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**EXTENSION**

# Berry Notes

Prepared by the University of Massachusetts Fruit Team

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## 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.

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#### UPCOMING MEETINGS

**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/yd<sup>2</sup> (42 g/m<sup>2</sup>). 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.*



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## RASPBERRY

### Raspberry High Tunnel Open House Highlights

*Cathy Heidenreich, Cornell University*

Despite driving rain and blustery high winds, approximately 40 people braved the wet and cold to attend the 2<sup>nd</sup> annual Cornell Raspberry High Tunnel Open House. Those attending came from near and far; some traveled from as close by as main campus for the event, others traveled from as far away as Quebec City, Canada to attend. Some were commercial growers looking for ways to extend their raspberry season, others were high tunnel owners/operators looking to share their own experiences or get discuss concerns with researchers. Also attending were CCE educators, homeowners, students, and some local newspaper reporters.



Tours of the tunnel were conducted by Dr. Marvin Pritts, the project leader, and Mary Jo Kelly and Jenny Conrad, who are assisting him with the project.

Some interesting raspberry high tunnel facts:

- √ The plastic goes on the tunnel in early September. The process takes about 2 hours.

- √ The tunnel, which is 30 x 90 ft, contains 4 rows of raspberries, planted on 7 foot centers.
- √ Bumble bees quickly adapt to life as high tunnel dwellers, often waiting to enter or exit each day when the doors were opened or the tunnel sides raised for ventilation. No additional pollinators were needed.
- √ Raspberries are harvested from the tunnel for approximately a 10 week period between early September and mid- November.
- √ Rows are picked on alternate days; two people harvest 8 hours a day, 3-4 days a week.
- √ Approximately 500 pints of fresh market quality fruit are harvested per week; the raspberries are sold from the Cornell Orchard store at \$5.00 per pint.
- √ The shelf life of tunnel produced raspberries is more than triple that of conventionally produced raspberries.
- √ Row covers are used to cover raspberries inside the tunnel on evenings when temperatures are predicted to drop into the mid to upper 20's to protect plants from cold injury.
- √ The plastic is removed again in early December after the cropping season is over.

One of the suggestions coming from the meeting was the development of a raspberry high tunnel production guide similar to the greenhouse raspberry production guide already available on line at:

<http://www.hort.cornell.edu/extension/commercial/fruit/Berries/bramblehtml/ghrasp.html>

Watch for the release of this new on-line publication in the months to come! (**Source:** *New York Berry News, Vol. 5, No. 10*)

### Insect Visitors to Late Season Berries

*Doug Pfeiffer, Virginia Tech*

Now is the time of the season when primocane-bearing raspberries and blackberries are yielding their fruit. As we collect our fruit at Kentland Farm in support of our Southern Region Small Fruit Consortium project on fall bearing brambles, we encounter a wide range of insects visiting these berries, some of which I'll review here.

**Japanese beetle and green June beetle** Japanese beetle and green June beetle have mostly tapered off, though there are still a few of each on our plants. Early in the primocane fruiting cycle, these two scarabs were the most common fruit feeders, and have been the cause

for most grower concern because of the relatively long Preharvest Intervals (PHIs) of insecticides that are effective (and the main targets of our project). Both species were more common on raspberries than blackberries, possibly because of an inherent preference for one over the other, but possibly also because raspberry fruit developed before the blackberries. These species feed on foliage of brambles, but the economic impact comes from the adult beetles feeding on ripe berries. The 2006 season was a serious one for Japanese beetle, not only on brambles but on other crops as well, such as grapevines.



*Green June beetle*

In 1972, a USDA entomologist published an excellent monograph on the Japanese beetle. In this manual, he proposed a rule of thumb

concerning the requirements for adequate rainfall. Japanese beetle, like many scarabs, lays eggs that are poor at maintaining moisture levels. Consequently, if soils are too dry, many eggs desiccate, and lower populations of adult Japanese beetles are present in the following year. The rule of thumb was a total of 10 inches of rain during June, July and August. This rule apparently needs some adjusting at least for some locales. In 2005, the total rainfall for this period around Winchester was about 6 inches; nevertheless, there were plenty of Japanese beetles to go around! This may be partly influenced by terrain, since low areas will always tend to have more soil moisture, and ovipositing females will tend to seek out areas with adequate moisture.

**Wasps** As the two fruit-feeding scarabs have declined, wasps have replaced them as the more common insects



*European hornet*

on berries (except for flies). One of the more common is the European hornet, *Vespa crabro*. This large wasp was introduced years ago and has spread so that it is established in many of the eastern states. It can be recognized by its large size, brown coloration, and the characteristic patterning in the yellow stripes on the abdomen. Despite their imposing appearance, European hornets are less aggressive than yellowjackets, and normally sting only when the nest is threatened. However, if grabbed along with a ripe berry, a sting

may be likely. Hornets nest in tree cavities and, like yellowjackets, predatory.

Paper wasps create the open-faced paper nests commonly seen under the eaves

of houses and other structures. While predatory for most of the season, they are also commonly seen feeding on ripe caneberries. The European hornet, paper wasps and yellowjackets all are social insects, creating colonies that last for a single season. Fertilized females overwinter.

**Lady beetles** are widely recognized as beneficial insects, feeding on a wide variety of soft-bodied insects in both their adult and larval forms. The newest member of the coccinellid community is the Multicolored Asian lady beetle, *Harmonia axyridis*. An introduced species, it has become abundant and widespread, sometimes the most common lady beetle found. It has aroused concern for two reasons. In the fall, it may aggregate by the hundreds or thousands in houses as it seeks protected places in which to overwinter. This is compounded by their tendency to leak orange blood (hemolymph) when threatened, possibly staining walls if brushed off the surface.

More central to this article, however, are the reports of this species also feeding on soft-bodied fruits, like raspberries and caneberries. While this will bear watching in the future, in our caneberry planting near Blacksburg, MALB numbers do not seem very common this season. Other lady beetles, apparently more strictly predatory, such as the convergent lady beetle, are also commonly seen at Kentland Farm.

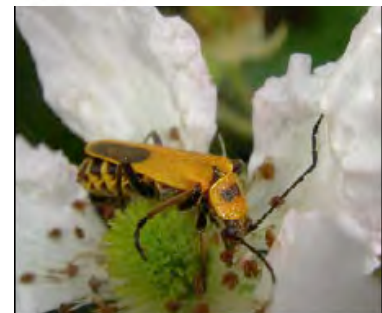
**Scorpionflies** have been seen visiting the brambles at Kentland, occasionally on berries. Their net role is uncertain; these insects (not really flies, despite the name) have a mixed diet, feeding on other insects, as well as fruit material and decaying animal matter. The insect shown is a male, indicated by the tail resembling the sting of a scorpion. These are



*Multicolored Asian lady beetle*



*Scorpion fly*



*Soldier beetle*

completely harmless. Females have a tapering abdomen.

**Soldier beetles** (sometimes known as leatherwings, owing to the leathery front wings or elytra) are often seen in caneberry plantings, often associated with blooms. They probably pose no problem, feeding on pollen and possibly some insects.

**Stink bugs** are common feeders on a wide range of fruiting structures. Their numbers have been high in

diverse cropping systems in recent years, from fruit systems to cotton. The image shows a green stink bug; brown and dusky stink bugs are also present. Their feeding may cause a loss of individual drupelets, but they are considered minor pests. For more information and some fine color pictures, visit the Virginia Fruit Web Site [www.ento.vt.edu/Fruitfiles/VAFS.html](http://www.ento.vt.edu/Fruitfiles/VAFS.html)

(Source: *The Bramble, Autumn 2006*)

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## BLUEBERRY

### Fall Blueberry Concerns

Gary Pavlis, Rutgers University

**Lime Sulfur:** I have recommended the use of lime sulfur for Phomopsis control. The fall application should go on when 2/3 of the leaves drop. Some growers have balked at using this material because of its corrosive nature. A grower from Massachusetts wrote to me and says he has a solution to this problem. He says that, "before applying the lime sulfur, I first spray the tractor and sprayer with a light oil and then the lime sulfur comes off when I wash the equipment after application. What works best, believe it or not, is "PAM", which is a combination of vegetable oil and lecithin, which are biodegradable and therefore not the environmental hazard that motor oil would be. Generic brands of this cooking oil are cheaper and are equally effective. I can cover my equipment with 3-4 cans for a total of about 6-7 dollars." Sounds like a good idea to me. I wouldn't want to do this for a weekly spray but lime sulfur is applied just once in the fall and once in the spring.

**Roguing:** Roguing of diseased bushes should be progressing. This is important in all varieties but should be done with extra care where blocks of Bluetta or Weymouth are located close to Blueray or Bluecrop. In the Pemberton area where there is still an appreciable acreage of Rancocas, varieties adjoining this old variety should be carefully inspected. In such situations there seems to be a more rapid spread of stunt disease. The Rancocas is very resistant to this virus disease but it is susceptible and may be a source of the disease without showing symptoms vividly. After many years of harboring the disease some Rancocas bushes are now clearly exhibiting stunt symptoms. All old plantings of Rancocas should be carefully rogued. Remember to spray diseased bushes before removing them. It is necessary to kill the leafhoppers and it is more efficient, more economical, and wise from the standpoint of conservation of beneficial insects to spray individual bushes rather than entire fields.

**Disease Identification:** A few growers have asked me to provide them with information so that they are more able to identify the typical blueberry diseases such as

Alternaria, anthracnose, Phomopsis, botrytis and mummy berry. I should just explain that the ability to positively identify a disease comes largely from experience. I once spent a few days looking at thousands of plants and tagging those with stunt while I was working on my masters degree in Arkansas. This experience was very early in my career and I accompanied Dr. Jim Moore from Arkansas and Dr. Al Stretch, USDA Pathologist. As a result of this experience, I have never forgotten what stunt looks like. This experience was invaluable and a grower who is not sure about disease ID should invite someone to his field who can spend some time and help him with identifications. This ability is critical in the choice of cultural and pesticide decisions.

Another aid to Disease ID are extension publications. The Highbush Blueberry Production Guide has photos and descriptions that will be of great value in disease ID Also, Michigan State produces one called 'Blueberry Diseases in Michigan', Extension Bulletin E-1731. Write Michigan Cooperative Extension, Michigan State University, East Lansing, MI 48824. There is also the new Compendium of Blueberry and Cranberry Diseases. This is an excellent resource for growers and researchers alike. This manual is produced by the American Phytopathological Society, 3340 Pilot Knob Road, St. Paul, MN 55121-2097. It should be realized that there are many times where disease ID is impossible without the help of their cooperative extension office in these cases.

Dr. Marvin Pritts, Cornell University has developed a Webbased diagnostic tool to help the grower/educator determine what might be wrong with their berry plants - from pest injury to herbicide injury to nutritional deficiencies. By answering a series of questions about symptomology, one is led to a possible cause. The site uses lots of photographs and can be very useful. To access the site, go to <http://www.hort.cornell.edu> or <http://www.fvs.cornell.edu> and select "Resources." Then select "Berry Diagnostic Tool."

**Nut Sedge:** I visited a farm infested with nut sedge with our Weed Specialist last week and picked up a few things that maybe useful to growers fighting this weed. You may recall that I have recommended Sinbar for the control of this weed. Actually, I stated that Sinbar will do a good job if applied

at the maximum rate but only on high organic matter soils. Applications are made as late as possible because nut sedge germinates about May 1. A combination of Solicam and Sinbar will result in early suppression by Sinbar until July 4<sup>th</sup>, and then Solicam will kick in. The grower I visited last week did all this and still has a major problem. Dr. Brad Majek, our weed specialist, pointed out that Sinbar is very soluble and will not work when a trickle irrigation system is present, i.e.

trickle + nut sedge = Roundup in early August. In addition, growers who have trickle systems would get better weed control from their herbicides if they would limit water applications in early spring when herbicides are first applied and are present. It actually might be a good idea to place the trickle tube at a 6 inch depth since herbicides work primarily in the top 6 inches of soil. Doing this may greatly decrease weed problems with trickle irrigation. (*Source: The Blueberry Bulletin, October 17, 2005 Vol. XXI, No. 21*)

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## GRAPE

### Long Island 2006 Season – Lessons Learned

*Alice Wise, Cornell Cooperative Extension*

2006 emerged as yet another challenging season in the vineyard. Humbling would be another way to describe it. Here are a few lessons we learned as managers of the research vineyard and observers of the industry.

- When it comes to bird/deer/critter damage, plan for the worst: Every creature in Riverhead Town decided to convene at the research vineyard this year. Soon after budbreak, deer were feasting on young shoots. When veraison was just starting – just – the birds, deer and raccoons began their onslaught. We have easily lost 1/3 of our crop, despite an electric fence, heavy duty netting across the ends of rows, various types of bird netting and trapping. While pressure in commercial fields ranged from none to significant, overall it seems that this was a difficult year for critter control.
- Boron toxicity: It is true what ‘they’ say, boron applications, whether ground or foliar, are tricky. We applied a light application (exact rate remains elusive but we only had a partial bag) and ended up with toxicity symptoms not long after budbreak. Fruit set was disrupted as well. Petiole analysis revealed levels as high as 116 (25-70 ppm being the normal range). Merlot was profoundly affected, Cabernet Sauvignon and Chardonnay somewhat. We were advised to spray calcium as calcium and boron are purported to be antagonistic. The Ca:N foliar material that we applied three times did seem to help the vines recover. Then again, we did not leave a check so this is pure speculation. Bottom line: we need to be a lot more careful when applying boron. Petiole levels are now hovering around 70 ppm and we anticipate no problems for next year.
- Early postbloom – the single most important time in the growing season: While the research vineyard emerged unscathed, some blocks were again inundated with powdery mildew on fruit. Why is this a continual problem in the eastern U.S.? Reasons vary from site to site/region to region but there are some common issues. On Long Island, after a cool May with sluggish shoot

growth, June was very warm and very wet. This led to explosive shoot growth. Keeping up with the demands of pest and canopy management becomes chaotic under these conditions. Inevitably, some key piece of equipment also breaks at this point. Thus, leaf pulling of the cluster zone, that most critical canopy management practice, is delayed. Complicating things further, it is difficult to run some of the leaf pulling machines early in fruit set as delicate clusters with newly set berries are vulnerable to breakage and slicing off. This commits many to hand leafing, a very labor intensive practice.

The chaotic June/July schedule has another consequence – vineyard managers often don’t have a minute to scout their vineyards. This means those early PM cluster infections go undetected. It is really easy to miss early PM on clusters, it often takes a very thorough scouting to find it. Those who are not in the vineyard can criticize and second guess, but this is the reality of winegrape vineyard management. The downside – a dense cluster zone provides ideal conditions for powdery mildew infections. It has happened in the past, it happened to an unfortunate few this year.

This rant is not to excuse a manager that clearly neglects to address disease management at this time of year. But mitigating factors do exist and when analyzing a situation like this, one must consider all angles. Choice of material, rate, timing, water, pressure etc. would be another obvious area to examine for potential holes.

- End of season disease control is important: Keeping the canopy functional is of utmost importance to proper ripening. We ended the season with a sulfur/PA application in late August. Bird netting (tenting out of nets) precluded further tractor work. At this point, the canopy was squeaky clean. But with lots of inoculum around and periodic rain, downy mildew soon became established. Powdery also appeared on the canopy but was less severe and not as ubiquitous. The downy came in on leaves of all ages thus blowing the ‘leaves are susceptible for a week after they unfold’ mantra out of the water. This may be true earlier in the season but it is clearly not the case in late summer and

fall. Thus, while clusters lose their susceptibility to the mildews around veraison, it is imperative to still address mildew management on the canopy in late summer and early fall. It does not have to be pristine

clean at harvest but it shouldn't be defoliated either. (*Source: Long Island Fruit & Vegetable Update, No. 29, October 2006*)

### Postharvest Vineyard Work

*Alice Wise, Cornell Cooperative Extension*

Though the season is winding down, there are still a number of vineyard jobs, some requisite (removal and storing of bird netting) and some to ponder (read on).

- **Postharvest fertilization** – This topic merits a chapter in a book. Postharvest applications of lime as well as nutrients such as potassium, calcium, boron and other micronutrients are routinely done and may save valuable time in the spring. Postharvest application of nitrogen is dicier. Common sense dictates that a functioning canopy and warmer soils facilitate the taking up of nutrients in the fall. This is particularly important with nitrogen as nitrogen, above all others, is prone to leaching. Postharvest application of nitrogen therefore would be most appropriate for earlier ripening varieties such as Chardonnay.

- **Postharvest weed control** – At first glance, this strategy seems wasteful. However, now that a couple of zillion tiny seedling weeds are apparent, there may be some wisdom in this. As long as labels permit usage, knocking down seedling populations may pay dividends in the spring, especially for those of us who are perennially late with spring weed control. Cultivation would be another option.

- **Powdery mildew postharvest spray** –Grape pathologist Wayne Wilcox expounds on the need for postharvest disease control, an often disagreed upon subject. New infections will show up on younger leaves in the top half of the canopy. \*IF\* this situation applies to you and \*IF\* you anticipate significant opportunity for additional photosynthesis before frost, a sulfur application \*MIGHT\* be beneficial to maintain optimum leaf health. Alternatively, an application of JMS Stylet Oil could be used to eradicate recent infections and reduce the number of overwintering spore bodies that they form. However, once these overwintering spore bodies have formed (about 1

month after leaf infections are visible), it's too late to do anything about them until next year. Lime sulfur (calcium polysulfide) applied to the vines in the spring prior to budbreak helps to knock back overwintering inoculum, but this is an unpleasant task and not routinely recommended.

For those who had significant powdery mildew fruit infection and are interested in reducing inoculum for next year, remember that nearly all of next year's inoculum comes from this season's \*leaf\* infections. So, if the fruit were hammered but leaves were clean, there should be no effect on increased inoculum just because the fruit were diseased.

- **Downy mildew**-- Only new leaves will get infected. Also, downy mildew becomes much less active once night temperatures get down into the 40's and 50's. Probably not worth it under normal conditions.

- **Other diseases: Black rot**--No benefit from postharvest sprays. **Botrytis**--No benefit from postharvest sprays. **Phomopsis**--No benefit from postharvest sprays. Lime sulfur before budbreak can help in vineyards with a history of serious Phomopsis infections.

- **Copper sprays to control downy mildew and “shut down vines”** – See downy mildew comments above. It is true that copper is phytotoxic to leaves, particularly copper without spray lime as a safener and/or under slow drying conditions. Repeated applications of copper are known to reduce vine size in Concord. If the goal is to shut down vine growth and help with the hardening off process, then vineyard management practices should be thoroughly examined first. If vines are so vigorous postveraison and postharvest (egads!), then there were problems with excess nitrogen and/or irrigation. A lack of proper periderm (bark) development may be due to overstimulation, vine stress (nutrient/water/disease), virus diseases or overcropping. (*Source: Long Island Fruit & Vegetable Update, No. 29, October 2005*)

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## General

### Do-It-Yourself Speed Cooler Helps Extend Shelf Life of Harvested Fruit

*Cathy Heidenreich, Cornell University*

Speed cooling of small fruits can dramatically extend their shelf life. A general rule of thumb is that for every hour of delay in cooling after harvest, shelf life is reduced by one day. This delay can have a significant

economic impact on a grower's ability to market fruit in retail and wholesale outlets. Large commercial berry operations routinely use large pre-coolers to speed cool warm fruit coming from the field.

Typical New York berry growers, however, operate on a slightly smaller scale. While most growers often have coolers for post harvest fruit storage, not many have speed cooling technology available to them.

Fortunately, William Wilcke, Extension Agricultural Engineer, and Herbert Stiles, Extension Horticulturalist, both from Virginia State University have designed a do-it-yourself forced-air produce cooler which can help get the job done - fast!

Their simple device, assembled from materials available from your local home improvement or hardware store, can be readily constructed using common household tools. It is intended to be used in your existing produce cooler to speed cool non-wrapped small fruit and/or produce packed in vented cartons. The cooler is custom-built to the dimensions of your filled produce cartons and is designed to cool one to three columns of cartons (approx. 15 cartons per column, depending on carton depth) at a time.

A print-friendly PDF version of the plans for this do-it-yourself is available free of charge from the Virginia Cooperative Extension Service at:

<http://www.ext.vt.edu/pubs/fruit/442-060/442-060.pdf>.

(Or contact them directly and ask for their Small Fruits Publication #442-060, The Forced-Air Produce Cooler, by William Wilcke and Herbert Stiles)

Once you have finished your custom-built forced air cooler, place it in a room maintained at proper temperature and relative humidity for the type of produce you need to speed cool (32°F and 90% relative humidity is recommended for small fruits). Load the fruit into the cooler following the instructions provided.

Operate the unit until the produce is within a few degrees of the cold room temperature. This may take 2-6 hours depending on the fan size of your unit and the initial temperature differences between the cold room and the harvested fruit. (Caution- Do not operate more than 6 hours as this may dry out the fruit.)

Once the fruit is speed cooled, move it out of your speed cooler into the main cold room area and re-load the unit with another batch of warm produce. If you need to add more warm fruit to the unit while it is already in operation, slide the partially cooled columns to the rear and set the warmer fruit closest to the forced air cooler to avoid reheating partially cooled fruit. (**Source:** *New York Berry News, Vol. 5, No. 10*)

### **The Organic Way – Yellow Nutsedge**

*Elsa Sánchez and Bill Curran, Penn State University*

Yellow nutsedge (*Cyperus esculentus*) is a problem for a number of growers in the northeast. It's a difficult weed to manage and is considered one of the worst weeds on the planet because of its perennial life-cycle and ability to reproduce by nutlets and seeds. Understanding the biology of yellow nutsedge is important in developing management strategies (<http://cropsoil.psu.edu/extension/facts/uc187.pdf>).

Yellow nutsedge is a perennial weed belonging to the Sedge family (Cyperaceae). It looks very similar to grasses except that it has triangular stems (this is why the saying “sedges have edges” originated) whereas grasses generally have round stems. If you cut a cross-section of a stem it will be solid and triangular. Each plant can grow 6 – 30 inches tall and produces seed heads in late summer. The seed heads are straw yellow in color and are produced from a flower cluster called an umbel, which resembles an umbrella. Several million seeds can be produced per acre each year. Of those seeds, 5 to 40% are viable and seedling survival only occurs when environmental conditions are favorable. Because of this seeds are not the primary strategy for spreading yellow nutsedge in a field; although, they are important for spreading the plant larger distances.

Underground storage stems, botanically termed tubers and commonly called nutlets, are the primary strategy for yellow nutsedge reproduction. In the spring, nutlets germinate and stems emerge from the soil. A few weeks after stem emergence, rhizomes (another type of underground storage stem) begin to develop. In about late July, as nights get longer, nutlets begin to develop at the tips of rhizomes and continue to develop until a hard frost. A single plant can produce hundreds to thousands of nutlets each year. According to the book “Applied Weed Science” (Ross and Lembi, 1985), a single nutlet produced over 1900 plants and about 7000 tubers in one year in one study. Nutlets most often germinate the following spring, but can be viable for several years.

The best strategy for management is to use multiple tactics. Below is a list of possible tactics.

- Once yellow nutsedge has been identified, avoid spreading it to other locations. Seeds and especially rhizomes and nutlets can be moved on equipment; cleaning equipment or avoiding moving equipment over infested area can help reduce spread.



- While, seeds are not the not the primary method for spreading yellow nutsedge, they are important for spreading the plant greater distances. Preventing seed production by mowing prior to flowering and seed set will prevent the formation of seeds.
- Mowing can exhaust the energy reserves of nutlets; however, it can take seven or more mowings until reserves are depleted.
- Tilling in fall can directly destroy small nutlets and expose larger nutlets to killing cold temperatures. In the fall, chisel plowing or using tillage tools that bring vegetative structures to the soil surface are better than tools that invert soil (moldboard plow) and bury the nutsedge. Tillage in the spring; however, can help spread yellow nutsedge. This is particularly a problem when using more shallow types of tillage.
- Obtain inputs such as straw and manure from a reputable supplier as they can be contaminated with yellow nutsedge flowers and seeds.
- Yellow nutsedge growth is inhibited by shade as well as with mulches. Using close row spacing can result in shading and minimize yellow nutsedge growth. Mulches, including plastic, straw and cover crop residues can also provide shade as well as provide a physical barrier that reduces plant emergence and success.
- A healthy crop can out compete yellow nutsedge. Use management practices that promote crop health.
- Yellow nutsedge tends to be a larger problem on low or wet areas in a field. Using raised beds in areas with poor drainage can help to manage yellow nutsedge.
- Certain crops such as potatoes and lima beans are directly damaged by yellow nutsedge. Avoid planting these crops in infested areas.
- Plant early spring or mid summer crops where yellow nutsedge is a problem. Yellow nutsedge emerges during May and early June. Cool season crops can have a competitive advantage for later emerging yellow nutsedge and preplant tillage and help control emerged yellow nutsedge prior to establishing a mid-summer crop.
- Some of the herbicides used by organic farmers (vinegar, clove oil, etc.) are not very effective on yellow nutsedge or on other perennial grass or grass-like weeds.

#### References:

1. Curran. 2004. Weed Management in Organic Cropping Systems. Penn State Cooperative Extension Agronomy Facts 64. <http://cropsoil.psu.edu/extension/facts/uc187.pdf>.
2. Kemble, Patterson and Everest. 2004. Alabama Cooperative Extension System Bulletin ANR-1073. <http://www.aces.edu/pubs/docs/A/ANR-1073/ANR-1073.pdf?PHPSESSID=dfc40e7670ad964a5f12b7b2d00ec908>.
3. Lingenfelter and Curran. 1995. Controlling Yellow Nutsedge in Agronomic Crops (An Integrated Approach. Penn State Cooperative Extension Agronomy Facts 47. <http://cropsoil.psu.edu/Extension/Facts/agfact47.pdf>.
4. Ross & Lembi. 1985. Applied Weed Science.
5. Yellow Nutsedge. [http://www.nwcb.wa.gov/weed\\_info/Cyperus\\_esculentus.html](http://www.nwcb.wa.gov/weed_info/Cyperus_esculentus.html). Viewed 9/5/2006.

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#### Upcoming Meetings:

##### **Sustaining Agriculture in Connecticut's Urban Environment**

November 16, 2006

Courtyard by Marriott Cromwell, Cromwell, Connecticut

The goal of this conference is to address issues that arise when agricultural and urban, suburban land uses come together and to identify funding resources.

For more information contact: [bartholomew@uconn.edu](mailto:bartholomew@uconn.edu)

##### **3rd Annual Maine Grass Farmers Network Grazing Conference**

November 18, 2006

Kennebec Valley Community College, Fairfield, Maine

9:00 am - 4:30 pm

For more information contact: [dianes@mofga.org](mailto:dianes@mofga.org)

### **Small and Tree Fruit – Weeds & Weed Control**

Nov. 27, 2006

UNH Cooperative Extension Hillsborough County Office, 329 Mast Rd. Goffstown, NH

6-9pm; cost: \$5

For more information contact: George Hamilton at 603-641-6060 or [george.hamilton@unh.edu](mailto:george.hamilton@unh.edu)

### **The Multicolored Asian Lady Beetle: an Informational Conference About the Pest and its Effect on Grape Producers, Wine Makers and Processors.**

Wednesday, November 29<sup>th</sup>, 2006

8:30 a.m. – 3:30 p.m.

American Legion Post 105

17 South Mill Street, North East, PA

For more information contact: [ajm4@psu.edu](mailto:ajm4@psu.edu)

### **NEV&BGA 569<sup>th</sup> Meeting**

December 2, 2006

Best Western Hotel, 580 Rt. 1 Bypass at the Portsmouth, NH Traffic Circle

9:30am – 3:30pm

For more information contact John Howell at [howell@umext.umass.edu](mailto:howell@umext.umass.edu)

### **Cider Makers Short Course**

December 5-8, 2006

New York Ag Experiment Station, Geneva, NY. More information: Ian Merwin [im13@cornell.edu](mailto:im13@cornell.edu) or Padilla-Zakour [oipl@cornell.edu](mailto:oipl@cornell.edu).

### **MARK GREENSPAN WORKSHOP ON LONG ISLAND**

December 6, 2006

Long Island Horticultural Research & Extension Center

Cost: \$25 per person (to help with travel expenses)

For more information contact: [avw1@cornell.edu](mailto:avw1@cornell.edu)

### **VEGETABLE PRODUCTION: From Greenhouse to Market**

December 11, 12 & 13, 2006

A Three-Day Farmer-to-Farmer Workshop for Vegetable Farmers

For more information contact: [arnold3@capital.net](mailto:arnold3@capital.net)

### **National Bramble Conference**

January 15-17, 2007

The annual conference of the North American Bramble Growers Association will be in Columbus, Ohio, this year, in association with the Ohio Fruit and Vegetable Congress. Sessions include an intensive "Bramble ABCs" workshop for novice growers. For more information, email [nabga@mindspring.com](mailto:nabga@mindspring.com).

### **2007 Empire State Fruit and Vegetable Expo**

February 14-15, 2007

Onodaga Convention Center, Syracuse, NY.

For more information go to: <http://www.nysaes.cornell.edu/hort/expo/>

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Massachusetts Berry Notes is a publication of the University of Massachusetts Extension Fruit Program which provides research based information on integrated management of soils, crops, pests and marketing on Massachusetts Farms. No product endorsements of products mentioned in this newsletter over like products are intended or implied.

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