Cornell University Cooperative Extension

Eastern NY Commercial Horticulture Program

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Tree Fruit News

Tree, Post & Trellis Wire Exchange

Orchard planting will soon be underway, followed closely by trellis installation. If you find yourself with trees, posts, and wire left over, or if you are just a little short to finish the block, The TPTW Exchange is here to help. Email Dan Donahue (djd13@cornell.edu) with the particulars:

-Trees: Variety, Strain, Rootstock, Caliper, Structure (feathered or whip), quantity
-Posts & Tree Supports: Material (type of wood, conduit, bamboo), diameter, length, quantity
-Wire: Material, Gauge, Length.

Include your farm name, at minimum a township & county, contact phone number & email.

Pricing information is not required. Any transactions between growers are the responsibility of those growers, Cornell Extension is only providing a forum to get buyers together with suppliers.

I will post these "classified ads" on the ENYCHP website at enych.cce.cornell.edu. - *Dan Donahue*

In this issue of Tree Fruit News:

Upcoming ENYCHP Events:

SAVE THE DATE
Tuesday, June 28, 2016
Vegetable Tour
ENYCHP Canada Bus Tour

Departure: Leaving Albany at 6:00 am, with pick-ups along the Northway (Saratoga, Queensbury, Plattsburgh)

Return: Arrive in Albany at 9:00 pm.

Details are being finalized but we plan to visit at least 2 large vegetable operations, 1 on muck soil, the other a greenhouse operation as well as an equipment manufacturer, all south of Montreal.

More information to follow

Temperature and Rain 3/14/2016 - 4/18/16

Locations	Avg Temp (F)	Max Temp (F)	Min Temp (F)	Total Rain (in)
Chazy	36.3	71.6	12.1	2.99
Peru	38	68.1	11.8	2.37
Crown Point	38.4	70	6.9	0.03
Clifton Park	42.3	81.1	11.6	2.4
Hudson	43.8	78.1	14.8	3.2
Highland HVRL	45.3	77.5	18.9	2.31
Marlboro	44.2	76	17.9	2.04
Riverhead	47.7	77.9	27.8	6.78

Pre-bloom Management of Inect Pests in the Hudson Valley,

Peter Jentch, Cornell HV Lab, pjj5@cornell.edu

The most effective window to control San Jose scale is during pre-bloom. Less foliage provides the best opportunity for greater application coverage to the limbs and trunk where overwinering scale reside. The previous year harvest pack out will be a good indicator for SJS presence in the orchard, as per specific bin location and percent damage from SJS culls. Multiple approaches for SJS will be needed if multiple blocks suffered injury over successive years. (See SJS Management: http://blogs.cornell.edu/jentsch/2015/04/24/dogwood-borer-and-scale-not-to-be-taken-lightly/)

San Jose Scale aside, is there a need to make insecticide applications to your pome fruit during the pre-bloom period in Eastern NY this season?

To begin, the winter freeze on the 14th of February combined with the recent cold snap on the 5th of April caused severe bud injury across the region, reducing this year's potential crop load. The remaining fruit will need to be assessed to determine the level of management required for this season. In mid-Hudson Valley orchards in which bud assessments were made during the past two weeks, we have seen dramatic variability in bud survival across a number of varieties. (See Bud Assessments of Hudson Valley Apple: http://blogs.cornell.edu/jentsch/2016/04/09/flower-bud-damage-assessments-of-hudson-valley-apple-april-8th-2016/).

During the tight cluster through pink period, insects begin to emerge from overwintering sites. They overwinter in, or make their way to tree fruit orchards beginning at tight cluster. As each orchard may have dramatically different insect pest pressure during the pre-petal fall period, your orchard should be assessed during this period to determine the need for insect pest management prior to bloom.

Some factors that play into pre-bloom management decision making:

- Influence of the orchard edge on small blocks harboring overwintering insect pest populations, as small blocks have greater edge effect with regard to insect pests.
- Historical insect species that have caused injury to developing flowers and fruitlets.
  Considerations for native bee conservation or commercial bee keeper contract constraints.
- The uncertainty of timely honey bee hive removal by the bee-keeper.
- Successful pollination and importance of preserving the king blossom fruitlet at petal fall.

Pre-bloom insect species causing injury to developing flowers and fruitlets: Of the insect pest population causing injury to fruit, the San Jose Scale, Tarnished Plant Bug, green fruitworm complex, Redbanded Leafroller, Obliquebanded Leafroller and potential of early Plum Curculio have the greatest potential to damage fruit during the pre-bloom period. A reduced crop load in the Hudson Valley this season is likely to find the loss of the king blossom in many varieties, necessitating the need for preserving the remaining lateral fruitlets. Given the reduced crop load, we may not be able to afford additional losses from insect and disease this season, making timely management all the more critical.

One insect that can cause fruit loss is the Tarnished Plant Bug (TPB), *Lygus lineolaris*. This insect infests over half of the cultivated plant species grown in the United States. TPB has piercing-sucking mouthparts and is a serious pest of fruit and vegetables in the Eastern US. Tarnished Plant Bug overwinters in the adult stage under leaf litter, stone walls, tree bark and other protected places along the edge of orchards. At the end of April, the adults become active and begin laying eggs in crop and weed hosts. The overwintering adult population peaks at about the pink stage of apple, sometime in late April/early May in the Hudson Valley, in average years.

Adults are 0.25 in. long, oval, and somewhat flattened. They are greenish brown in color, with reddish brown markings on the wings. A distinguishing characteristic is a small but distinct yellow-tipped triangle in the center of the back, behind the head. Scout for these insects on days when temperatures exceed 70°F along the orchard edge where broadleaf weeds are present. Look for the adult and droplets of sap that indicate feeding sites.

1.

2.

(Image 1. Adult tarnished plant bug. Photo Credit: Alex Wild.)

Image 2. tarnished plant bug nymph fifth instar with wing pads. Photo Credit: Bo Zaremba.

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Tarnished plant bug will move to buds and developing clusters as temperatures increase, moving back to suitable ground cover as temperatures fall. Maintaining the area beneath tree canopies 'weed-free' and the fescue-based sod in alleyways mowed will prevent buildup of flowering

(Image 3. TPB Injury to Gala)

plants and reduce TPB activity.

The tarnished plant bug causes injury to tree fruits when it feeds and lays eggs. Damage occurs primarily in the spring on flower buds, blossoms, and young fruit, although bleeding of sap may result from twig and shoot injury. On apple trees, some early egg laying may take place in the buds. However, most eggs are laid in the developing fruit starting at bloom.

TPB nymphs begin feeding first on buds and then later on developing fruit. Small droplets of sap may be present on the surface of injured buds. Within 1 or 2 weeks after feeding, the flower clusters may appear dried and the leaves distorted, with a distinct hole where the insect fed. Generally, later damage to developing fruit is more important than earlier feeding on flower buds. In apples, feeding can cause punctures or deep dimples to form as the fruit develops, and in peaches various deformities known as "catfacing" occur.

The damage to apples caused by egg-laying is usually deeper, resulting in more distorted fruit often with blemishes or "scabs". Damage early in the season tends to be near the calyx end of the fruit, and later injuries tend to be elsewhere. Cultivars differ in their susceptibility to damage, with depressions or scabs in some being less pronounced. Location of tree fruit near broad-leaf weed hosts edges of ponds or hedge rows also influences the likelihood of injury from TPB.

The use of unbaited, nonreflective, white sticky boards hung low in the trees to effectively monitor TPB can help in determining TPB activity. The best places to set the traps are in lower areas such as ditch banks and in hedgerows, which are favorable overwintering sites of the adults. White sticky traps are available commercially.

A biological control parasite introduced into the Northeast from Europe that has been attributed to reduced TPB populations in both apple and alfalfa. This wasp parasite of the

(Image 4 Photo: USDA.ARS. Scott Bauer).

TPB, *Peristenus digoneutis* (hymenoptera: braconidae) is believed to have reduced both damage and occurrence of the pest.

TPB Management:

- If your pack-out has greater than 4% culls from TPB an application is warranted.
- In varieties such as Honey Crisp in high density systems, lower injury levels may still equate to economic injury.
- Target for application: sustained temp. >70 for three days or more beginning at TC.
- Applications at both TC and Pink were found most effective in years when TPB feeding is early and high, however we have not found consistent yearly results in reducing TPB using pre-bloom applications to control this pest.
- Pyrethroids have been shown to be very effective against TPB during the pre-bloom period.
- Neo-nicotinoid insecticide use at pre-bloom is less effective, and may NOT be acceptable to bee keepers given the present perception of this group of insecticides by the bee industry.
- In years where the king fruit sets & development begins, followed then by cooler delayed set of the laterals, the king becomes susceptible to plum curculio injury. A protectant insecticide effective at controlling plum curculio (PC) will protect fruit by reducing early PC migrations during late pink and early bloom.
- In years when bee keepers are delayed in hive removal causing a delay in a timely petal fall application, a pink application will reduce European sawfly and plum curculio injury to sizing fruit.

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So, to answer the question "to spray or not to spray at pink" for TPB. If economic injury has been observed in the past few years in high valued fruit that exceeds the cost of the applications per block then treatment is warranted.

Important to note: The mite, *Typhlodromus pyri*, is a very effective predator and has been shown to effectively manage European red mite (ERM), *Panonychus ulmi* populations. ERM feed on leaves of apple trees and interfere with photosynthesis and production of carbohydrates, reducing yield, fruit color, overall quality and subsequent fruit bud development. The use of pyrethroids and multiple applications of Manzate dramatically reduce or eliminate *T. pyri* populations. Reduced predation can contribute to mite flare-ups during the growing season.

Achieving Biological Control of European Red Mite in Northeast Apples: An Implementation Guide for Growers (http://nysipm.cornell.edu/factsheets/treefruit/pests/erm/erm.asp)

Management of Early Season Insect Pests: Tarnished Plant Bug. HVL 2008

Treatment	Formulation amt./A.	Timing	% TPB	% PC
Actara	4.0 oz./A	P, PF, 1C	8.3 b	2.0 a
Calypso SC	4.0 oz./A	P	7.6 b	2.1 a
Baythroid XL	2.8 oz./A	PF		
Calypso SC	6.0 oz./A	1C		
Asana XL	14.5 oz./A	P	5.3 ab	2.6 a
Calypso SC	6.0 oz./A	PF-1C		
Asana XL	14.5 oz./A	TC, P	2.5 a	0.0 a
Calypso SC	6.0 oz./A	PF-1C		
Untreated			8.8 b	3.3 a

Effects of Sunburn Suppressant Treatment on Honeycrisp at the HV Lab in 2015,

Peter Jentch, GemmaReig, David Rosenberger

INTRODUCTION

Appearance is a major factor determining apple marketability. Anything that adversely affects fruit appearance, including sunburn (apple fruit discoloration caused by heat-related stress), reduces economic viability of the crop. Sunburned areas cause fruit to either be culled or downgraded on the packing line. With some high-value cultivars like Honeycrisp that sell for $50 to $100 per packed box, any fruit that are damaged and unmarketable represent significant losses to the grower.

Sunburn is a physiological disorder of apples and other fruit species caused by excessive solar radiation and high air temperature during the ripening period along with other contributing factors. Three types of sunburn in apple have been identified and characterized: sunburn necrosis (Fig. 1), sunburn browning (Fig. 2) and photooxidative sunburn (Fig. 3). Sunburn necrosis occurs when the apple fruit surface temperature (FST) approaches 126 F for approximately ten minutes. A dark brown or black necrotic spot appears on the exposed surface within 1 to 4 days after exposure to such temperatures. Sunburn browning is induced under high solar radiation when the apple FST reaches a certain threshold temperature, which varies with cultivar. For 'Cameo' and 'Honeycrisp' the threshold FST is near 115 F and for 'Pink Lady' approximately 129 F under Washington State conditions. Ultraviolet radiation is not consistent worldwide, it is conceivable that the minimum FST for induction of SB in the Hudson Valley may be different than in Washington State. The third type of sunburn,

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Figure 1. Sunburn necrosis

Figure 2. Sunburn browning

Figure 3. Photooxidative Sunburn

The third type of sunburn, photooxidative, can develop at an FST below 88 F (air temperature below 65 F) and can be detected within 24 hours of the irradiation. The first symptom is a white spot that appears on previously shade-grown (non-acclimated) apples that are abruptly exposed to full sunlight. With continued exposure to full sunlight, the center of the photo bleached area often turns brown and cells become necrotic.

Considering that the climate is changing and that high-density plantings are allowing more exposure of fruit to sunlight, sunburn could become an increasing concern. Different strategies are used around the world to avoid sunburn in apples. One of them is the use of spray materials, called sunburn suppressants. At least two classes of suppressants exist:

1. **White particle films** composed of either kaolin clay, calcium carbonate, or talc, all of which provide a white, highly reflective cover on the fruit surface that increases reflection of solar radiation, a key aspect of reducing sunburn incidence in apples. Surround® WP and ScreenDuo®, among others, belong to this group;
2. **Sunscreens** that contain organic-chemical absorbing agents in addition to physical inorganic constituents to augment the natural waxes in the cuticle and pigments in the upper epidermis of the apple which attenuate only a part of damaging ultraviolet rays and heat-producing infrared radiation, and enhance the optical properties of the natural wax layer. Raynox®, among others, belongs to this group.

In summer of 2015, a trial was set up at Hudson Valley Research Laboratory in order to study the incidence of Sunburn in Honeycrisp
ScreenDuo®, Deco®405, Raynox® + Deco®405 for their effectiveness on the incidence of sunburn at harvest.

MATERIAL AND METHODS

Treatments were evaluated in an experimental orchard planted in 2001 at Hudson Valley Research Laboratory (Highland, NY). Honeycrisp trees were grafted on Bud.9 rootstock with M.9 interstems. Trees were trained to a slender spindle tree form, spaced at 10 ft. between trees within the row and 25 ft. between rows, and grown in silt loam soil.

Half of the trees were irrigated according to the NEWA irrigation model (http://www.newa.cornell.edu) from the beginning of August until the end of September while the other half was not irrigated. From each block (irrigation and non-irrigation), five trees were used for each treatment (Raynox®, ScreenDuo®, Decco 405, Raynox® + Decco 405, and Control). Treatments were applied using an air-blast sprayer at 2.6 mph at two different times (28 July and 14 Aug.). Each tree was harvested completely and at each harvest the presence or absence of sunburn for each fruit was recorded. Following sunburn evaluation, five healthy fruit and five sunburned fruit from each tree and harvest date were evaluated for flesh firmness, soluble solids content (total sugar) and titratable acidity.

RESULTS AND DISCUSSION

Preliminary observations from the 2015 trial showed that no statistical differences were found in terms of yield, average fruit weight, crop load and yield efficiency among treatments and blocks (Table 1). In addition, perhaps because the trial was set up at the end of July, no differences were also found between the irrigated and non-irrigated blocks in terms of fruit size and yield (data not shown). Applying ScreenDuo® and Raynox® to reduce sunburn incidence according to their labels is expensive for growers. For this reason, we decided to make only two applications during the month and a half before harvest, the period of time when fruit have become large enough to more heat-absorbing surface area perpendicular to the sun at any given time. The first application was on the same day as the first heat event (T > 90F), and the second application was three days before the next heat event.

Preliminary results comparing the two blocks (irrigation vs non irrigation) showed no significant differences in the percentages of fruit with sunburn (Figure 4), although the irrigated block had a numerically greater incidence of sunburn compared to the non-irrigated block. These results were

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Table 1. Yield, average fruit weight, crop load and yield efficiency (YE). The data show mean values and standard error.

Block	Treatment	Yield (lb.)	Average fruit weight (g)	Crop Load (# fruit cm^{-2})	YE (lb. cm^{-2})
Irrigation	Decco 405	82.4 ± 25.1	219.1 ± 28.7	3.6 ± 1.1	0.5 ± 0.1
	Control	77.1 ± 28.5	159.4 ± 22.5	4.5 ± 0.8	0.4 ± 0.1
	Raynox®	90.8 ± 34.1	206.2 ± 33.8	4.1 ± 1.3	0.5 ± 0.2
	Raynox® + Decco 405	70.8 ± 48.7	197.7 ± 23.7	3.6 ± 1.1	0.5 ± 0.1
	ScreenDuoÒ	74.9 ± 47.8	177.6 ± 39.5	3.8 ± 0.8	0.4 ± 0.2
	P≤ 0.05	**NS**	**NS**	**NS**	**NS**
No irrigation	Decco 405	73.2 + 30.4	186.0 ± 11.7	3.4 ± 0.8	0.4 ± 0.1
	Control	100.2 + 38.5	209.1 ± 21.3	3.6 ± 0.7	0.5 ± 0.1
	Raynox®	90.1 ± 19.6	216.7 ± 21.8	4.3 ± 1.4	0.5 ± 0.1
	Raynox® + Decco 405	78.9 ± 34.4	213.5 ± 19.1	3.6 ± 0.3	0.5 ± 0.1
	ScreenDuoÒ	106.5 ± 37.4	195.9 ± 18.5	4.4 ± 0.8	0.5 ± 0.1
	P≤ 0.05	**NS**	**NS**	**NS**	**NS**

NS, not significant.

Preliminary results comparing the two blocks (irrigation vs non irrigation) showed no significant differences in the percentages of fruit with sunburn (Figure 4), although the irrigated block had a numerically greater incidence of sunburn compared to the non-irrigated block. These results were completely unexpected. June and July were dry months in the Hudson Valley. The decision to add irrigation late in the season (beginning of August) in this Honeycrisp block may have allowed rapid growth of previously stressed fruit, thereby leaving them more susceptible to sunburn than non-irrigated fruit that remained under water stress until harvest. Some researchers have speculated that trees suffering from water stress are more prone to have more sunburn, but that was not supported by the results from this trial. However, we did not evaluate water potential of the trees in this trial and are therefore lacking the data that might have helped us to better explain these results. On the other hand, within each of the two main blocks (irrigation or non-irrigation), we also found no statistical differences among treatments (Figure 4). In addition, the same treatments did not show significant differences between blocks.

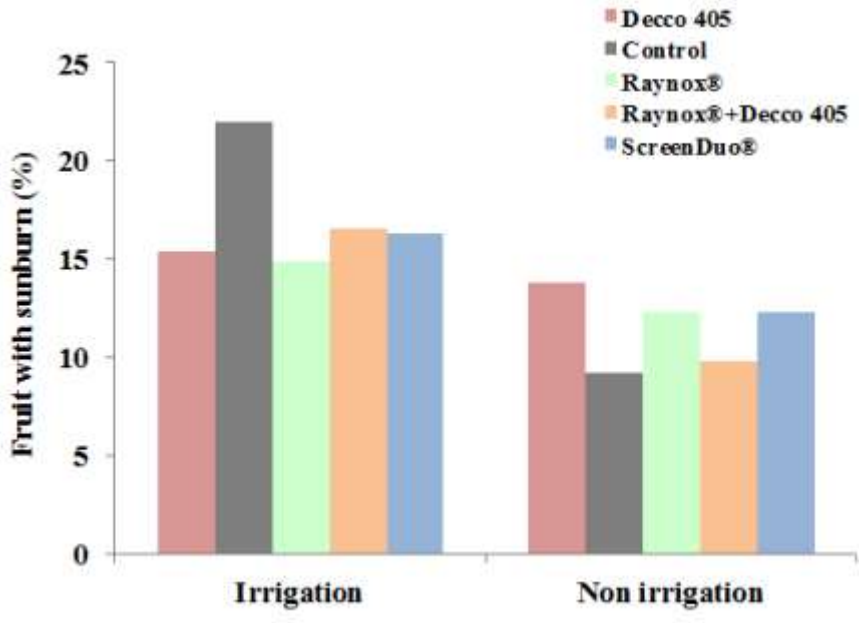

Figure 4. Total percentage of Sunburn (all three types are included) in Honeycrisp.

In terms of fruit quality, flesh firmness was generally higher, sugars (SSC) were lower and acidity (TA) was higher in the irrigated block compared to the non-irrigated one (data not shown). The treatment of Raynox® + Decco 405 tended to show higher SSC and TA compared to the other treatments in both blocks, and high firmness in the non- irrigated block (Table 2). However, when healthy and sunburned fruit were analyzed separately, this trend changed. In general, the sunburned fruit for all treatments and blocks showed higher SSC and lower TA . The results obtained in 2015 do not mean that these products are without value in preventing sunburn in Honeycrisp. Rather, further studies on timing applications are needed to help growers avoid useless applications of any given product and to know what is the correct timing to apply these products under Hudson Valley conditions. The results also show that the sunburn prevention products are not the perfect or the only solutions for preventing sunburn. It would be interesting also to know the roles of solar radiation and fruit surface temperatures in sunburn incidence under our climatic conditions.

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Table 2. Flesh firmness, sugars and acidity mean values of each block and treatment.

Block	Treatment	Flesh Firmness (lb.)	Soluble solids content (°Brix)	Titratable acidity (g malic acid L^{-1})
Irrigation	Decco 405	12.7 a	12.9 b	3.1 ab
	Control	13.7 a	12.8 bc	2.9 b
	Raynox	12.4 a	12.7 bc	3.1 ab
	Raynox®+Decco 405	13.7 a	13.3 a	3.2 a
	ScreenDuo®	12.9 a	12.8 c	2.9 b
No Irrigation	Decco 405	12.7 ab	13.2 b	2.7 c
	Control	12.5 ab	12.8 cd	2.9 b
	Raynox	12.3 b	12.9 c	3.1 ab
	Raynox®+Decco 405	12.8 ab	13.5 a	3.3 a
	ScreenDuo®	13.1 a	12.7 d	2.9 bc

For each treatment means followed by the same letter in each column are not significantly different at $P \leq 0.05$.

Although sunburned fruit are not visually acceptable for the consumer, we do not know if flavor changes occur in fruit with slight sunburn, if a change would be detected by consumers, and if purchase decisions would be affected in blushed and red apple cultivars. It is very easy at the packing line to miss some sunburned fruits in blushed and red apple cultivars (mostly those with a very small area of sunburn browning or those where red color mask the sunburned area). Therefore, the consumer may notice a different taste, and that might change the consumer's perception of that particular apple or cultivar.

Dr. Srdjan Acimovic Joins the Hudson Valley Research Laboratory as Our New Tree Fruit Pathologist

We would like to welcome Dr. Srdjan Acimovic as the new tree fruit plant pathologist at the Hudson Valley Research Laboratory. Srdjan accepted the position offer on February 17th and plans to begin his employment in early April. The incoming plant pathologist will be replacing Dr. Dave Rosenberger, recently retired in February 2014. During his retirement and transition in developing a new model of economic sustainability through increasing partnerships with the agricultural industry, Dave has continued to serve the region's tree fruit growers with disease management advice and recommendations through his timely blog site, contributions to CCE ENYCHP E-Alerts, and CCE ENYCHP Winter Fruit School presentations.

Srdjan recently completed his PhD program at Michigan State University Department of Plant, Soil and Microbial Sciences Applied Insecticide Toxicology Laboratory & Pesticide Analytical Laboratory. He completed his Masters of Science in 2009, Phytopathology, University of Novi Sad, Serbia under Dr. Jelica Balaz.

His Master's Thesis was titled "Monitoring of Infection Intensity and Development of Specific Symptom Types in Apple Fire Blight". His PhD project "Disease Management in Apples Using Trunk Injection Delivery of Plant Protective Compounds". focused on a trunk injection approach and technology for disease and insect control in fruit trees. The projects encompassed applied and fundamental aspects of fruit tree trunk injection with conventional and alternative plant protective compounds. The research studied protective compound distribution properties in apple tree crown after trunk injection to control of Apple Scab (*Venturia inaequalis*) and Fire Blight (*Erwinia amylovora*) with SAR inducers and fungicides.

During his PhD program at Michigan State, Srdjan has worked under George Sunden and John Wise.

Srdjan's CV provides addition details of his Professional Appointments And Employment.

Meet the Newest Lake Ontario Fruit Program Team Member!

Courtesy of LOFT Fruit Notes

Dr. Tessa (Tess) Grasswitz

We are pleased to announce Tessa (Tess) Grasswitz has been appointed to the position of IPM Specialist for the Lake Ontario Fruit Team by Director Chris Watkins. She will be based out of the Orleans County Office and serving Niagara, Orleans, Monroe, Wayne and Oswego counties and will start her onboarding at Cornell on April 18th.

Tess is a native of the UK with undergraduate and master's degrees from the University of London and a PhD in entomology from the University of California (Riverside). She worked at both Washington State and New Mexico State Universities as an Entomologist/IPM Specialist serving the fruit and vegetable industries, establishing a solid record of applied research and extension. She is passionate about IPM, has worked on a variety of pests in different crops and growing systems, and has a particular interest in biological control. Tess said she is greatly looking forward to working with the Team and serving the growers in the Lake Ontario Fruit region.

Cornell Fruit Field Day — Wednesday July 20th

The Cornell Fruit Field Day will be held in Geneva and will feature ongoing research in berries, hops, grapes, and tree fruit, and is being organized by Cornell University, the NYS Agricultural Experiment Station, CALS Fruit Program Work Team and Cornell Cooperative Extension. Attendees will be able to select from tours of different fruit commodities.

The event will be based at the NYSAES Fruit and Vegetable Research Farm South, 1097 County Road No. 4, 1 mile west of Pre-emption Rd. in Geneva, NY. Registration will begin at 8:00 AM and tours will begin at 8:30 and run until 11:30. Lunch will be served at the exhibit tent area between 11:30-12:30 PM. Tours will resume at 1:30 and run until 5:00 PM.

Admission fee will be $50/person ($40 for additional attendees from the same farm or business). Pre-registration is required; walk-in registration may be available for a $10 surcharge on the day of the event.

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