear on lower leaf surfaces. These enlarge to form angular spots usually bordered by small veins. The spots appear translucent when held up to the light but are dark green under reflected light. Calyxes may also become infected. The disease is favored by moderate to low day time temperatures (68°F) along with low to near freezing night time temperatures and precipitation events such as rain, overhead irrigation or heavy dews. Kocide 3000, Badge SC, and Rendition are labelled for conventional use. Cueva, Double Nickel 55 or LC and Badge X_2 are labelled for organic production.

—Blueberries—

- ***Bloom sprays for Mummyberry, Botrytis blossom and twig blight, Anthracnose fruit rot, Blueberry leaf rust*** – There are several fungicides that are labelled for most of these diseases – Captevate, Switch, Abound are a few. But depending on your specific problem – make sure that your fungicide choices are appropriate.

- ***Prepare for N applications in May and again in early June.*** Review foliar tests then read the article by Eric Hanson in this issue.

- ***Apply sulfur if soil pH is higher than 5.2*** – 200#/A is the maintenance rate that should be applied 1-2 times annually to prevent soil pH from creeping up. Remember that the target pH is 4.5.

- ***Make sure Boron is applied*** if foliar test suggests deficiency. Boron can be added any time of the year directly to soil, or dissolved into trickle irrigation water or sprayed on the foliage.

- ***Petal fall sprays for cranberry fruit and/or cherry fruit worm*** – We saw lots of damage from this pest last season in several plantings. There are many different labelled insecticides that provide protection. Two sprays are often required for adequate control; the first should be applied at petal fall and the second 10 days later, about 2 weeks before harvest

—Brambles—

- ***Uneven budbreak*** in floricanes seems to be levelling out to show just a ***small amount of winter damage – mostly at the tips***. We might see some collapse of borderline canes when hot weather arrives. Bloom on some early floricanes in the south. ***Primocane growth*** is up to 12" in some areas.

- As leaf tissue expands, watch for ***orange rust on blackberries and black raspberries*** and rogue out plants where it is found. Orange rust is systemic and cannot be treated to eliminate it from an infected plant. Now is one of the key times for infection on new growth.

Orange Ruse on brambles is systemic. Photo courtesy of MSU.

- ***Iron deficiency chlorosis*** might be an

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explanation for anemic looking plants (see article in this issue), although herbicide damage and virus should also be considered.

- ***Complete the necessary pruning***: keep cane density at no more than 4 canes per square foot. There may be some winter injury so look for that and prune it out. Don't worry if you are still pruning. Many folks have chosen to do the spring pruning after the canes have leafed out – to make sure they get the correct density of excellent canes.
- ***Bud Break*** is the trigger for ***sprays to control Anthracnose, spur blight, and Cane blight***.
- ***Watch for raspberry fruitworm*** feeding on new leaves.
- ***Early pre-bloom sprays for Gray Mold and Powdery Mildew*** would be wise given the weather.

—Juneberries (Saskatoons)—

- ***Strong bloom*** in these berries this year.
- Now is the time to spray ***for apple curculio and/or saskatoon sawfly*** if you've had damage in past years. The larval stages of these insects feed inside the developing berries, resulting in fruit losses or the presence of insects inside fruits at harvest. Treat if damage to berries exceeded 10% last season. Products include Molt-X (10 fl oz/A) or SuffOil-X (1 – 2 gal/100 gal) or PyGanic 1.4 ECII (16-64 fl oz/A).
- There are relatively few pesticides registered for use on this crop. Even for products that are registered, there is limited information on the efficacy of the active ingredients against specific saskatoon pests. Therefore, the recommendations are based largely on how well the pesticides are known to work on related pest species on other fruit crops.

—Ribes—

- Excellent fruit set in currants and gooseberries in the Hudson Valley.
- Powdery mildew sprays (many organic options including oil, Kailgreen, sulfur and Actinovate, but also Rally, Cabrio and Rampart) should begin now if this has been a problem in the past.

—Haskaps/Honeyberries—

- These plants are in bloom north of Albany. They can tolerate low temperatures, even at bloom (tolerating down to 18°F), so frost protection is not needed. ■

Nitrogen Management in Blueberries

Dr. Eric Hanson, Michigan State University; edited by Laura McDermott, CCE ENYCHP

Blueberries require nitrogen on an annual basis. The big question is what you can do to use nitrogen efficiently. Answers to this question include choosing the right fertilizer, fertilizer rate, application timing, and product placement.

Nitrogen Fertilizers

There are many nitrogen fertilizers to choose from. Products with the highest nitrogen content tend to be the cheapest per pound of nitrogen and are generally the most preferred N sources. Nitrogen products also vary in their reaction in the soil (Table 1).

Table 1: Nitrogen Fertilizers and Their Lime Equivalents

Source	%N	Reaction	Lime equivalent (lb lime/lb N)*
Ammonium nitrate	32	acidic	-1.8
Ammonium sulfate	21	acidic	-5.3
Calcium nitrate	16	basic	1.3
Potassium nitrate	12	basic	1.9
Urea	46	acidic	-1.8
Diammonium phosphate (DAP)	17	acidic	-4.1
Monoammonium phosphate (MAP)	11	acidic	-3.5

***Lb lime equivalent to alkalinity from 1 lb N (positive values) or required to neutralize the acidity from 1 lb N (negative values)**

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Fertilizers that supply nitrogen in the ammonium (or ammonium plus nitrate) form tend to have an acidifying reaction in soil. Those fertilizers that supply nitrogen only as nitrate have a basic reaction in soil. The measurement of this effect is called the lime equivalent. Essentially the lime equivalent is the lbs of lime that would be equivalent in reaction to 1 lb of nitrogen supplied as a nitrogen fertilizer. For example, if you were to apply 1 lb of N as calcium nitrate it has a positive number indicating for every lb of nitrogen applied as that source it would have the equivalent reaction in soil as 1.3 lb of lime. This is not a large amount of lime but over time could accumulate and affect soil pH. The fertilizers with negative numbers indicate you need to add lime to neutralize the acidity supplied by those sources. Ammonium sulfate is known to be a good N fertilizer for blueberries because it is so acidifying. For every pound of N applied as ammonium sulfate as you would need to apply 5 lb of lime to neutralize the acidity.

Choosing Nitrogen Sources

The choice of nitrogen source should be based first on cost per pound of nitrogen, and then second on the need for other nutrients, particularly phosphate. That would be a reason to choose ammoniated phosphates. Thirdly, one should take into consideration soil pH needs to be changed and in which direction, and then finally, volatilization losses.

For blueberries, preferred nitrogen sources are urea and ammonium sulfate. If your pH is below 5.0 the material of choice would be urea (less acidifying); you might opt for Monoammonium phosphate (MAP) or Diammonium phosphate (DAP) if your P is also low (slightly acidifying). If soil pH is below 5.0, ammonium sulfate is the product of choice to further lower pH. Again you might consider using MAP or DAP if your P is low in this case.

Recommended nitrogen rates for blueberries vary from state to state and region to region, and certainly with various soil types. Table 2 gives the rates recommended in the 2019 Cornell Pest Management Guidelines for berry crops.

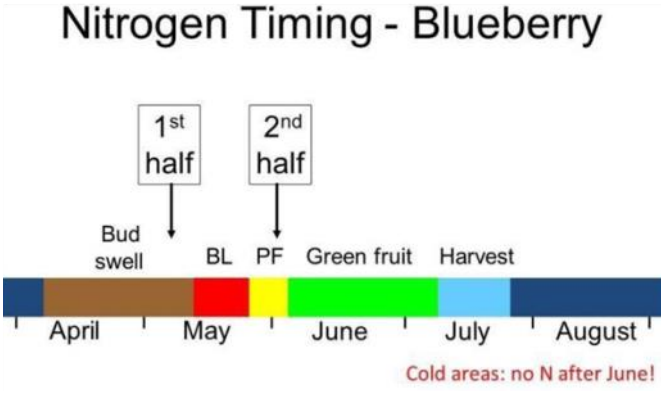
Rates for blueberries start out low and increase over time. As the planting reaches maturity (7 years and older) the rate would be between 40 and 70 lb actual N/A. The sandier the soil and the lower the organic content, the higher the rate of N you might need.

Table 2. Nitrogen Guidelines for Blueberries

Plant age (yrs.)	Amount/timings (actual N)	N source	Comments
0	Do not fertilize newly planted blueberries		Soil should be adjusted to pH of 4.5 prior to planting
1	15 lb/A, split between May and June	ammonium sulfate or urea	Use ammonium sulfate where soil pH is >5.0.
2	20 lb/A , split between May and June	ammonium sulfate or urea	Use ammonium sulfate where soil pH is >5.0.
3	25 lb/A, split between May and June	ammonium sulfate or urea	Use ammonium sulfate where soil pH is >5.0.
4	35 lb/A, split between May and June	ammonium sulfate or urea	Use ammonium sulfate where soil pH is >5.0.
5	45 lb/A split between May and June	ammonium sulfate or urea	Use ammonium sulfate where soil pH is >5.0.
6	55 lb/A split between May and June	ammonium sulfate or urea	Use ammonium sulfate where soil pH is >5.0.
7+	65 lb/A split between May and June	ammonium sulfate or urea	Use ammonium sulfate where soil pH is >5.0.

Nitrogen application timing

Timing is critical in terms of optimizing nitrogen use (Figure 1). A good system for blueberries is to apply N fertilizer in a split application with half of it going on a bud swell time before bloom, and the second half going on during petal fall approximately 3 weeks later. This provides nitrogen to the plant during the rapid growth flush through bloom, petal fall and green fruit. The second application maintains adequate levels through the harvest period. If growing on heavier soils or with higher organic content you may not observe a significant benefit with a split application, one application at bud swell may suffice. The split application system is of greater benefit on sandier sites. **If growing blueberries in cold locations where winter injury is a concern, do NOT apply nitrogen later than June 30**. N applications made later than June in colder growing areas tends to reduce hardiness of the bushes going into winter.



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Nitrogen Placement

Nitrogen placement is a balance between putting fertilizer where it is readily available vs. not concentrating the fertilizer so much you create salt issue with resulting plant injury. With young plants in the 1st and 2nd years, apply fertilizer by hand in a 2 to 3-ft wide circle around the plant or in a 3 to 4-ft wide band down the row. Broadcasting fertilizer over the entire surface at this point is very inefficient. As the bushes mature, the root systems of these old bushes intertwine in between the rows; any advantage then with banding fertilizer in the row is likely lost and broadcasting fertilizer makes more sense.

Nitrogen Release Rates from Organic Nitrogen Sources

There are a number of organic materials to choose from, of both of plants and animal origin (Table 3). They are relatively high in nitrogen and release a larger percentage of their nitrogen the first year. Composts and aged manures tend to be more stable and release lower percentages of nitrogen during the first year.

Table 3. Nitrogen Content and Release Rates of Some Organic Sources

Material	% N	% available in year 1
Soy meal	7	60-90
Cotton seed meal	6	60-90
Dried blood	12	70-100
Fish meal	14	70-100
Nitrate of soda	16	100
Manure—fresh	0.5-2.5	40-80
Manure—dried	2.0-5.0	40-80
Compost	0.6-2.5	10-40

Figure 2 illustrates work done in Michigan with release rates of N from a soy-based organic fertilizer McGeary's 8-1-1 at 2 different rates. Fertilizer was applied on May 10 and total inorganic N (ammonium and nitrate in the soil profile) was monitored. There was an immediate release of available N after application, and then the release rate declined as the season progressed. There was an elevated rate of available N being released into the middle to end of September, particularly with the higher rate.

In a study in another field with the same fertilizer (Figure 3), only the lower fertilizer rate was applied. Again, there was an elevated rate of available N being released into September. While the gradual early season release mimics the nitrogen demand of the blueberries in the spring, these trials highlight a concern as to how fertilize organic blueberries without elevating levels of available nitrogen late in the season when plants should be slowing growth. A corresponding increase in the levels of bud damage and winter injury was observed in the fertilizer treatments in both trials. ■

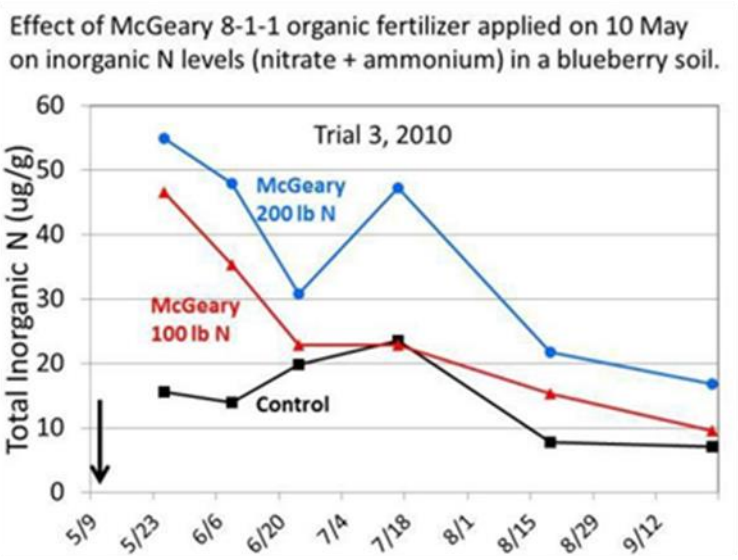

Figure 2: Release rates of N from a soy-based organic fertilizer, field 1.

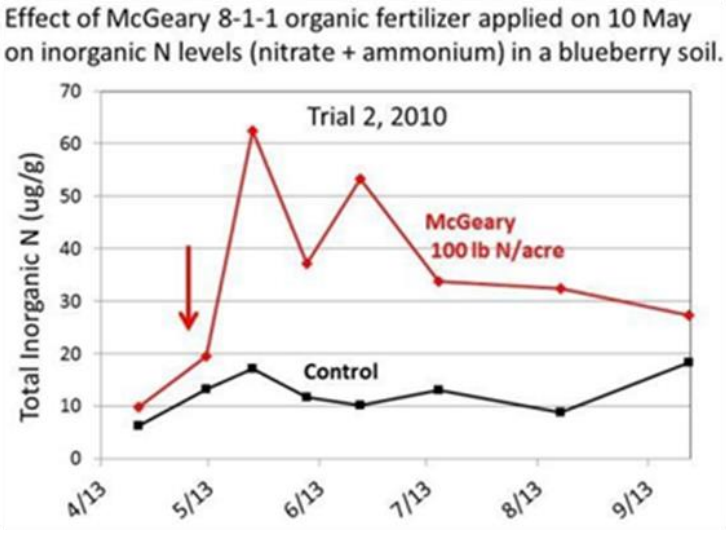

Figure 3: Release rates of N from a soy-based organic fertilizer, field 2.

Iron Deficiency Chlorosis in Berries

Dr. Brent Black, USU Extension Fruit Specialist, Dr. Grant Cardon, USU Extension Soils Specialist, and Dr. Corey Ransom, USU Weed Scientist

Editors note: While eastern NY doesn't have the alkaline soils that pre-disposes western grown berries to Iron Deficiency chlorosis, we have had an unusually wet and cool spring so far this season. Iron chlorosis is not caused by a lack of iron in the soil. Iron is typically abundant in our soil, but a variety of soil conditions (including pH that is too high) can limit how well a plant can get to the iron in the soil. Other soil situations that could lead to Iron chlorosis include heavy clay soil, compacted or overly wet soil, or too much phosphorus in the soil.

Chlorosis is a symptom of iron deficiency common in Utah berry crops. Chlorosis is characterized by interveinal yellowing in mild to moderate forms, with more severe cases resulting in the leaf becoming almost white in color and then curling and browning of leaf edges. While Utah soils typically contain iron, the alkaline pH (> 7.0) makes the iron relatively unavailable to plants.

Several management practices can make iron deficiency more severe.

Fertilization

First, improper application of N-P-K fertilizer can promote iron chlorosis. Nitrogen deficiency can result in slowed growth and leaf yellowing. Applying too much nitrogen will stimulate excessive vegetative growth, which under some conditions will cause the plants to out-run their ability to take up iron. Nitrogen requirements differ between young and old plantings and among soil types, but annual N requirements for established raspberry and strawberry planting are typically 70 to 100 lbs per acre (2.5 to 3.5 oz per 100 sq ft). Likewise, excessive phosphorus can also contribute to iron chlorosis by binding iron with low-soluble phosphate in the soil solution, by competing with iron for root uptake, or by binding up iron with excess phosphates in plant tissues.

Over-irrigation

Second, over-irrigation early in the spring will induce iron deficiency, as cold waterlogged roots are not effective at iron uptake. This seems to be the most common cause, particularly on heavy soils. Remember that snow pack and spring rain will often saturate the soil profile in the spring. Starting your irrigation cycle too early will prolong this waterlogged condition. Allow the soil in the top foot to dry (i.e., a squeezed soil ball crumbles easily upon shaking in hand) before beginning irrigation.

Is It Really An Iron Deficiency?

Some completely unrelated conditions can mimic iron chlorosis in raspberry plantings and should be ruled out. During several recent seasons in Utah, winter injury produced chlorosis symptoms on floricanes. Some buds were winter killed, while surviving buds opened slowly and showed leaf yellowing similar to iron chlorosis. This is likely caused by injury to the vascular tissue that slows transport of nutrients to the developing laterals.

Figure 1: Comparison of healthy (left) and chlorotic (right) raspberry leaves. Note the green veins on the chlorotic leaf.

Injury from winter applications of the pre-emergent herbicide Princep (simazine) can also cause leaf yellowing that may be confused with iron deficiency symptoms. Follow the label carefully when using this material, giving extra attention to restrictions on use rates, application to young, diseased, or stressed plants, and use on coarse textured (gravelly, sand, and loamy sand) soils.

Figure 2: Chlorosis on a blackberry floricane.

Prevention

Several management actions can prevent or alleviate chlorosis. One way to prevent chlorosis is to lower the soil pH to slightly acid range of 6.0-6.5. This can be accomplished with the addition of organic matter, elemental sulfur, and by using fertilizers that tend to lower soil pH, such as ammonium sulfate.

However, sulfur amendments take one or more growing seasons to

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fully react and lower soil pH and are not effective in the very alkaline soils (pH >8) common in Utah. Another method is to select varieties that are less susceptible to chlorosis. If you have a site prone to chlorosis, you might experiment with a wide range of varieties to see which of these is less likely to run into problems.

The authors have commonly seen chlorosis on 'Ruby' and 'Encore' raspberries, and these may be more susceptible than other varieties. ■

Figure 3: Chlorosis on Strawberry. Note the brown leaf edges on the most severely affected leaf.

For Your Information:

- **IPM Alert**: The PA Department of Ag has reported that "Triple Action Neem Oil Broad Spectrum Fungicide, Insecticide, and Miticide", manufactured by Southern Agricultural Insecticides Inc in Palmetto, FL, contains pesticide active ingredients not listed on the product label. They confirmed the presence of malathion, chlorpyrifos and permethrin.

  The EPA Reg. No. is 70051-2-829. Consumers, distributors and pesticide applicators are advised to cease the sale and use of this product.

  https://www.media.pa.gov/Pages/Agriculture_details.aspx?newsid=799

- **Enroll Now in the NYS IPM Spotted Wing Drosophila Blog:** The statewide blog is managed by Juliet Carroll, Fruit IPM Coordinator, NYS IPM Program.

  The primary purpose of th eblog is to convey first reports of the trapping network each season. These reports are correlated with Growing Degree Days and general county locations. There are also links to resources, research updates, and posting of events state and region wide that might be of interest to berry growers. And most importantly, information about other invasive pests, like the Spotted Lanternfly (pictured here), is also posted. If you are not currently enrolled in the blog, enroll now at:
  http://blogs.cornell.edu/swd1/2019/03/22/have-you-seen-blueberry-stem-gall/

Spotted lanternfly nymphs
Photos: L Barringer

Spotted lanternfly adults
Photos: R. Parker

New egg masses
Photo: R. Parker

Old egg masses
Photo: E. Swackhamer

- **NY FarmNet is there to Help:** Always free, always confidential, NY FarmNet services are available to all farms in New York state, large and small, with a diversity of commodities including dairy, crops, livestock, maple, fruit, vegetables, honey, nursey, and more. For assistance, call 1-800-547-3276.

  Is your organization interested in offering Mental Health First Aid, stress management programming for agricultural service professionals or farmers? Contact Kate at kdownes@cornell.edu.

NY FARMNET
1-800-547-3276 | www.nyfarmnet.org

Calendar of Events

May 27 - Last Monday Grant Webinar for Fruit and Vegetable Growers

The webinar will be limited to grants that are relevant to fruit and vegetable farmers in Eastern New York. More information and register at https://enych.cce.cornell.edu/events.php.

June 24 - Last Monday Grant Webinar for Fruit and Vegetable Growers

The webinar will be limited to grants that are relevant to fruit and vegetable farmers in Eastern New York. More information and register at https://enych.cce.cornell.edu/events.php.

July 15 – FSMA/PSA Grower Food Safety Training Course
CCE Warren County office, Schroon River Road, Warrensburg, NY

A grower training course developed by the Produce Safety Alliance (PSA) that meets the regulatory requirements of the Food Safety Modernization Act (FSMA) Produce Safety Rule. This one-day training is a requirement for farms growing more than $25,000 worth of fruits and vegetables. Cost: $35/person. For more information, contact Elisabeth Hodgdon at eh528@cornell.edu or 518-650-5323. Register here: http://bit.ly/JulyFSMA

July 29 - Last Monday Grant Webinar for Fruit and Vegetable Growers

The webinar will be limited to grants that are relevant to fruit and vegetable farmers in Eastern New York. More information and register at https://enych.cce.cornell.edu/events.php.

August 8 – VT Berry Growers Workshop
Sunshine Valley Berry Farm, 129 Ranger Rd, Rochester, VT—4pm-7pm

Photo courtesy of Rob Meadows of Sunshine Valley Berry Farm

Rob Meadows and Patricia Rydle invite you to a tour of their 6-acre PYO organic blueberry and raspberry farm. Come see, and possibly try out, their new Easy Harvester for blueberries. Rob will explain his laser and distress call systems for bird control, and we will see their farm store and cool room setup. The farm is open until 6 pm so please park so as not to compete with customers. Attendance is free for members of the Vermont Vegetable and Berry Growers Association. The cost is $10 per-person for non-members, payable on-site. Refreshments will be served. For more information: www.uvm.edu/vtvegandberry/meetings/2019VegandBerryFarmWorkshops4-16-19.pdf

August 27 – Willsboro Farm Trial Field Day
Cornell Willsboro Farm, 48 Sayward Ln, Willsboro, NY—5pm-7pm

Jud Reid (Cornell Vegetable Program, Harvest NY) and Elisabeth Hodgdon (ENYCHP) will lead a tour of high tunnel research projects, including insect exclusion netting demonstrations and variety trials for trellised cucumbers and new trellising systems and varieties of ground cherries and goldenberries. Participants will have the opportunity to taste test and provide feedback on ground cherry and goldenberry varieties. Registration information to follow.

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