THE UNIVERSITY OF RHODE ISLAND COOPERATIVE EXTENSION

VEGETABLE PRODUCTION

# THE WEEK IN VEGETABLES

February 18, 2019

The light is changing, the sap is running. Redwing Blackbirds are making some noises and bluebirds are moving about. You are seeding onions, leeks and artichokes (a few of you, anyway) and probably have many more seed purchase decisions to make. This month we feature a guest column from Middletown, RI, Growers Jim and Michelle Garman.

--> **Need to discuss? Got something you need looked at? URI Extension: 401-874-2967/andy_radin@uri.edu, hfaubert@uri.edu**

## Guest Column!

# Seed-buying for small growers: One farm's attempt at a System

"Vigorous Growth." "Extraordinary Yields." "Improved Disease Resistance." By now your mailbox has overflowed with what we cheerfully call the agricultural porn, and you're deep in the process of ordering seed. Calculator at hand, you sit and stare at the new varieties and old standards while your mind races with the possibilities. Do I grow "Bright Lights" again or make my own chard mix? Can I really sell all the Jack-O'-Lanterns from a bulk 1,000-seed purchase? And how much time will a basil touted as having downy mildew resistance buy me when basil season starts to runs down?

Seed ordering is a process fraught with excitement and tension, and one that is occasionally colored by more emotion than is really necessary. For some of us, it's the single biggest purchase of the year, and therefore stressful. Over the years we've worked out a rationale to remove at least some of the stress from the process. We think it's important to consider economics, customer demand, and disease resistance when you're sitting down to plan your year.

**Economics.** Seed decision-making should be tied directly to what makes money on the farm – and what makes money isn't necessarily gross, it's *net*. We keep track of sales in QuickBooks, which is an incredible if sometimes frustrating tool for generating invoices and tracking your sales. The real benefit of QuickBooks lies in its analytical strength. When you run the numbers and see where your sales lie, you get the insights into your highest-grossing products. We are astounded every year to see that parsley comes in third or fourth, following more typical big grossers like kale, slicing tomatoes, and zucchini mixes.

**Blessed with many middle-aged sugar maples**

But that's only half the story. If you record hours spent on a particular crop in a simple Excel spreadsheet, you can take a stab at estimating your net from specific crops. Parsley may be our fourth-highest gross, but if it's grown on landscape fabric, it doesn't require cultivation. It has an extraordinarily high margin, and we're always looking to sell more of it. Conversely, cherry tomatoes have a high gross for us, but require staking, weaving, and spraying, and are time-consuming to pick and pack. Does that mean we won't grow them? Of course not. But we'll continue to refine our variety choices in terms of customer demand (see below), and try to select varieties that have high yield, good color balance, and some disease resistance without occupying too much real estate.

**Customer Demand.** Wholesale and CSA demand shape seed-purchasing, too. There's no summer without green beans, and there's no hand-harvesting green beans without endless cursing and your choice of analgesic at the end of the day. We try to be crafty here. We can choose a standard that has to be picked every other day, or a jumbo Roma-type that might give us a three-to-four day window. For a small operation, that's an easy decision.

And there will always be the unusual crops demanded by chefs. Can you grow ube? What about scorzenera? And how about Arctic kiwi? We like these challenges because they constitute the creative aspect of growing. Taking a shot at some out-of-the-ordinary cultivars – and getting chefs out in the field to see them growing – is essential to building great relations with the restaurant industry.


**Disease Resistance and Yield.** We're a small operation (five acres), and we don't have the labor capacity, equipment, and other resources to be spraying everything all the time. So we focus on varieties with demonstrated disease resistance. For tomatoes, that means all the usual suspects and less famous pathogens, like *Stemphyllium*. It also means searching for high-yielding varieties. We won't deny that "Cherokee Purple" is a tomato with amazing taste, but we never got more than seven or eight pounds a plant. We'll take a "Red Deuce" yielding twenty pounds a plant any day.

It's important to remember that "disease resistance" is not "disease immunity." But choosing a powdery-mildew resistant butternut like "Honeynut" will at least buy you some time when that late July humidity rolls in, and that time may make the difference between a crop coming through and a crop failing.


**Our Formula.** To keep all of this in perspective, we try to use a seed-buying formula encompassing all of the ideas discussed above.

Our largest category (70% of seed purchases) consists of tried-and-true varieties that have worked on our ground successfully for a number of years and are stalwarts of our business. Most, like "Honeynut", have some level of disease resistance, but some admittedly do not. "Striato d'Italia" is a striped zucchini with virtually no resistance, but it's prolific (even for a zucchini) and our customers love it. But we'll balance that with "Jackpot", a drab, resistant zucchini that matures in 42 days, just to cover our bets.


Our next category (15% of seed purchases) is made up of new varieties of crops that already work pretty well for us, but might need some improvement in different regards. For example, we might be on the lookout for a Delicata that might throw out six to eight fruits without gobbling up 64 square feet, or an early – season head lettuce that won't bolt on the first warm day.

Our final category (15% of seed purchases) contains the "creative purchases" – the oddball or experimental cultivars that keep things interesting. Last year we had a chef who really wanted popcorn, so we tried a quarter-acre of "Robust 997." It was the surprise hit of the season, a huge favorite with whole-sale and CSA, and we sold the whole crop. We'll definitely do that again. On the other hand, salsify and scorzonera just didn't work in our soils, so we can let those dreams die for a while.

Keeping the proportions between money crops, trial crops, and experimental crops can keep you sane while maintaining cash-flow. Stay calm while filling those on-line carts, and best wishes to everyone for a prosperous 2019 season.

# Synthetic and Organic Foliar Feed Concoctions for Determinate Field Tomatoes

## Research Question: Does foliar feeding improve tomato crop yield, fruit quality or nutrient status?

During the winter of 2017-2018, I surveyed growers at two different conferences on their knowledge of and use of foliar feeding practices. I found that over 50% of the 68 growers who returned the survey used foliar feeding. This means that it is a relatively common practice, despite the fact that few if any studies have shown a marked improvement in yield or quality of crops. Still, I am interested to see how well such a popular practice works.

I attempted a study of foliar feeding on tomatoes in the summer of 2017 and it ended up as a flop: all of the plants that I received to plant at URI were diseased, and nearly all of the tomato plants at the cooperating farm were also infected. Data was collected, we went through the motions, found no differences between sprayed an unsprayed plots on both the farm field plots and the URI plots. But I didn't trust the data given the extreme disease conditions. So I ran it again in 2018, solely at URI, with an improved design. Here are the results from that study.

**The methods, in brief**

Foliar feeding was tested on determinate field tomatoes in three separately planted experiments, each with 3 treatments (no foliar feed, organic foliar feed, synthetic foliar feed). Plots in the first two experiments were replicated four times; in the third experiment, plots were replicated six times. 'Red Deuce' tomatoes were grown in all three experiments. The same foliar spray treatments were applied in all three experiments but soil-applied pre-plant fertilizers were different: the first planting received a controlled release synthetic fertilizer (12-7-13) at 72 lbs N/ac, the second received an organic fertilizer (8-1-9) at 72 lbs N/ac, and the third received the same organic fertilizer at twice the application rate (144 lbs N/ac). Organic foliar sprays consisted of dilute Neptune's Harvest Fish/Seaweed (2-3-1) liquid, Baicor Micro Plenty (2-0-1 + 0.1 Ca, 2 Fe, 2 Mn, 2 Zn, 0.1 B), and compost tea. Synthetic foliar spray consisted of dissolved HarvestMor 5-10-27 and HumaZinc 6-24-3 with 0.75% Zn and % humic acid. Foliar sprays were applied 4 to 5 times in all three treatments.

In all three experiments, no significant differences were found between treatments in any yield parameters we measured (gross fruit harvest weight, marketable fruit harvest weight, percent marketability, gross number of fruits picked, marketable number of fruits picked, and mean fruit weight.)

Replicated leaf tissue analysis was performed for all treatments in all three experiments. In the first planting, the organic treatment had significantly higher P concentration than the control or synthetic treatments. In the second planting, the synthetic treatment had significantly higher P, Mn, Cu and B concentrations than the control or organic treatments. Overall, neither organic nor foliar fertilizer applications produced significantly increased yield parameters over untreated controls.

**Tables below show the hard facts of the study.**

**Planting dates, pre-plant fertilizers, plot sizes, and replications**

| Expt No. | Planting Date | Pre-plant fertilizer | Analysis | Lbs N/ac | Foliar treatments | Plot size | Reps |
|---|---|---|---|---|---|---|---|
| 1 | May 24 | Synthetic controlled release N | 12-7-13 | 72 | Control, Organic, Synthetic | 2 X 5 plants | 4 |
| 2 | June 13 | Organic pelletized | 8-1-9 | 72 | Control, Organic, Synthetic | 2 X 5 plants | 4 |
| 3 | July 6 | Organic pelletized | 8-1-9 | 140 | Control, Organic, Synthetic | 1 X 5* plants | 6* |

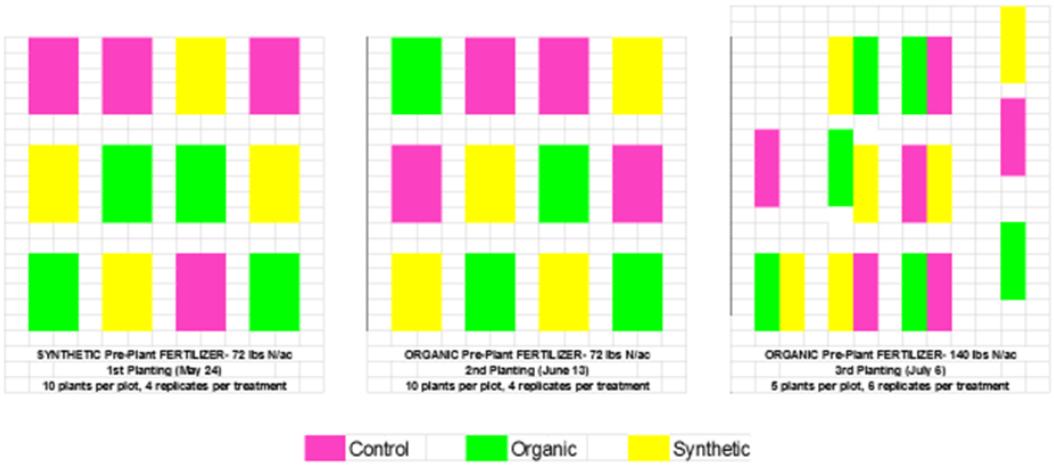
**Rhizoctonia solani* stem rot

| Foliar Feeding Materials | | | |
|---|---|---|---|
| **Organic Protocol Components** | **CT:** Compost Tea (not analyzed) | **NH:** Neptune's Harvest Fish-Seaweed Blend 2-3-1; contains less than 1% S, Ca, Mg, Na | **Baicor** Micro Plenty 2-0-1; B (0.1%), Ca (0.1%), Fe (2%), Mn (2%); Zn (2%) |
| **Synthetic Protocol Components** | **HM:** Harvest More Urea Mate 5-10-27; Ca (4% chelated); Mg (1.5% chelated) | **HZ:** HumaZinc 7% Humic Acid 6-24-3; Zn (0.75%) | |

| Foliar Feed application dates and materials applied | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Expt No.** | 1 (Planted May 24) | | | 2 (Planted June 13) | | | 3 (Planted July 5) | | |
| **Synthetic** | **HM** | **HZ** | | **HM** | **HZ** | | **HM** | **HZ** | |
| | Jun 22 | Jun 22 | | July 4 | July 4 | | July 30 | July 30 | |
| | July 12 | July 12 | | July 12 | July 12 | | Aug 9 | Aug 9 | |
| | July 30 | July 30 | | July 30 | July 30 | | Aug 20 | Aug 20 | |
| | | | | Aug 9 | Aug 9 | | | | |
| **Organic** | **CT** | **NH** | **Baicor** | **CT** | **NH** | **Baicor** | **CT** | **NH** | **Baicor** |
| | | Jun 22 | | | Jun 28 | Jun 28 | Jul 30 | Jul 30 | Jul 30 |
| | | Jun 28 | Jun 28 | Jul 4 | Jul 4 | Jul 4 | Aug 7 | Aug 7 | Aug 7 |
| | Jul 4 | Jul 4 | Jul 4 | Jul 12 | Jul 12 | Jul 12 | Aug 15 | Aug 15 | Aug 15 |
| | Jul 12 | Jul 12 | Jul 12 | Jul 19 | Jul 19 | | Aug 25 | Aug 25 | |
| | Jul 19 | Jul 19 | | Jul 30 | Jul 30 | | | | |
| | Jul 19 | Jul 19 | | Aug 7 | Aug 7 | | | | |

**Research Plots Soil Test:** One of the least fertile areas of the farm was chosen for this study for the reason that a fertile spot might mask the supplemental effects of the foliar sprays. These are the following UConn Soil Test values: pH 6.2; Organic Matter 2.0%; Estimated CEC 6.8; Ca, Mg and P at "Optimum" range; K at "Below Optimum"; Fe, Mn, Zn and B on the low end of surveyed New England soils. Note that these soil micronutrient concentrations do not mean that the soil is on the verge of deficiency; rather, typical New England soils may contain a wide range of these elements. Crop plants might well test "sufficient" in these.

# Research Plot Layouts



**Spraying procedure**: Sprays were applied in the late afternoon/early evening for the longest possible leaf wetness period to allow maximum absorption. We used a CO2 backpack sprayer, and material was sprayed until it ran off the leaves. Plants were on black plastic mulch to prevent infiltration of sprays into soil under the canopy. Buffer plants between plots prevented overspray of adjacent treatments.

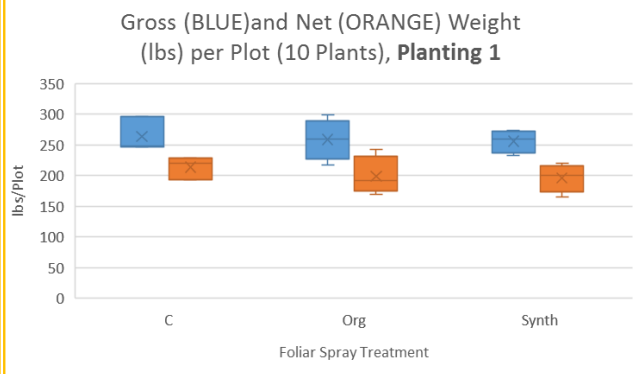
**Results:** The following bar charts depict results for all three experiments. There are four charts associated with each planting (total of 12 charts). Each chart shows different yield parameters.

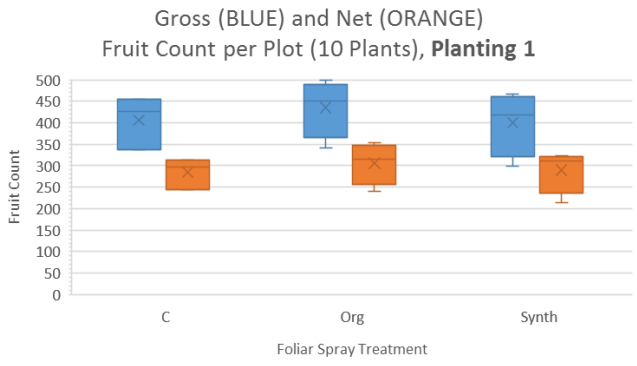
What are treatments? What are replications? What is meant by "Statistically Signficicant."

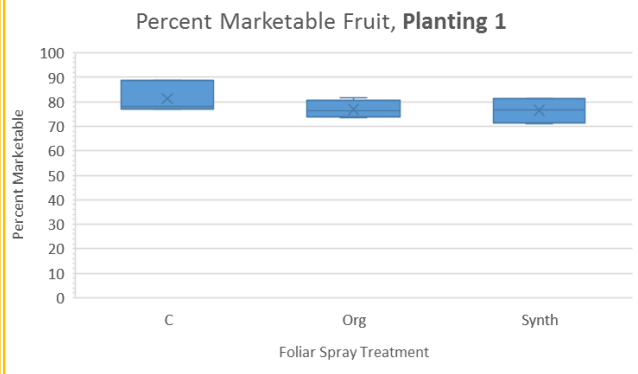
A **treatment** refers to a set of conditions we impose on an experimental subject or unit. In this case, a treatment is **one** of the three spray mixtures [no spray (= "control"), organic or synthetic]. The **experimental unit** is a pre-determined group of 10 plants that receive the treatment. These experiments had 3 treatments.

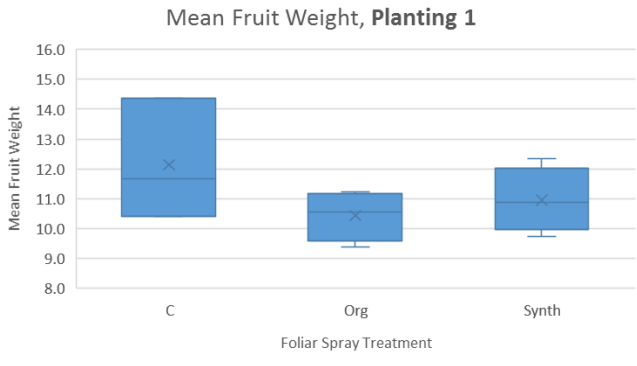
We collect **data** to assess the response of the experimental units to the treatments that we applied. In this case, we weigh the total amount of fruit picked, sort out the unmarketable fruits to find marketable fruit weight, count the number of fruits picked, calculate average fruit weights, and sample tomato leaves to find plant nutrient concentrations. All of these numbers are used to determine if the treatments have an effect.

One **replication** is a complete set of the three treatments. Replicated experiments have multiple complete sets of treatments. The first two experiments had 4 replicates, and the third had 6. The treatments are replicated to give us a better idea of the consistency of our results. If we only did one complete set of treatments, we couldn't feel certain that other **factors** that we did not **control** may not have influenced the results.



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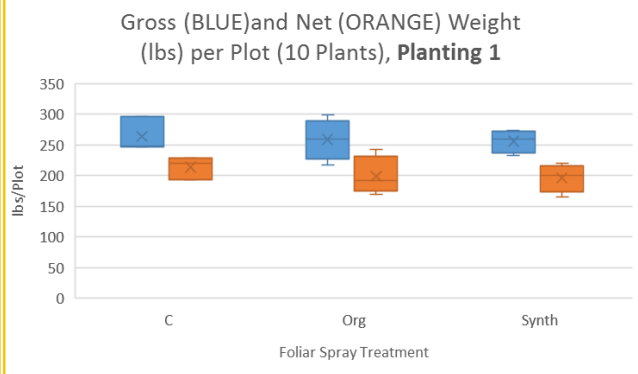


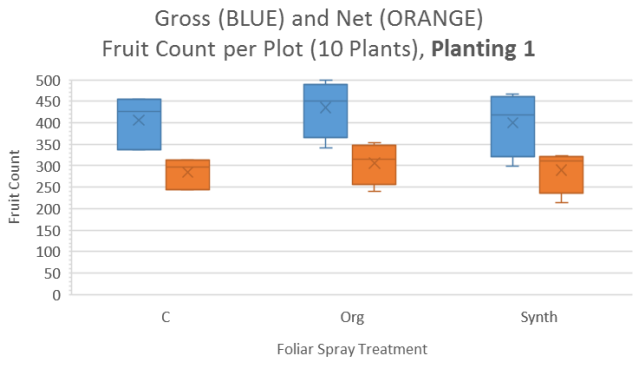


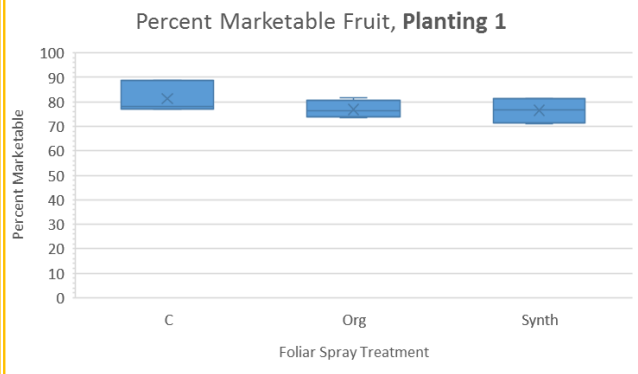


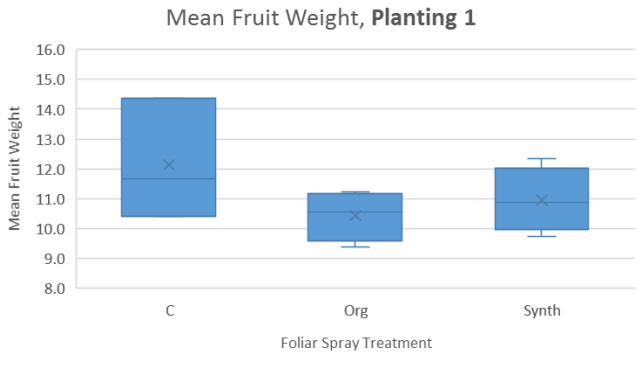

## EVENTS and Opportunities

⇒ Webinar: **Grants for Northeast Agriculture**: The Ins and Outs of Finding and Applying for Grants, Incentives and Cost-Shares. This took place on Dec 4 but you can view it here: https://www.farmcrediteast.com/knowledge-exchange/Webinars/grants-incentives-and-cost-shares

⇒ Jan 18: **Rhode Island Food System Summit** 2019: https://web.uri.edu/food-center/foodsummit-2019/

⇒ Jan 7: **UConn Extension 2019 Veg and Fruit Conference**: http://ipm.uconn.edu/events_154_158003663.pdf

⇒ Jan 26: **SNE Livestock Conference**, Dighton, MA: https://www.thelivestockinstitute.org/2019-conference.html

⇒ Feb 14: **UConn Extension offers Bedding Plant Program for Greenhouse Growers**: http://ipm.uconn.edu/documents/raw2/1428/2019Bedding%20Plantsspringprogramfinal.pdf

⇒ **Request for Proposals**: James L. Maher Center, Middletown, RI, solicits proposal for new use of Garden Center Space. **Attached to email!**