

# **The Vegetable & Small Fruit Gazette**

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## Quote for Thought from Pete Ferretti

*A variety of nothing is superior to a monotony of something.*

*~Jean Paul Richter*

# Romaine Lettuce Trial

John Esslinger, Penn State Cooperative Extension Educator

A Romaine Lettuce Trial was conducted last summer on the Mark Phillips Farm in Lackawanna County. The trial was established to identify varieties that perform well with an emphasis on the plants ability to hold in the field. The varieties were seeded over several days with the later maturing varieties seeded first and the earlier varieties seeded later in an attempt to have all varieties mature at the same time. The entire trial was planted on June 13, 2008. We wanted to have lettuce ready for harvest on the opening day of market. The first harvest and the opening day of market occurred on July 18.

The varieties were planted on both black plastic mulch and bare ground to evaluate the pros and cons of each. There were two replications of the varieties planted on plastic and just one replication on bare ground. An additional goal of the trial was to measure consumer acceptance of Romaine types in the Scranton Cooperative Farmers' Market. Two leaf lettuces, 'New Red Fire' and 'Bergam's Green', and head lettuce, 'Summer Time', were included in the plot for comparison. Very little Romaine lettuce is brought into the Scranton Market. Romaine lettuce had the reputation among local growers that it bolts too quickly to make it practical for a farmer's market. The Scranton Coop Farmers' Market is open Monday, Wednesday and Friday.

## Yields

Eight heads of each variety grown on black plastic were weighted at harvest early in the morning on market days. The harvest date and weights (in pounds) of the eight heads is recorded below.

July	Freckles	Paris White	Cim-maroon	Ideal Cos	Green Towers	Para-mount	Summer Time	New Red Fire	Bergam's Green
18	12.5	10.0	9.0	12.0	11.5	8.0	-	6.5	10.0
21	10.0	9.0	9.5	12.0	10.5	10.5	-	7.0	10.0
23	10.5	11.5	8.5	12.0	13.5	14.0	8.0	9.0	11.5
25	bolted	10.5	7.0	13.0	12.5	10.5	9.0	8.5	11.5
Total	33.0	41.0	34.0	49.0	46.5	43.0	17.0	31.0	43.0

On July 28 the Romaine varieties 'Ideal Cos', 'Green Towers', and 'Paramount' were still harvestable but were starting to elongate. 'Ideal Cos' did not have any brown leaf tips but 'Green Towers' had 40% of the plants showing leaves with brown tips and 'Paramount' had browning on 100% of the plants. The 'New Red Fire' and 'Bergam's Green' were still holding nicely on July 28.

A note on the 'Cimmaron Red': It did not perform well in the greenhouse. It produced a spindly transplant that was hard to plant. We had a problem with some of the plants breaking off when we removed them from the tray. That being said, the variety performed well once it hit the field.

## Plastic vs. Bare Ground

The lettuce grown on bare ground was ready for harvest on July 28. It worked out nicely that the bare ground lettuce was ready just as the lettuce on plastic was finishing. The lettuce grown on plastic was 8-10 days earlier than the bare ground. We were not able to get a fair yield comparison of the two

production methods. The weather turned hot and dry as the bare ground planting neared harvest. The bare ground plot did not hold as well due to high temperatures. One thing that was obvious was that the lettuce grown on plastic was much cleaner and required very little washing before marketing. The head lettuce, 'Summer Time', performed poorly on the plastic but performed well on bare ground.

### **Marketing**

Demand for lettuce has grown steadily at the Scranton market. We wanted to know if customers prefer leaf type or Romaine. The leaf lettuce out sold the Romaine lettuce by a 3 to 1 margin the first two weeks of market. By the third week of the market the leaf lettuce out sold the Romaine by a 2 to 1 margin. Customers that bought the Romaine lettuce came back to buy more gave positive feedback.

While the yield was record in pounds /8 heads, the lettuce was sold by the head.

### **Conclusions**

The Romaine varieties performed well. They produced a large attractive head. They held fairly well in the field but not as well as the leaf lettuce. The customer acceptance improved as the marketing season progressed. They had good flavor and texture.

Plastic definitely has advantages over bare ground. Bare ground can be used to extend the harvest of a particular planting.

While the varieties with red coloring like 'Freckles' and 'Cimmaron' offer great eye appeal, the best over-all performers were 'Ideal Cos', 'Green Towers', and 'Paramount'. 'Ideal Cos' had the best holding ability.

Sincere thanks to Mark Phillips the grower/cooperator and Rupp Seeds, Inc. for providing the Romaine lettuce seed.

# Putnam Scale on Blueberries

Kathy Demchak, Penn State Horticulture

Last summer in late June, a local county extension office was contacted by a grower who noticed some small white dots on their blueberry fruit. The dots were surrounded by a narrow reddish ring, and beyond that, a surrounding light-colored bleached area. The diagnosis (thanks to Dean Polk and Cesar Rodriguez-Saona at Rutgers) was Putnam scale.

There have been several instances of Putnam scale being diagnosed as a problem on blueberries in Pennsylvania, and though the frequency hasn't been high, I'm suspicious that this insect may be more common than you'd think. A heavy infestation of Putnam scale can result in a decline in plant vigor, smaller berries, and eventual plant death, so you may want take a look for these insects after the leaves fall off the bushes, or monitor for them next spring.

Putnam scale falls in the category of armored scales, which means that the insects themselves, which are soft-bodied, are protected by a hard coating. This affects which control measures are effective and timing of their use. Newly-hatched scale insects are called "crawlers" because they move to their feeding locations, and it is only at this point in their life cycle that they are exposed. Putnam scale is found not only blueberries, but also can be found on apple and cherry trees, and various forest and shade trees including maple, ash, beech and oak. Putnam scale may be most commonly brought into a planting on nursery plants, but crawlers can also be moved in from surrounding forest or fruit trees by wind, birds or insects. Their populations most commonly build when pruning has been minimal.

On blueberries, most of the scales are found under the rough bark on older canes - another good reason to prune the oldest canes out. By removing older canes, you remove a good percentage of the scale population, and also their most-protected living areas. A recent report suggested that the scale may only be seen on other areas of the plant, such as young stems, leaves, and berries, when their living conditions become too crowded on the older stems.

So, how do you know whether you have Putnam scale? The scales once mature are difficult to see, as they may be covered by bark, and appear as tiny (only 1/16" in diameter) gray waxy dots. If the waxy covering is lifted off, yellow insects can be seen underneath. The crawlers also are yellow. Double-sided sticky tape can be wrapped around the stems in spring and early summer, when crawlers on the tape should be apparent. Applying black electrician's tape (sticky-side out) to the double-sided tape will make the crawlers on the edge of the tape more visible, but you'll probably still need a magnifying lens or hand lens to see them, as they are about the size of mites. Research in New Jersey showed that there are two generations of this insect per year in warmer areas of New Jersey. In colder areas of the Northeast such as Connecticut, only one generation occurs. Most, if not all, of PA, probably falls in the one-generation-per-year area, but this isn't for certain. The bottom line is that crawlers will be around in spring to early summer, but if you are in a warm location where there are two generations per year, they may be found in midsummer also. Photos of all life stages can be found at <http://www.blueberries.msu.edu/scales.htm>.

Besides pruning out old canes, conserving naturally-occurring predators of Putnam scale – several species of parasitic wasps – will help with management. This means avoiding the use of broad-spectrum insecticides (whether conventional or organic) when possible. Lime sulfur applied in the  
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The Pennsylvania State University

springtime for disease control also helps with scale control. Superior oil can be applied when the buds are swelling, but prior to green tissue appearing. This material is basically used to smother overwintering scales, but coverage must be complete. Use 3.0 gal of oil in 250-300 gallons of water per acre at high pressure (300-400 psi).

Esteem 35WP at 5 oz/ is labeled for Lecanium scale, which can also be a problem on blueberries, but isn't labeled for Putnam scale. Esteem's active ingredient (pyriproxyfen) is a juvenile hormone mimic. It is relatively specific, affecting certain insects such as scale crawlers and cherry and cranberry fruitworm larvae, and is safe to parasitic wasps and bees. However, on the down side for predator conservation, it is also toxic to ladybird beetles.

Life cycle and further info on control measures for Putnam and other scales are outlined in the Blueberry chapter of the Mid-Atlantic Berry Guide, available possibly through your county Extension offices (call ahead) or on-line at <http://pubs.cas.psu.edu/freepubs/MABerryGuide.htm>.

#### References and for Further Reading:

Gauthier, N. L. 1993. Scale Control on Highbush Blueberry. Univ. of Connecticut IPM. <http://www.hort.uconn.edu/ipm/fruit/htms/hbbblueb.htm> Accessed 11/3/08.

Issacs, R. Michigan Blueberry Facts. Insects – Scales. <http://www.blueberries.msu.edu/scales.htm> Accessed 11/3/08.

Polavarapu, S., J. A. Davidson, and D. R. Miller. 2000. Life history of the Putnam scale, *Diaspidiotus ancylus* (Putnam) (Hemiptera: Coccoidea: Diaspididae) on blueberries (*Vaccinium corymbosum*, Ericaceae) in New Jersey, with a world list of scale insects on blueberries. Proc. Entomol. Soc. Wash. 102(3):549-560.

# What is the Best Way to Put Micronutrients into Plants?

*Question from: Tom Childs, Greenhouse Manager, Twin Springs Fruit Farm*

*Steve Bogash, Penn State Cooperative Extension Regional Horticulture Educator*

There are several ways to approach micronutrient plant nutrition. The first and best long-term management technique is to have sufficient micronutrients available to plants through their root system. Root micronutrient (and macronutrient as long as we are talking nutrients) uptake is largely based on pH, and having nutrients in available forms and in sufficient amounts so that and single nutrients' availability is not adversely affected by other nutrient concentrations. Secondly, plants also take in nutrients through their leaves. Foliar application can be an excellent method to make up for short term deficiencies. A regular program of timely tissue testing is the only method to spot deficiencies before they affect plant health and yield.

In general, when we are talking micronutrient deficiency in our region we are considering levels of Copper, Iron, Manganese, Boron, and Zinc. Calcium and Magnesium are primary nutrients, but since they are seldom addressed in articles relating to macronutrients and we use similar techniques to make up for deficiencies in them, their application is included here. Working towards a slightly acidic pH of 6.2-6.8 in the root zone will greatly increase the availability of most of the nutrients needed to grow a good small fruit or vegetable crop (with the notable exception of blueberries). As pH in the soil solution approaches 7.0 and higher, many nutrients become less available. Some soluble fertilizers such as Miller's Nutrichem 9-15-30 contain a blend of micronutrients formulated largely as chelates which are very stable and available to plants along with N, P and K. Dry kelp meal or kelp extracts are good natural sources to bring soil micronutrient levels up. Some, but not all of these products are OMRI listed. Soluble fertilizer blends consisting only of a blend of micronutrients such as Miller's Microplex are another option. Specific nutrient materials such as Helena's Ele-Max Super Zinc and Ele-Max Magnesium FL are very useful in supplementing zinc and magnesium levels. Trace elements fed to livestock and applied as manure to fields will often prevent micronutrient deficiencies.

While agricultural limestone and dolomitic limestone are good sources of Calcium and Magnesium, the often heavy application rates of these materials have the unpleasant side effect of increasing pH, thus decreasing the availability of many other nutrients. Applications of liquid calcium products, calcium chelate, magnesium oxides and magnesium chelate will increase the availability of these nutrients without adversely impacting soil pH.

Foliar application of nutrients is an excellent method to cure immediate deficiency problems. The single greatest concern in foliar application is in causing phytotoxic reactions, thus damaging leaves or fruit. While you might apply #1-2 / acre of Zinc chelate through drip lines, a foliar application of 3-8 oz of the same material is sufficient. Up to #3/ acre of Boron as Borax can be applied to the soil, yet only 4-8 oz/ acre is the maximum that can be applied foliarly. Growers can utilize tank mixes in applying many micronutrients. However, just as some mixes of fungicides and insecticides can be phytotoxic, multiple micronutrients in a tank mix can have a similar result. Most injury shows up within the first 48 hours. So apply a test solution to a small area, wait 48 hours and assess the situation before making the entire application. Foliar applications are best used to make up for short term deficiencies. Growers will either need to apply them often or combine foliar with fertigation application. The first step in producing a healthy crop is in creating a healthy canopy. Once you've

burned the leaves from too much material or a toxic blend, it is very challenging to turn the crop around.

Copper and zinc deficiencies are often not seen when fungicides / bactericides such as Kocide, Phyton 27, Champ, mancozeb, Manzate, Dithane are used as these materials contain either copper or zinc (zinc-based materials are primarily fungicides while copper materials do double duty). In fact, tissue testing often indicates very high to toxic amounts of these materials if the samples are pulled shortly after their application.

Liquid kelp extracts are often applied foliarly to make up for general micronutrient deficiencies in crops grown under organic production rules. Many organic growers that I've spoken with in the Lancaster area are convinced that fermented vermiculture solutions not only supply vital nutrients, but also confer serious disease prevention characteristics. Fertrell Products worked in a side-by-side tomato nutrient study this past season at Penn State's Southeast Research and Extension Center (SREC, also known as the Landisville Research Farm). We are just starting to analyze the results of that study which will be published over the next few months. An increasing number of new nutrient products are being introduced to serve the organic production market. Be sure to check the most recent OMRI listing and check with your certifier before application as this list is evolving over time.

Of all of the errors that I've made and seen growers make over the years, simple mathematical errors that occur in determining foliarly applied micronutrient rates seem to be the worst. It is very easy to make a simple mistake of one decimal point in calculating rates and burn a crop past the point of no return. A one decimal point mistake can produce a 10x error that will readily create a micronutrient solution that is very toxic to a crop. Foliar application also complicates tissue testing since the laboratory has no way of knowing whether the boron / zinc / copper.... that is showing up in their sample is sitting on the tissue surface or has been taken up by the plant. For field samples, wait to harvest tissue until after a soaking rain. When pulling greenhouse or high tunnel samples, wait at least one week after nutrient application, carefully wash the leaves or petioles, then, blot dry on paper towels. This simple extra care in sample handling will greatly increase test accuracy.

Both foliar and root applied micronutrients are useful in maintaining plant health, neither method is better than the other. A program of soil or media testing prior to planting followed up with regular, timely tissue testing and subsequent nutrient application is the "solution" to applying micronutrients. While several examples of specific fertilizer blends and manufacturers were mentioned in this article, Penn State does not recommend one product over another. Speak to your current supplier, shop around for products that meet your needs and always get competitive pricing. Be sure you are comparing like materials.

# Row Covers

Mike Orzolek, Penn State Horticulture

For most crops, floating row covers require no support because they are lightweight. They literally "float" or lie directly over the crop, whether direct seeded or transplanted. Materials include perforated plastic, spunbonded polyester, and spunbonded polypropylene; they do not impede seedling emergence or subsequent growth of the crop. (For an exception, see below.) To secure the cover against wind, all the edges are buried or weighted down with sandbags, rocks, or secured to the ground with plastic pegs.

There are two types of these covers: perforated polyethylene which is about 1 mil thick and spunbonded polyester or polypropylene which is available in several weights (rather than in thickness).

Perforated polyethylene has a uniform pattern of 3/8-inch holes (74 holes/sq ft) for ventilation. However, the holes allow for heat loss at night and are an entry point for insects. Overall, many growers have found these covers to be very beneficial for growth enhancement.

Spunbonded covers are comprised of a thin mesh of white synthetic fibers which entrap heat and serve as a barrier to wind, insects, and some wildlife. Water from rain or overhead irrigation freely passes through. The weight of these covers range from 0.3 to about 2.0 oz/sq yd (10 to 68 grams/sq meter). The lightest covers are used primarily for insect exclusion while the heaviest of the covers are used for frost protection. The most common weights are 0.5 to 1.25 oz/sq yd (17 to 42 grams/sq meter). With covers under 0.5 oz there is minimal heat retention at night; and over 1.75 oz, there is a significant reduction in light transmission. The heavy covers are used for nighttime frost protection only since they do not transmit sufficient light for optimum crop growth.

Spunbonded row covers in the 0.5 to 1.25 oz range provide 2° to 4° F frost protection in the spring. In the fall, there is more protection because there is a larger reservoir of heat in the soil in the fall than in the spring. These covers perform very well in protecting late-season tomatoes and pepper from early frosts.

Floating covers require much less installation labor than hoop supported covers. The wider and longer the covers, the less labor required per unit area since only the edges are secured. These covers vary in width from 6 to 50 feet and up to about 800 feet long. One way to evaluate labor needs is to compare the time that it takes to apply one piece of cover 50 feet wide x 200 feet long (500 perimeter feet) versus the time it takes to apply 5 pieces 10 feet wide x 200 feet long (2100 perimeter feet). Regardless of width, the cover is secured by weighting down the edges (sides and ends) with soil, sand bags, stones, or long pins or pegs. In extremely windy areas, additional weighting in the middle of the cover is advisable.

Insect control is effective with spunbonded covers when all of the edges are completely sealed. For example, maggots in radish (and in other crops in the cabbage family) are controlled when a cover is applied at seeding with a complete seal around the edges. When the adult maggot flies search out the young seedlings for laying eggs, the flies will be unable to get under or through the cover. A continuous furrow of soil along the edges is probably the best method.

It is feasible, however, that row covers could actually increase insect damage on some crops. The environment under the cover is pretty "cozy" for insects, so it is important that all transplants that are to be covered are free of insects at transplanting. To prevent a heavy population of Colorado potato beetles under a cover do not plant potatoes in the same place in successive years and use a cover the second year. Overwintering adult beetles could emerge from the soil under the cover and lay an abundance of eggs that would soon hatch into a dense population of larvae.

There are a couple of disadvantages of floating covers. One is the weed pressure under the covers. Between strips of plastic mulch or with crops such as sweet corn where plastic mulch is not used, weeds grow rapidly and competitively. When using herbicides, the highest labeled rate is generally needed to adequately control weeds. There is also some inefficiency in covering the space between strips of plastic, but here again the trade-off is reduced installation labor of wide covers versus narrow covers.

Most all vegetable crops as well as strawberries, raspberries, and cut flowers have been grown with row covers. Although the primary crops for row cover use are high value crops such as melons, tomatoes, pepper, summer squash, sweet corn, and strawberries, many growers find row covers to be valuable for a number of crops for varying reasons -- earliness, higher yields, overwintering protection, and insect and wildlife control. Crop selection and cover selection are important to the economical success of the extra inputs. Crop distinctions such as temperature sensitivity, pollination methods, and growth habit dictate the type of row cover that is best to use.

Even though most crops can be grown without damage under floating covers, tomatoes and pepper are an exception. If the spunbonded material is not supported with wire hoops for these crops, flapping of the cover in the wind will damage the growing points of young plants. Also, with summer squash under windy conditions, many of the leaves might be broken by the cover. For these three crops, a series of strategically placed wire hoops will prevent crop damage.

At the Penn State Center for Plasticulture, evaluation of floating row cover materials is being conducted on crops in the field as well as crops being grown in high tunnels.

# Changes to the Insect Control Sections of the 2009 Commercial Vegetable Production Recommendations Guide

Dr. Gerald Ghidui, Rutgers University Entomology

The Insect Control sections for each vegetable crop in the 2009 Commercial Vegetable Production guidebook will look much different than it has in the past. There have been so many generic insecticides marketed during the past several years that it is impossible to list all the names for any one particular type of insecticide. The mid-Atlantic Vegetable Recommendations Committee, composed of representatives from NY, NJ, PA, MD, VA, and DE, unanimously decided it would be better to list the common name of each recommended insecticide, then put the most common brand names in ( ) next to it.

All insecticides have 3 names: the **structural** name (such as 1-naphthyl N-methylcarbamate), which describes to the chemist what the molecule looks like; the official **common** name (such as carbaryl) which is a universal name for that material; and the **brand** name (such as Sevin), which is the marketing name used by each seller or manufacturer. Thus when we list a common name in the recommendation book, it encompasses all the different brand names that are available on the market. For example, Warrior insecticide is now listed as “lambda-cyhalothrin (Lambda-Cy, LambdaT, Silencer, Warrior, Warrior II or OLF). The OLF refers to “or other labeled formulation” as there are other brand names on the market that we did not list. Multiple brand names exist for abamectin, bifenthrin, cypermethrin, cyfluthrin, permethrin, imidacloprid, thiamethoxam, etc. etc. Plus many of these materials, even newer ones, are marketed in combination with other insecticides, such as Hero, which is a combination of zeta-cypermethrin and bifenthrin; Brigade, a combination of bifenthrin and imidacloprid; or Consero, a combination of spinosad and gamma-cyhalothrin – just to name a few. It became nearly impossible to continue to list by brand names.

To further complicate matters, the different brand-name labels for the same insecticide did not always list the same crops! The only way growers would know this is to refer to each label. Technically, it would be illegal to apply a “generic” insecticide to a crop if that crop is not on that particular label, even though another label of the same active ingredient has the crop on their label. In addition to these differences in crop listings, some generic materials have different formulations than did the original, and thus rates are different for the different generic brands of the same active ingredient! The problems were growing exponentially with the introduction of more and more generic insecticides.

Lastly, as the Insecticide Resistance Action Committee (IRAC) becomes more important in efforts to manage insect pest resistance to insecticides, it is best for growers to become familiar with the common names. For example, the Recommendation book lists the insecticides by the IRAC Group #, based on it’s mode of action, so growers can be aware of potential insecticide resistance concerns. Growers would know that imidacloprid is a neonicotinoid, and repeated use of it would greatly risk Colorado potato beetle resistance to the entire neonicotinoid class of chemistries. Thus, Admire, Admire Pro, Nuprid, Provado, Concur, Gaucho, Lattitude and several others all have the same active ingredient – imidacloprid.

The 2009 Commercial Vegetable Production Recommendations still list the recommended materials for each pest, so that growers will have the best options available as a management tool. He or she will need to refer to the actual label to obtain the rate(s) for that pest as well as for any restrictions and other pertinent information. The REI's and Days-To-Harvest are still listed in the Recommendation Book, as they do not change regardless of brand. Table D-6 (Toxicity of Insecticides) still cross-references many brand names, so if one were to look up 'imidacloprid' it would list the various known brand names.

A copy of the actual label can be quickly downloaded from the internet, at [www.CDMS.net](http://www.CDMS.net) or at [www.Greenbook.net](http://www.Greenbook.net). The most recent labels are posted and updated at these sites by the manufacturers.

## Upcoming Meetings

If you have a meeting you would like to announce, please send the meeting title, date, location and contact information to [esanchez@psu.edu](mailto:esanchez@psu.edu).

### Local

- ✓ Nov. 13, 2008. **Vegetable and Small Fruit Agricultural Educators Roundtable**, Sam Hays Livestock Evaluation Facility, Rock Springs, PA. For more information contact Bill Lamont at (814) 865-7118 or [wlamont@psu.edu](mailto:wlamont@psu.edu).
- ✓ Nov. 18, 2008 (tentative date). **Western Pennsylvania Vegetable & Berry Seminar**, Butler, PA. For more information contact Eric Oesterling at (724) 837-1402 or [reol@psu.edu](mailto:reol@psu.edu) or Lee Young at (724) 228-6881 or [ljs32@psu.edu](mailto:ljs32@psu.edu).
- ✓ Nov. 18, 2008. **Diagnosis, Visual Assessment and Management of Plant-Parasitic Nematodes of Vegetables and Small Fruit in the Northeast**, Lehigh County Cooperative Extension Office, Allentown, PA. For more information contact Beth Gugino at [bkgugino@psu.edu](mailto:bkgugino@psu.edu).

### Regional

- ✓ Jan. 13 – 15, 2009. **Atlantic Coast Agricultural Convention and Trade Show** (NJ Vegetable Meeting); Trump Taj Mahal. For more information contact Mel Henninger at (732) 932-9711 x 120 or [henninger@aesop.rutgers.edu](mailto:henninger@aesop.rutgers.edu).
- ✓ Feb. 3-5, 2009. **2009 Mid-Atlantic Fruit and Vegetable Convention**, Hershey Lodge and Convention Center, Hershey, PA. For more information contact William Troxell at 717-694-3596 or visit [www.mafvc.org](http://www.mafvc.org).
- ✓ Nov. 6-8, 2008. **Southeast Strawberry Expo**, Charlotte, NC. Workshops (“Strawberry Plasticulture for New Growers” and “Are You Making a Profit”), tour, educational sessions and trade show. For more information call 919-542-4037, email [info@ncstrawberry.com](mailto:info@ncstrawberry.com) or visit [www.ncstrawberry.com](http://www.ncstrawberry.com).

### National

### International

- ✓ Dec. 8-9, 2008. **North American Raspberry & Blackberry Conference**; Grand Rapids, MI, in association with the Great Lakes Fruit & Vegetable Expo (Dec. 9-11). For more information email [info@raspberryblackberry.com](mailto:info@raspberryblackberry.com), call 919-542-4037 or visit [www.raspberryblackberry.com](http://www.raspberryblackberry.com).

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The newsletter is also posted within three days on the Department of Horticulture Vegetable program website at: <http://hortweb.cas.psu.edu/extension/veg crops/newsletterlist.html>.

Where trade names appear, no discrimination is intended, and no endorsement by Penn State Cooperative Extension is implied.

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