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UPCOMING MEETINGS

SHORTS:

NEW WILDLIFE DAMAGE CONTROL HANDBOOK - A new handbook, *Wildlife Damage Control for Organic Farmers* describes non-chemical strategies for prevention and control of wildlife damage to gardens and crops. It covers ground squirrels, pocket gophers, voles, rabbits, woodchucks, deer, skunks, raccoons and coyotes, and there is also a general chapter on birds. Find it on the Montana State University Wildlife Damage Extension page at: <http://animalrange.montana.edu/extension/wildlifeprevent.htm>.

WINTER WEDNESDAY LUNCH SERIES – Vegetable and Small Fruit Production Webinars by Penn State. Topics include Hydroponic Vegetable Production, Current Issues in Strawberry Pest Management, Soil Health Through Reduced Tillage and Cover Crops, Using Sanitizers in Wash Water, and Tomato Nutrition in High Tunnels. \$10 each or \$35 for the whole series. For dates and registration information go to www.extension.psu.edu/vegetable-fruit/winter-webinars.

INTEGRATED PEST MANAGEMENT (IPM) AND POLLINATORS - The Northeastern IPM Center recently hosted a discussion on the topic of pollinators in a live-streamed web event: "Integrated Pest Management (IPM) and Pollinators: What is the appropriate role for IPM on the issue of pollinators?" The Northeastern IPM Center invited speakers from the USDA Agricultural Research Service, the Natural Resources Defense Council, USDA National Institute of Food and Agriculture, and the US Environmental Protection Agency. In the recording, panelists provide an update on current issues surrounding pollinator health. They share facts about pollinators and pollinator decline, and give some thought to the role that the integrated pest management community, as well as scientific experts, public officials, and citizens, should take to address it. The event took place November 12, 2014, as part of the Northeastern IPM Center Advisory Council meeting in the Washington, D.C. area. Over 300 people viewed the live-stream event. View the web broadcast recording here: <http://neipmc.org/go/HsFg>.

STRAWBERRY

Winter Mulch for Strawberries

Sonia Schloemann, UMass Extension

An important fall job in commercial strawberry production is mulching. Strawberries are commonly grown in cold climates, such as the northern US and Canada, but the strawberry plant itself is actually quite vulnerable to cold injury. Research has shown that, without mulch, strawberry crowns can suffer damage at temperatures below 12°F and unprotected strawberry plants can suffer desiccation damage from drying winter winds. A protective mulch can protect strawberries from cold by providing insulation, and from desiccation by providing a barrier against drying winds. Mulches will also protect plants from injury caused by soil heaving, which results from freezing/ thawing cycles during the winter. So, a key to consistent quality strawberry production in cold climates is in protecting the plants from severe temperatures or temperature swings through the practice of mulching.



Production systems can also affect the need for mulching. Plants on raised beds, for example, are more vulnerable to cold and desiccation injury than plants in level plantings, especially in locations that are exposed to strong winter winds. Annual production systems, such as fall planted plasticulture, may utilize less hardy or disease susceptible cultivars. As we will see, mulching practices must adapt to these new systems.

When should the strawberry grower plan to apply mulch? Research suggests that a good timing guide is to apply mulch after three consecutive days with a soil temperature of 40°F or below. This soil temperature usually occurs after multiple frosts, and when the plants have slowed growth in response to cooler temperatures. It is best to apply mulch before the soil freezes solid. In New England mulches are applied in late November.

What is a good mulch material? The traditional mulching material for strawberries in New England is straw. Straws from wheat, rice, oats, or Sudan grass work well. Straws coarser than Sudan grass are not recommended. Straw should be clean, free from weed seed, and contains a minimum of grain seed. Strawberry growers can produce their own straw, often cutting the straw before the grain seed is viable. Store straw for mulching in a dry area. Occasionally, grain seedlings can become a weed problem the following spring; an application of sethoxydim will give good control.



How much mulch should be applied? A traditional, level matted row planting will require 2.5 to 3 tons of straw per acre for a 2 to 3 inch deep mulch, or about 300 small bales of average weight. Raised bed plantings and sites with strong wind may require twice this amount for adequate coverage.

How is the mulch applied? Smaller plantings may be mulched by hand by shaking out the bales of straw over the row. Larger plantings often use bale choppers to break up the straw bales and distribute the straw over the bed. Choppers are available for both small bales and large round bales.

How and when is the mulch removed? In the spring,



when plants begin to show growth under the winter mulch (new green tissue), the mulch should be raked off the rows to allow sunlight to penetrate and reach the foliage. Delaying removal will delay plant growth and flowering and may reduce yield. Mulch can be raked off by hand with ordinary yard rakes in smaller plantings. In larger plantings, various mechanical tools are available ranging from modified hay rakes and tedders to equipment specifically designed for the purpose.



Floating row covers as mulch. These covers are composed of a plastic such as polypropylene, spun-bonded into a fabric that is permeable to light, air, and water. Research and growers' experiences demonstrate that these covers are useful for winter protection of

strawberry plantings. While floating row covers are available in several weights, only the heavier weights are recommended for winter protection. At present a widely available weight recommended for winter strawberry protection is 1.25 oz/yd² (42 g/m²). A variety of fabric widths are available, with common widths ranging from 15 feet to 60 feet. This material currently costs about 4 cents per square foot. With proper care, this heavier fabric should last 3-4 seasons. Floating row covers are widely used to protect annual plasticulture plantings.

Row covers are best applied on still days. Be sure to line up sufficient labor to place the row cover. If possible, use wider widths for more efficient application. The row cover edges must be anchored, as must areas where two covers overlap. A variety of methods are used to anchor the edges. Edges may be anchored with posts, rocks, or tube sand. The edges may also be covered with soil.

Once the mulch is in place, the job is not done for the winter. Monitor the planting frequently. If straw has blown off areas, replace at once. Watch the edges of row covers, and adjust anchors if needed. Repair any rips or holes as soon as possible.

Any reference to equipment or product brand names does not constitute endorsement over like products or equipment.

Monitoring And Management Of Strawberry Aphid: What We Learned This Summer

Erica Pate, Summer Assistant (OMAFRA- USEL project), Pam Fisher (OMAFRA) & Rebecca Hallett (University of Guelph)

Strawberry viruses have recently been identified as a



Figure 1. Strawberry aphid magnified to show knobbed hairs, characteristic of this species.

major problem in Ontario and northeastern America.

Strawberry aphids, *Chaetosiphon fragaefolii*, are known to be an important vector of several strawberry viruses: strawberry mild yellow edge (SMYEV), strawberry vein banding (SVBV), strawberry mottle (SMoV) and

strawberry crinkle virus (SCV). Strawberry aphid can be distinguished from other aphids found on strawberries by its knobbed hairs, visible with magnification (Figure 1). Information about strawberry aphid, its life cycle, overwintering methods, and the timing of population build-up and dispersal, is needed to develop pest management plans for aphid and virus control. The greenhouse whitefly has been recently

identified as a vector of strawberry pallidosis virus (SPaV) . We have little or no information on this pest in Ontario strawberry fields.



Figure 2: Strawberry aphid egg on lower leaf surface in early spring: photo credit D. Moreau, Agriculture and Agri-Food Canada



Figure 4. Winged strawberry aphid. Photo: D. Moreau, Agriculture and Agri-Food Canada

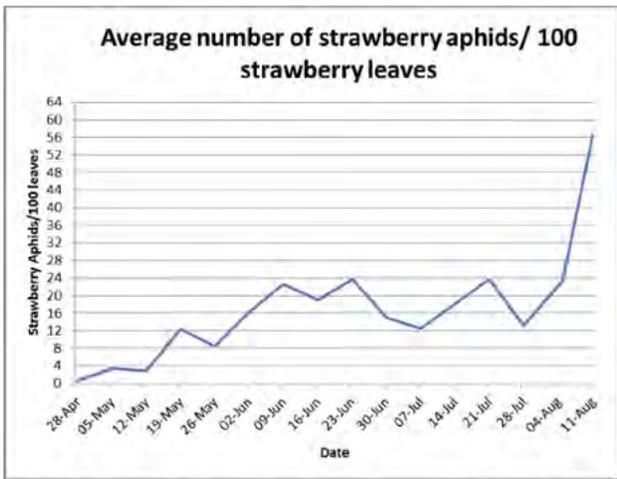


Figure 3. Average strawberry aphid population from fifteen farms.



Figure 5. Yellow sticky trap for monitoring winged aphids.

A project to address these information gaps was developed with funding from the Undergraduate Student Experiential Learning Program, a collaborative program between OMAFRA and the University of Guelph. Summer students collected leaf samples and counted aphids at 15 strawberry farms throughout the summer. In Simcoe, sticky traps and bowl traps were tested to assess the flight period of winged aphids and monitor their dispersal.



Figure 6. Yellow bowl traps, filled with a soap and water drowning solution.

What we learned:

- At least some strawberry aphids overwinter as eggs. Shiny black eggs (Figure 2) were found on lower leaves of overwintering strawberry plants in late April, and most eggs had hatched by early May.
- Strawberry aphids are present throughout the season, from early May to end of August (Figure 3).
- Aphids developed wings and the ability to disperse from field to field in early to mid-June. (Figure 4)
- Bowl traps (Figure 5) and sticky traps (Figure 6) were effective, but inconvenient tools for monitoring aphid flight in general (Figure 7). It was difficult to identify the aphid species caught in these traps. Monitoring strawberry foliage provided a better indication of when first winged aphids developed, and when dispersal could begin.
- Most (80%+) aphids found on strawberries are THE strawberry aphid, *Chaetosiphon fragaefolii*. Two other species of aphids were found in lower numbers, towards the end of the season. These have been sent to Agriculture And Agri-Food Canada for identification to species.

- New plantings are at high risk for strawberry aphids throughout the season. While we expected to see aphids in May and June, we were surprised to see such high numbers of aphids on new growth in these fields in late summer (Figure 8).
- Whiteflies were not observed in fields during the spring and summer. However, since late September, whiteflies have been observed in several strawberry fields.

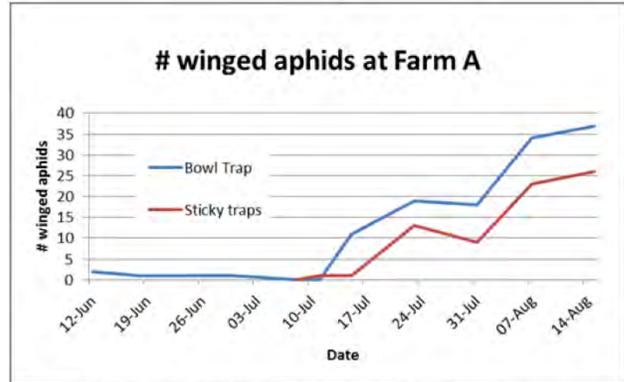


Figure 7. The number of winged aphids found in bowl and sticky traps at one farm.

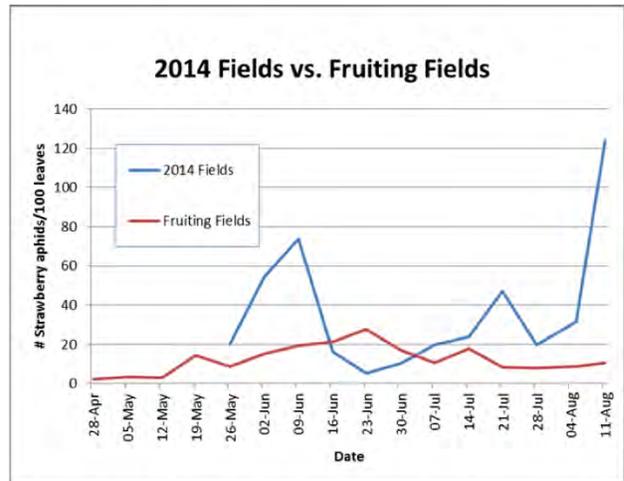


Figure 8. Strawberry aphid populations in fruiting fields compared to newly planted 2014 fields. Using data from nine 2014 fields and 17 fruiting fields.

(Source: The Ontario Berry Grower, November 2014)

Comparing the Yields of J Rooted Strawberry Plants vs Normally Rooted Plants

Mark Bolda, UC Santa Cruz Extension

[Mark Bolda] Got a rather lengthy text from a colleague this afternoon concerning J rooting of strawberry plants - question was: does it really make a difference whether or not a strawberry transplant is J rooted?

Let's go to the Green Sheets, which have been a real treasure trove of information.

The one included in the link below was a summary of field work done by the late Warren Bendixen, who served as the Farm Advisor in Santa Maria for many, many years:

<http://www.calstrawberry.com/research/library/98-18.pdf>

This work was done by Warren in response to a shift going at that time in Santa Maria from 40" inch beds with 5-

6" deep planting slots with very little J rooting to the 64" beds so familiar today, but with planting slots which would result in a lot of J-rooted plants.



UC Statewide IPM Project
© 2000 Regents, University of California

Strawberry transplant showing correct positioning of the roots and depth of planting. UC Statewide IPM Program.

Key takeaway from the paper, it's in bold because it's so important.

Plants with J roots reduced fresh fruit yields by 18.5%.

If this doesn't get your attention as to why we shouldn't be J rooting, I don't know what will.

(Source: UCANR [Strawberry/Caneberry Blog](#) Oct. 17, 2014)

RASPBERRIES/BLACKBERRIES

Evaluation Of Raspberries For Tunnel And Field Production In North Carolina

Penelope Perkins-Veazie and Gina Fernandez, North Carolina State Univ.

Introduction

Raspberries are a highly popular fruit with consumers, and also a high value crop for producers. One of the major limitations to production in North Carolina is heat. Raspberry plants often respond to heat stress by reducing fruit size. Also, the warm temperatures encountered during harvest can lead to a very short postharvest loss, as berries are softer and easier to bruise when harvested warm. In this multi-year study, raspberry cultivars and NC breeding selections were evaluated in high tunnel and field production systems.

Harvest and Handling: Pick firm fruit and place in shallow vented containers. Red raspberries can be harvested when pink and come off the plant with minimal tugging. The most often used container is a plastic ½ pint with vents in top, bottom, and sides to aid air flow. Containers for raspberries should be shallow, as only a few layers of berries should be in the box to prevent fruit collapse and leaking. The best time to pick raspberries is early in the morning, while fruit are still cool. Picking wet raspberries after rainfall or heavy dew is not recommended as the shelf life quickly drops.

Raspberries can be cooled at temperatures slightly below freezing (31 F) as the high sugar content acts as an anti-freeze. It is better to cool fruit soon after harvest and hold

raspberries below 40°F as long as possible. If cooling is delayed, storage life is lost in proportion to the delay (a one hour delay can mean a one day loss in shelf life).

Best cultivars and selections for postharvest life when grown in North Carolina. These suggestions are based on several years trials at research stations in NC. Check <http://rubus.ces.ncsu.edu> for yield data of these selections and cultivars. Note that some yield data is still being collected in fall 2014.

Cultivar/selection

10-14 day shelf life if held at 35°F within 2 hours from harvest

NC344

Octavia

Polka

Joan J

MacBlack

7-10 day shelf life

NC548

Nantahala

Caroline

For local use only (less than 5 days)

Latham

HimboTop

Tulamagic

BLUEBERRY

Blueberries – Popular, but Vexing!

Kathy Demchak, Penn State University

This year in particular has been a tough year for blueberries. We've had some winter injury issues, but in addition to those, we are seeing nutritional problems that tend to recur on different farms in various years.

Blueberries are a completely different plant type from the rest of the food crops that we grow, and are more similar in their needs to azaleas and rhododendrons than other food crops, except for cranberries. In fact, if you have a soil with a high CEC that is great for growing tomatoes or other "heavy feeders", you probably don't have a soil that is very good for blueberries. This means that you will need to take time to modify your soil before planting to give the plants a chance at growing well. Some of the deficiencies we are seeing commonly this year (and in many others) are described below.

Plants are deficient in magnesium. The cause is usually that the soils the blueberries are being grown in are high in calcium. Calcium, magnesium, and potassium compete for the same sites on soil particles and roots, so too much of one can cause a deficiency of one or both of the others. Blueberries really don't like calcium, and belong to a group of plants called "calcifuges", which basically means "calcium-fleeing". High calcium levels may occur because the soil was limed in the past, or because the soil is derived from parent material that is high in calcium, as is often the case with many of our fertile valley soils. In addition to this, some soils are also low in magnesium.

What can you do about this problem? Be sure the soil pH had been adjusted to the correct range for blueberries (4.5 to 5.0) before you plant. In the process of dropping the soil pH, some of the calcium is "floated off" of the soil particles, and is eventually leached out (though some magnesium will be also). However, this may take quite some time (2 to 3 years), so if you wait to drop the pH until after the plants are planted, they will not thrive. You also run the risk of burning the blueberry roots (and anything else that happens to be in the soil) if you add too much sulfur after planting. Sulfur prills, even moreso than the powdered form of sulfur, take a long time to react, and it is best if the soil is worked periodically after their application to help break them down. Of course, you can only do this if the plants aren't already planted. Then re-test to see if you need to add additional magnesium before you plant. Magnesium (and calcium) move through the soil profile very slowly, so it is much better to incorporate magnesium before planting rather than to top-dress it later and expect it to percolate through.

Also, when plants are being planted, at least half of the soil volume placed back into the planting hole should be organic matter, preferably peat moss, because it is acidic already, and basically replaces half of a less-than-desirable soil (from the blueberry plant's perspective) with a great medium. Keep the plantings mulched, preferably with a rotted sawdust, possibly mixed half with bark mulch. Though we've found hardwood sawdust to work fine if we keep track of the pH, the pH of mulch derived from conifers (pine for example) is lower, and the pH of sawdust of certain hardwoods, beech and maple in particular, can be very high (greater than 8.0). Using ammonium sulfate as the nitrogen source helps keep the soil pH low even if a hardwood sawdust is used. Just be sure that the sawdust is decomposed when you apply it, or it may tie up nitrogen as it decomposes, which brings us to our second nutritional issue.

Plants are deficient in nitrogen. This could be from the application of fresh sawdust in many cases. However, in this year in particular, much of the nitrogen from spring applications may have been leached out by heavy rains. At this point, it's too late to apply additional nitrogen because you could push growth that could be winter-injured. However, when you make your usual spring nitrogen applications, apply half when the plants begin to growth, and the other half four to six weeks later. This makes the best use of the nitrogen because the plants will be able to take it up, rather than it being leached away with spring rains before they have a chance to use it.

Finally, our third issue that we are seeing:

Plants are deficient in iron or zinc. Iron and zinc become much more available when the soil pH is low. In some cases, though, the pH is in the correct range, but the plants are deficient anyway. In most of these cases, soil tests show extremely high phosphorus levels, and it's likely that the excess phosphorus is interacting with the micronutrients to decrease their availability.

The solution to this problem, at the risk of sounding repetitive, is to first be sure the soil pH is in the correct range before planting. If the soil pH is in the correct range, foliar applications of the micronutrients can be helpful, especially if soil phosphorus is high, and a soil application of the micronutrients may also be needed. If the soil pH is not the correct range, a soil application of micronutrients is nearly pointless as the micronutrients will become tied up. (*Source: Penn State Vegetable and Fruit News Blog, Sept. 2, 2014*)

Fall Pre-emergent Herbicides to Prevent Early Spring Weed Germination

David Scurlock, Ohio State University/OARDC

If you have perennial weed problems then you may want to try using a dormant application of a pre-emergent herbicide in combination with a contact herbicide. You probably already know but, your vineyard should be scouted to determine the success of your weed control program. This past year many vineyards were killed to the ground and weed control was probably not as good as usual because of the fear of injury to the new shoots being trained up. A dormant application of a pre-emergent herbicide in combination with a contact herbicide may be a good option this year if you were not satisfied with your weed control, this past season.

A fall application of a contact herbicide, such as glyphosate, to the vineyard in combination with a pre-emergent herbicide, such as Princep 90DF or Prowl H2O will ensure that the weeds that exist now in the vineyard will not be there in the spring. The weeds are preparing for winter too and the glyphosate chemical will be taken down to the roots at this time of year to kill the weeds.

Warning: If you do apply a systemic herbicide such as a glyphosate product and even some of the pre-emergent herbicides you still do not want to wet any green trunks or shoots of young vines because it can translocate to the roots and you will probably see the round up like symptoms or death in the spring. **Make sure your spray is directed at the base of the trunk.** Also if you have various ages of vines in your vineyard use a pre-emergent spray that can be applied to the whole vineyard. **Most herbicides have age restrictions on them.** See pages 66-68 in the Midwest Small Fruit and Grape Spray Guide <https://ag.purdue.edu/hla/Hort/Documents/ID-169.pdf>.

The pre-emergent herbicide will degrade over the winter depending on soil temperature. These dormant herbicides

Table1. Recommended Pre-emergent Herbicides for Fall Application

*Vineyard 1 year old	Rate	Target Weeds
Devrinol 2-XT 2lbs. a.i./gal	2gal/A	Annual grasses/some broadleaves
Gallery75DF 75% a.i.	0.66-1.33 lbs. in min. of 10 gallons of water	Annual broadleaves/suppression of grasses
Snapshot 2.5TG 2.5% a.i.	100-200lbs/A not to exceed 600lbs/12 months	Annual grasses/certain broadleaves
*Vineyard 3 year old plus	Rate	Target Weeds
Chateau WDG or SW 51% a.i.	6-12 oz. in 10-30 gallons of water	Annual broadleaves/suppression of grasses
Goal 2XL 2 lbs. a.i./gal	5-8 pt. in min. of 10 gallons of	Annual broadleaves/suppression of grasses
Princep 4lbs a.i. gal.	2-4qt. in 25-40 gallons of water	Annual broadleaves/ grasses

degrade slower when applications are made when soil temperatures remain at 500F and below. The benefit of the Fall Applied Herbicide is that you already have an herbicide in place for the spring weed flush in case you cannot get in to apply one. One more bit of advice, Apply your herbicide after you hill up your vines if this is part of your winterizing process. You do not want to disturb the soil again if you are applying a pre-emergent herbicide. Some pre-emergent herbicides to consider are listed in Table 1 below. I have grouped them according to age of your vineyard. This is just a partial list to simplify your decision. It is a good idea to call your dealer for current price information and availability. Another consideration is soil type when considering rates. Sandier soils tend to leach quicker and lower rates may be needed. If you have steep slopes where erosion may be a problem herbicide treated mulches may be something to consider. Mulch holds the herbicide and reduces the leaching effect.

As stated previously any contact herbicide such as one of the glufosinates of Cheetah or Rely or a glyphosate such as Roundup can be tank mixed with any of these pre-emergent herbicides in Table 1. **Just another note of caution: Direct your spray at the base of the vine to avoid contact with any potential green surface to reduce translocation of the herbicide into the vine.** This is another cultural tool in your arsenal that is worth a try. You may want to try this out on a small scale to convince yourself this is effective and economic for you. If you do try this or have been using a dormant herbicide application for years, I would really like to hear about your results, good or bad. **Remember to always read and follow the label.**

*Note on Prowl. Prowl has 3.8lbs. a.i./gal and can be used at the rate of 3.2-6.3qt. in a minimum of 20 gallons of water. For fall applications, the higher labeled rates is best.

(Source: Ohio Grape-Wine electronic Newsletter. Volume 2014 No. 35, November 19, 2014)

GENERAL INFORMATION

Harnessing Insects For On-Farm Biological Control And Nutrient Cycling

Matt Grieshop and Joe Tourtois, Michigan State University

Composting farm and food wastes has become increasingly important to management of small farms. However, some food wastes are difficult or impossible to process using hot compost or vermicomposting techniques. Arthropod based composting using black soldier flies is an attractive option because the flies can process high oil and protein sources that worms cannot. In addition black soldier flies make a great feed source for fish and fowl and common composting systems incorporate “self harvesting.”

You may have experience with two and four footed livestock but how about livestock with six or no legs?

Thrips, fungus gnats and other soil borne pests are a consistent problem in greenhouse, hoop house and some open field agriculture crops. Thrips are especially challenging to manage due to their rapid development of insecticide resistance. Augmentative biological control provides a good alternative to insecticides when available. Entomopathogenic nematodes and predators like *D. coriaria* are two biological control organisms with a track record of use for Integrated Pest Management (IPM) of a variety of soil insects including thrips. Sourcing these natural enemies can be challenging, so learning to rear your own can make them a more feasible pest management option.

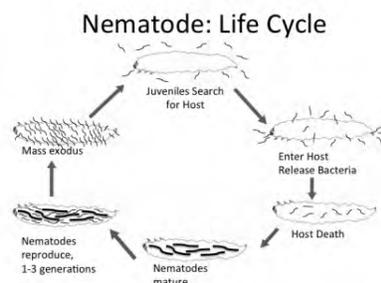
Join us for a [webinar on Tuesday November 25, at 1 p.m. EST](#) covering three easily reared invertebrates to learn how they



Larval and adult black soldier fly.

might be applied in your farm, garden or greenhouse. We will present rearing strategies for these three groups of “micro livestock”: a predatory beetle, entomopathogenic nematodes and black soldier flies.

Dalotia coriaria is a highly mobile predatory beetle that prey upon thrips, fungus gnats and other soil dwelling pests. Entomopathogenic nematodes are small, unsegmented worms used as a biopesticide for many soil dwelling insect pests. Black soldier fly (*Hermetia illucens*) larvae can be used to recycle nutrients from large quantizes of organic matter ranging from manure to pre- and post-consumer wastes. (Source: Michigan State University Fruit Crop Alert, Nov. 11, 2014)



Protecting Irrigation Equipment from Winter Damage

Lyndon Kelley, Michigan State University Extension

Irrigation risers from underground lines often cost \$200-\$300. Z pipes, pivot elbows and center pipe can cost the farm more than \$600 each and all are common irrigation freeze damage repairs. Often next year's

irrigation startup problems are winter damage that can be prevented. Time spent now will prevent damage and lead to a better start on next year's irrigation season. Inspection of the system now allows you to make

improvements and repairs in the less costly off-season and get irrigation problems out of the way for spring planting season when everyone is busy. Steel pipes up in the air may freeze solid days before we think of freezing weather on the ground.

Park pivots in a safe location - When choosing a location to park the system for the winter, consider the three most common potential sources of winter damage: Wire theft is less likely in a visible but inaccessible area of the field; Wind damage is less likely if pivot points into or away from the wind direction rather than perpendicular to wind direction; and squirrels and other rodent damage to span wire is rare when pivots are a few hundred feet from the tree line.

Get rid of the brush and branches near equipment - Squirrel and chipmunk damage to span-wire and gasket can be minimize by removing limbs near equipment parked for the winter preventing animals jumping between trees and the structure. Trimming trees and removing brush near control panels and disconnect boxes reduces the chance of rodent damage. Removing woodchucks from the vicinity of pivot and pumping plant pads or electrical box can also help prevent damage.

Drain pivots and solid set systems - Most of the currently designed pivots have automatic frost drains that drain the main overhead pipe. Solid set systems may have automatic drains but you should always inspect that water has been eliminated from the pump to the furthest ends of the system. Plugged automatic frost drains can lead to major repairs if not caught in a fall inspection. Rock traps need to be cleaned and drained, some designs may accumulate water condensing in the pipe over the winter leading to freeze cracks in rock traps that are emptied and put back in place. To avoid this issue many producers install a piece of hardware cloth held in place by the lock ring to allow condensate to leave the system. Pivot supply lines, end gun supply and hydro control hoses are often installed to allow drainage but the hose may sag and trap water which can lead to damage. Remember to cap all large openings

into the system to prevent bird nesting.



Lower water levels in underground piping systems - Few underground piping systems require complete draining to protect from freezing in most of Michigan and Indiana. Lowering the water within the system so that the water is two to three feet below soil surface will prevent freeze damage in most situations. Water can be pushed out of the system by compressed air pumps available from most irrigation dealers or may be pumped from the underground pipe system using a common fertilizer style transfer pump. As a [Michigan State University Extension](#) and Purdue Extension irrigation educator, I have found an easy way to do this is by using a gas powered transfer pump at the lowest access point in the underground piping system. A one and one fourth inch tube slid down inside a riser or two inch access in the manifold where air relief is, can be piped to the intake of the pump.

Drain travelers and big guns - Travelers and stationary big guns often have portions of their system that hold water. Drain and roll-up hoses, unhook and drain ends couplers and drain water drive piston and motors/impeller drive systems that may be damaged by freezing.

Trickle and drip lines and tape - Trickle and drip lines and tape are designed to be self-draining but manifolds and supply systems need attention to make sure no water pockets remain to freeze. Winter rodent damage can turn usable drip tape and trickle line into junk rapidly. Lines that are to be moved for next year are best stored in the barn. Lines over wintering in the field stand less rodent damage if not covered by plastic, plant material or mulch.

Pump down or drain underground pipe lines - Most underground pipe lines are buried deep enough to prevent freeze damage but they often require pumping or draining enough water from them to empty the upper portion of Z-pipe risers and pump manifolds. This is typically done by purging the system with air or

modifying a fertilizer transfer pump to pump system at its lowest outlet or inlet points. Remember to cap all pipe inlets and outlets to prevent animals from entering.

Drain the pumping plant - Drain pumps and manifolds to the lowest point they can hold water. Replace brass drain plugs if damaged. Good designed pumping installations will be easy to drain without stripping drain plug threads or the need for air purging. Inspect gauges, supply and control wires for needed repairs. Service the engine with attention to engine oil, bearing and seal lubrication. Check the cooling system for adequate anti-freeze level and concentration. Drain the fuel tank to reduce water accumulation in fuel tank and potential theft.

Inspect and lock down electrical power supplies - Inspect each electrical box in the system from power supply to the last pivot or disconnect on system line for damage and holes that may be accessible for rodents. Sealing small holes helps keep rodent damage to a

minimum. Both snakes and mice have even been known to crawl into electrical boxes and control panels through small hole or underground conduit with unprotected ends resulting in electrical fire and damage. Locking down electrical power supplies helps prevent vandals from turning wells and pivots on midwinter and minimizes potential electrical system damage. Now is an excellent time to inspect grounding, system test resistance and make repairs.

Create a winter work list for each system - While it is fresh in your memory list the improvements and repairs needed for each system. As you are inspecting and winterizing your system, add any other areas needing attention to the list of repairs needed. Assign the repair to someone whether it is your people or the local irrigation dealer repair crew, the sooner it gets into the plan the better and more efficient it can be. (*Source: Michigan Fruit Crop Team News. Nov. 15, 2013*)

New Search Engine For Tree Fruit Diseases, Pest And Beneficial Insects Now Online

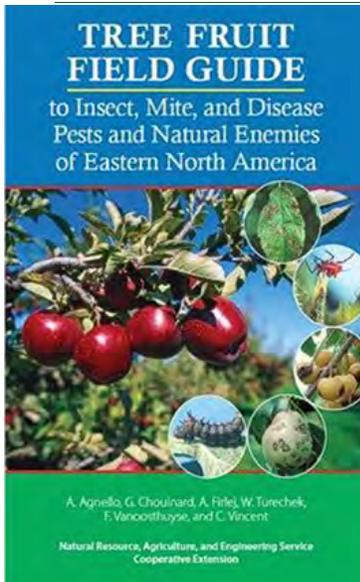
Julianna Wilson, Michigan State University

A new search engine tool for identifying diseases, insect and mite pests and beneficials of tree fruit is now online. The search can be accessed in its entirety from the [MSU Integrated Pest Management](http://www.ipm.msu.edu/search) website at www.ipm.msu.edu/search.

Users can quickly search for diseases, pest and beneficial insects and mites that are found in apples, cherries, peaches, pears, and plums. The content currently in the search engine is based in large part on the “Tree Fruit Field Guide to Insect, Mite, and Disease

with some updated and new content based on current diseases and pests in the region.

The content of this print version of the “Tree Fruit Field Guide to Insect, Mite, and Disease Pests and Natural Enemies of Eastern North America” has been converted into an online search engine. Just by using the search engine, you can help us improve it.



“Pests and Natural Enemies of Eastern North America”

Searches can be made using a combination of either the name of a particular disease or insect, the location on

the plant where evidence of the disease or insect has been found, the plant growth stage, or the crop. There are also apple and cherry specific versions on the [MSU Apples website](#) and the [MSU Cherries website](#) respectively.

The tool can be used from any device that can access the Internet, but plans for a more mobile-friendly version are already underway as is the addition of other crops and their pests.

You can contribute to improve this search engine just by visiting one of the links above and conducting some searches. Each search will help our developers better understand how it is being used and what needs to be improved. In addition, you can [complete a short survey after you use the search engine](#). Your feedback is very important to us for making this tool as useful as it can be. (Source: *Michigan Fruit Crop Team News*. Oct. 17, 2013)

UPCOMING MEETINGS:

November 5-6, 2014 – *Northeast Greenhouse Conference*. Mass Mutual Center, 1277 Main St. Springfield, MA.

For more information see: <https://extension.umass.edu/vegetable/events/northeast-greenhouse-conference>.

November 17-19, 2014. *2014 Southeast Strawberry Expo*, Pinehurst Resort, Pinehurst, NC. For more information see: www.ncstrawberry.com.

December 2, 2014 – *CT Pomological Society Annual Meeting*. The Gallery Restaurant in Glastonbury. Program details available soon.

December 4-5, 2014 – *Massachusetts Farm Bureau Annual Meeting*. University of Massachusetts – Amherst, Amherst MA. For more information or to register, go to: <http://mfbf.net/AnnualMeeting/MFBFAnnualMeetingAgenda/tabid/154/Default.aspx>.

December 6, 2014 – *New England Vegetable And Berry Grower's Association Winter Meeting*. Portsmouth Country Club, 80 Country Club Lane, Greenland, NH 03840. See: <http://nevbg.org> for program. \$20. For more information and to register contact John Howell by calling 413-665-3501 or email howell@umext.umass.edu.

December 9-11, 2014 – *Grate Lakes Fruit, Vegetable and Farm Market EXPO and Michigan Greenhouse Growers EXPO*. More information: <http://www.glexpo.com/>.

December 10, 2014 – *Greenhouse Vegetable Production in Containers*. 9:30 – 3:45. Publick House 277 Main St. Sturbridge, MA. \$40. Registration required. 2 pesticide license contact hours requested. For more information see: <https://extension.umass.edu/vegetable/events/greenhouse-vegetable-production-containers>

December 17, 2014 – *Spotted Wing Drosophila Winter Regional Workshop* (NY). Ramada Inn, 1305 Buckley Rd. Syracuse, NY. \$25-\$50 Register by Dec. 10. For more information or to register go to: <http://www.hort.cornell.edu/grower/nybga/swdworkshops/index.html>.

January 10, 2015 – *NOFA-MA Winter Conference*. Worcester State University, Worcester MA. For more information go to: <http://www.nofamass.org/events/wc#.VH4Wh77P7WE>.

January 13, 2015 - *Massachusetts Farm to Cafeteria Conference*. College of the Holy Cross, Worcester, MA. Save the date. For more information and updates, see: <http://www.massfarmtoschool.org/conference/>.

January 14, 2015 - *Spotted Wing Drosophila Winter Regional Workshop* (NY). CCE Albany Co., 24 Martin Rd., Voorheesville, NY. \$25-\$50 Register by Jan 7. For more information or to register go to: <http://www.hort.cornell.edu/grower/nybga/swdworkshops/index.html>.

January 15, 2015 - *CT Vegetable & Small Fruit Conference*. Maneely's Conference Center, S. Windsor. Program details available soon.

January 20 – 22, 2015 – *2015 Empire State Producers Expo*. Oncenter Convention Center, Syracuse NY. For more information or to register go to <http://nysvga.org/expo/information/>.

January 21, 2015 – *Vermont Vegetable and Berry Growers Association Annual Meeting*. Lake Morey Inn, 1 Clubhouse Rd. Fairlee, VT For program details and to register go to: <http://www.uvm.edu/vtvegandberry/meetings/AnnualMeeting2015.pdf>.

January 23-25, 2015 – *NOFA-NY Winter Conference*. Saratoga Hilton and City Center, Saratoga Springs, NY. For more information go to: <http://www.nofany.org/events/winter-conference>.

January 27-29, 2015 – *2015 Mid-Atlantic Fruit and Vegetable Convention*. Hershey Lodge and Convention Center, Hershey PA. For program details and registration information go to: <http://www.mafvc.org>.

February 3-6, 2015 – *North American Strawberry Growers Conference and Symposium*. Ventura CA. More information: www.nasga.org.

February 14-15, 2015 – *NOFA-VT Winter Conference*. University of Vermont, Burlington VT. For more information go to: <http://nofavt.org/annual-events/winter-conference>.

February 24-27, 2015 – *North American Raspberry and Blackberry Conference*. Fayetteville, NC. More information: www.raspberryblackberry.com/.

March 4, 2015 - *Spotted Wing Drosophila Winter Regional Workshop* (NY). Clarion Hotel, 8250 Park Rd., Batavia, NY. \$25-\$50 Register by Feb 25. For more information or to register go to: <http://www.hort.cornell.edu/grower/nybga/swdworkshops/index.html>.

March 17-18, 2015 - *Tree Fruit, Berry & Grape Plant Nutrition Short Course*, Maneely's Conference Center, S. Windsor. Program details available soon.

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