UMass Extension
Vegetable Notes
For Vegetable Farmers in Massachusetts since 1975

Volume 30, Number 19 August 16, 2018

In this issue:

*No till onions looking good in Amherst, MA. Come to a **Reduced Tillage for Vegetable Farmers Twilight Meeting** on August 28th to learn more.* Click here to register!

Crop conditions

It's still wet out there! Direct-seeding of fall crops like carrots and beets and greens has been delayed or just impossible in many wet fields. Those farming in reduced- or no-till fields are reporting less erosion, easier access to fields without getting equipment stuck, and fewer complaints from their harvest crews who prefer working in hard or mulched ground over mud.

While some reported over 5 inches of rain this past week, southeastern MA is still considered 'abnormally dry' according to the US Drought Monitor. Some places got hail with Monday's big storm and we've seen damage—large ragged holes—in leafy crops on some farms. With highly variable and unpredictable weather this summer, farmers have struggled to harvest crops like onions, garlic, and potatoes and get them properly cured. Onions need dry warm conditions to cure properly, but if you cured them outdoors during this short dry spell you may see some sunburn, since temps in the high 80's or above can cause damage. One grower was concerned that the effect of heat on curing his onions was amplified on reflective mulch that he used for the first time this year.

Using pesticides effectively has also been a challenge lately, with frequent rain and high heat. Some materials lose their efficacy in high heat, like pyrethroids, or cause phytotoxicity, like oils. Rain activates some materials, like copper, but just washes other materials off of plants. See the article 'Using Copper Fungicides' in this issue for more information. With so much rain, farmers are having difficulty getting into their fields at all to make protectant applications for downy and powdery mildews, or the many caterpillars infesting corn and brassicas. George Hamilton of UNH Extension would like to remind those of you using airblast sprayers to only expect decent coverage on sweet corn 12 rows deep—he is seeing larger fields not getting good coverage in middle rows. If this applies to you, check middle rows more carefully for corn earworm when you harvest.

Pest alerts

Basil

Downy mildew has spread across MA and the Hudson Valley in NY but has not been seen in northern NY yet where they have had a drier year than we have. If you can get your hands on some seed, consider trying the new resistant varieties from Rutgers: 'Obsession', 'Devotion', and 'Thunderstruck'; who knows, perhaps you will fall in love.

Brassicas

Blindness was diagnosed in a field of broccoli in Franklin Co., MA last week (photo). Blindness is a physiological condition of brassicas in which the plants lose their apical meristem. The cause is unknown. Blindness has been reported to be associated with a wide range of conditions: low or high temperatures, insect damage, fertilizer or pesticide

Blindness in broccoli. photo: A. Madeiras

burn, day length, low light intensity, moisture stress, and seed quality, though the scientific evidence for some of these is patchy. Lygus bug and Swede midge damage has also been associated with blindness. Some cultivars are more prone to blindness than others.

Flea beetle: As fall brassicas are establishing, many growers across MA continue to struggle with flea beetles. Planting fall brassicas as far as possible from spring plantings is crucial—some growers who are not able to plant more than ¼ mile away from their spring brassicas are choosing to forego spring brassicas next year in order to focus on their fall brassicas. Whatever you decide, continue to control this year's population and destroy residues immediately after harvest to starve out adults and potentially kill larvae in the soil. Feeding should slow down in September when adults begin to leave the fields and go into diapause for winter.

Cucurbits

Downy mildew was diagnosed in Franklin Co., MA last week on 'Nokya' and in Worcester and Franklin Cos., MA this week on several varieties of cucumber. Reports in the region have only been on cucumber so far. There are at least 5 strains of CDM, each affecting different cucurbit crops. All 5 strains can infect cucumber and cantaloupe, but only some strains can infect watermelon, squash, or pumpkins. It is safe to assume that all cucurbits are now at risk of CDM in MA and a downy mildew specific material may be added to chlorothalonil, copper, oil, or sulfur protectants. Use mancozeb only when downy mildew is already present in the field.

Solanaceous

Bacterial canker was diagnosed in a small tomato planting in Worcester Co., MA this week. Bacteria survive in the field on infected crop debris or on wooden stakes. Plowing after harvest will help to speed up decomposition of crop residues. Rotate to a non-host crop for two to three years before returning to tomato and do not allow volunteer tomato or potato to survive. Avoid working in fields when bacterial diseases are present and the foliage is wet. Use new stakes or stakes that have been cleaned and disinfected. Sanitize tools such as clippers and pruning shears with an approved disinfectant during field operations. Coppers may help protect uninfected plants but will not cure those already infected.

Not Late Blight: Twice this week farmers have reported what they thought was late blight on dark-skinned tomato varieties like 'Cherokee Purple'. Neither case was late blight, but the symptoms were understandably misleading! These varieties seem to respond to foliar pathogens or abiotic stresses without showing the typical yellowing and dieback that other varieties do. Instead, lesions on these varieties appear water-soaked like the first symptoms of late blight. The only diagnoses of late blight in the Northeast this year were made back in June in New York on tomato. While we haven't seen late blight since then in the Northeast, conditions are favorable for the disease and growers should be spraying preventively for late blight. Preventative sprays will also help control other fungal and bacterial diseases on tomato, like early blight, Septoria, and bacterial leaf spot.

Pepper Maggot larvae are being found now in pepper fruit across the region. Early on "stings" appear on the walls of fruit and then soft rot occurs leading to rotten fruit hanging on the plant. Maggots have been feeding inside the peppers for a while now and are about to drop to the soil to pupate until next season—removing infested fruit and destroying larvae inside can help to reduce the size of the overwintering population.

Two-spotted spider mite damage in eggplant. Photo: A. Radin

Two-spotted spider mite: Despite the rains, spider mite populations have been spreading in **beans** on one farm in Middlesex Co., MA and in CT, and were also found causing severe damage in **eggplant** last week in RI (photo). Predatory mites may be used prevenatively as a biological control in high tunnels but must be released preventatively. If crops have not fruited yet, miticides may be useful, though most are broad spectrum and will also harm beneficials. With most miticides (excluding bifenazate), make 2 applications, approximately 5-7 days apart, to help control immature mites that were in the egg stage and protected during the first application.

Sweet Corn (Trap count map at the end of this issue)

Corn growers have reported decreased efficacy of pyrethroid materials like Warrior, which break down in high temperatures and are sensitive to pH of the spray solution. Coragen or Beseige perform better in the current environmental conditions.

Corn earworm trap counts continue to be high across MA and NH, as more storms came in this past week. These caterpillars, also known as tomato fruitworm, have even been reported eating cherry tomatoes in Maine!

European corn borer trap counts have gone down in MA, and larvae are found now causing damage in fields scouted in Worcester Co., MA. The Iowa strain of ECB is still emerging in some parts of the state and may still cause problems.

Fall armyworm trap captures have started to increase, and later successions, particularly in whorl stage, are now at risk. These crops should now be scouted—treat if 15% infestation is reached.

GROWING OUR OWN NITROGEN: RESULTS FROM 6 ON-FARM TRIALS IN MA

Are you wondering if your crops are getting enough fertility this year with heavy rains possibly washing all your nitrogen away? Take a break from worrying about this year's crops and plan ahead for next year. Working with vegetable farmers in MA over the years, I have often been asked, "how much nitrogen is available from my cover crops in the spring, and when will that nitrogen become available to my cash crop?" To answer these questions, we conducted 6 on-farm trials in MA between 2016-2017. Our first goal was to measure when nitrogen is being released by cover crops in relation to cash crop growth stages on different farms. Participating farmers were also interested in finding ways to provide nitrogen to their crops in cost effective ways and without additional phosphorus. Lastly, farmers wanted to reduce commercial fertilizer use.

Table 1. Cover crop treatments.

Farm	Farmer Choice (lbs/acre)	Cover Crop $/acre*	Cash Crop	Crop N needs lbs/acre	% Soil Organic Matter	2016 Fall NO_3 ppm	Soil Type
Langwater N Easton	Oat (90), Pea (50), Vetch (40)	$308	Winter Squash	110-140	6.8	105	Charlton-Paxton fine sandy loam
Lyonsville Colrain	Fria rye (15), Crimson clover (15), Vetch (18)	$136	Winter Squash	110-140	2.9	25	Occum fine sandy loam
Many Hands Amherst	*Summer 2016 seeded:* Sorghum Sudan (90) *Spring 2017 Seeded:* Oat (100), Pea (100)	$485	Cabbage	160	6.2	5	Pootatuck fine sandy loam
Tangerini Millis	Oat (90), Crimson clover (15), Vetch (18)	$205	Chard	105-130	3.4	30	Merrimac fine sandy loam
Twin Oaks Hadley	Fria annual rye (6), Crimson Clover (4), Tillage Radish (10)	$52	Cabbage	160	2.2	28	Deerfield loamy fine sand
UMass S Deerfield	Rye (60), Vetch (20), Tillage Radish (5)	$96	Sweet corn	100-130	1.7	20	Winooski silt loam

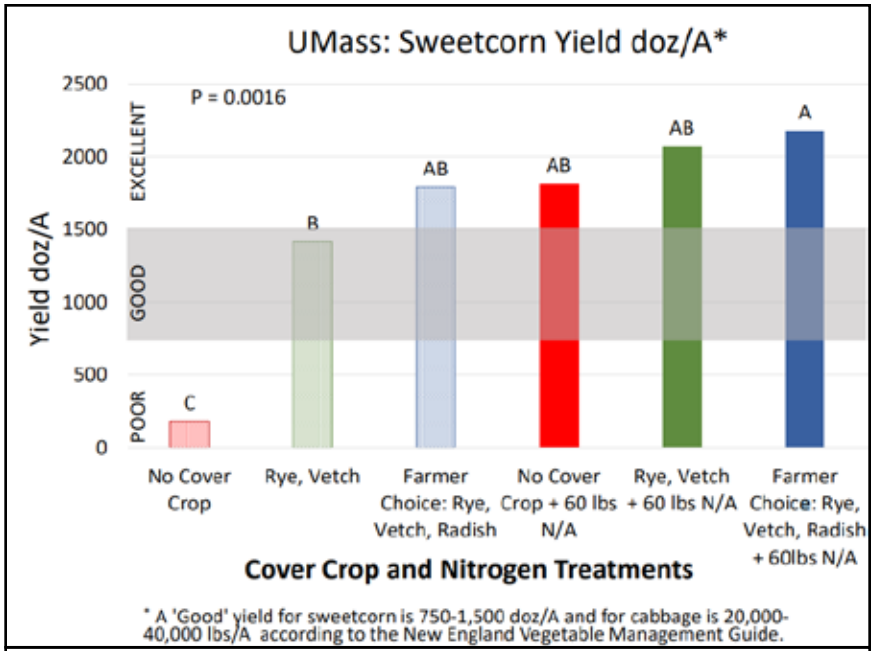
***The Rye (70lbs/A) and Vetch (20lbs/A) trt. cost $90/A and the additional 60lbs nitrogen cost $248/A.**

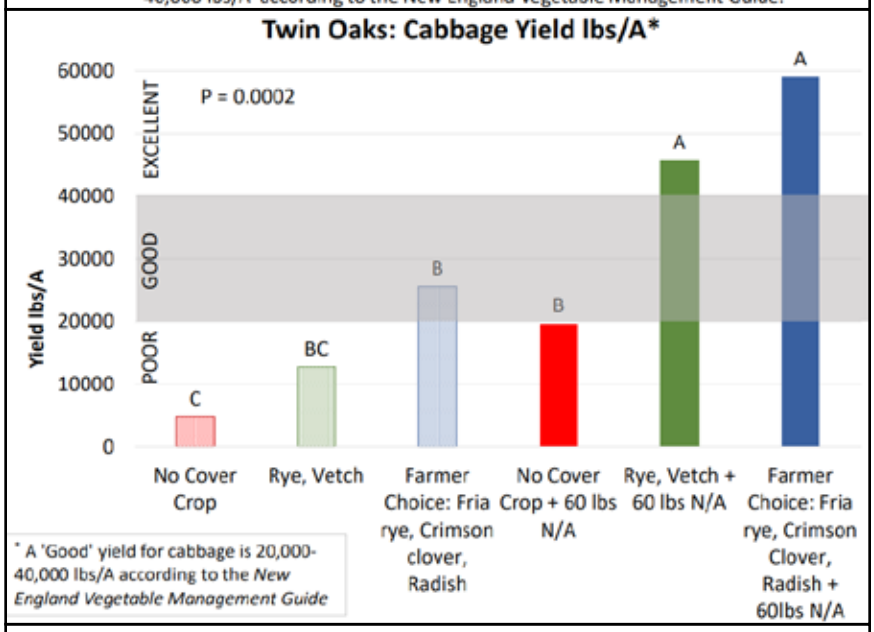
We planted cover crops on six MA farms in a randomized complete block design. In early September 2016, plots were seeded using different implements on each farm with the following treatments: 1) No Cover Crop, 2) Rye (70lbs/A) and Vetch (20lbs/A), 3) Farmer Choice (Table 1, next pa). The cover crops were sampled for biomass and tissue analysis, and incorporated using different implements on each farm in late May 2017. Two weeks later each plot was split with half receiving 60 lbs N/A in the form of Chilean Nitrate and the other half receiving none. Four weeks after incorporation, a cash crop of the farmer's choice was planted on each farm. We sampled soil nitrate 6 or 12" deep (depending on soil compaction) every two weeks beginning on the day of incorporation in late May until eight weeks after in late July. Finally, we measured yield of the cash crop planted into each of these treatments on 3 farms.

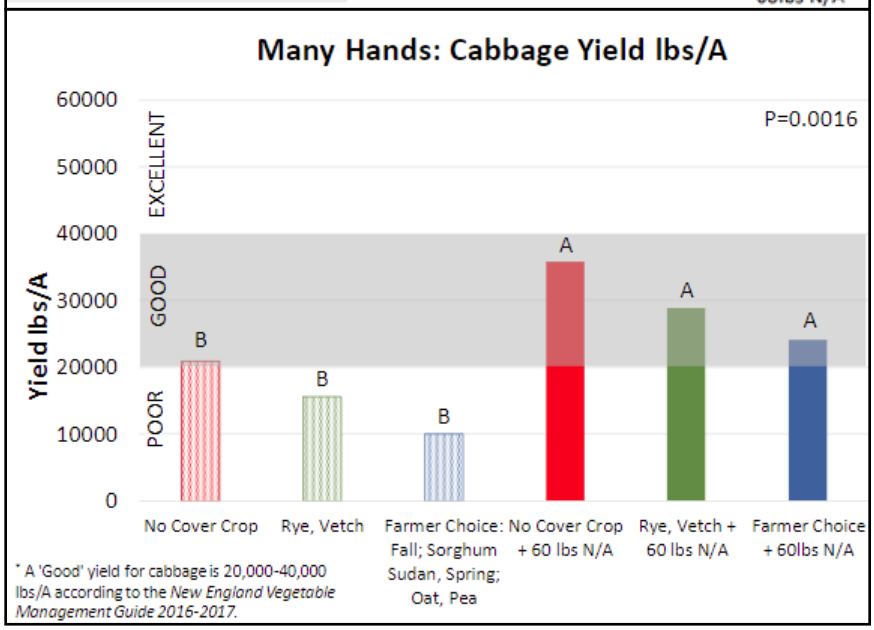
Results: Not surprisingly, there was statistically greater soil nitrate (NO_3) in plots with additional fertilizer on all farms, and in most cases there as statistically greater nitrate in plots with cover crops than those without. We saw the following trend of greatest to least NO3 on 5 of 6 farms: Farmer Choice plus 60lbs N/A, Rye Vetch plus 60lbs N/A, No Cover plus 60 lbs N/A, Farmer Choice, Rye vetch, No Cover. Mostly, farmers were better at choosing treatments providing additional N compared to the traditional Rye/Vetch. In many locations, 'good' to 'excellent' cash crop yields (see New England Vegetable Management Guide) were achieved with a combination of cover crops and less than half the required N rates applied or only with the use of cover crops.

Nitrogen Release Rates: Despite these overall trends in the data, varying soil type, microclimate, and cultural practices all affected the great variability in nitrate release from treatments on each farm. Twenty-five to 30 ppm NO3 is considered 'sufficient' soil nitrate for most crops at the time a pre-sidedress soil nitrate test is taken, which should be just before the plants' rapid growth phase (New England Vegetable Management Guide 2016-2017, Nitrogen Management Section.) The UMass Research Farm and Twin Oaks Farm both achieved sufficiency ranges for their cash crops (Fig 1. UMass and Fig 2. Twin Oaks). Some farms did not achieve the sufficiency range due to a combination of factors. On Many Hands Farm, we saw poor cover crop establishment, and despite high soil organic matter, saw low mineralization rates due to wet soils (Fig 3. Many Hands). Lyonsville Farm was also below sufficiency range possibly due to poor cover crop establishment, low soil organic matter, and high mineralization rates in sandy soil, which may have led to leaching (Fig 4. Lyonsville). Some farms exceeded the sufficiency range of NO3 required for their cash crops. Langwater Farm had high starting nitrate levels due to prior compost applications (Fig 5. Langwater) and Tangerini Farm applied an early spring 5-4-3 chicken manure fertilizer at 25 lbs N/acre to the entire plot (Fig 6. Tangerini).
(Click on the links to see figures)

Yields: We were only able to collect yield data from 3 of the 6 trials. An 'excellent' sweetcorn yield was achieved without the use of additional fertilizer and additional fertilizer did not significantly increase yields at UMass (Fig. top right). "Good" yields of cabbage were achieved at Matuszko Farm (Fig. middle right) without the use of additional fertilizer, but there were statistically greater yields with the combination of cover crop and 60lbs N/A. At Many Hands (Fig. bottom right), yield was reduced with the use of cover crops! According to the farmer at Many Hands, the low yields and slow mineralization of N on his farm was likely due to several factors: 1) His field was previously planted in Sorghum Sudangrass which has a high carbon content and can slow the mineralization rates of N; 2) To reduce tillage, his only method of incorporat-







ing cover crops was with a disc, which does not break down the cover crop very much; and 3) the field in which the trial was located was very wet, and reduced oxygen will slow mineralization rates.

Conclusions: Results from this trial are as varied as the farms themselves, which is why conducting research on working farms is so useful. Farmers can gain valuable, farm specific information, combining their own experiences with research results to improve practices. Here are some conclusions and recommendations from this trial:

- Cover cropping takes practice and finesse, but will pay off in the end. At $4.00 per lb/N for organic fertilizer ($434-660 per acre for most crops) or $0.85 per lb/N for conventional fertilizer ($89.25-136 per acre for most crops), a farmer is saving money by planting a nitrogen fixing cover crop. The cost of 60lbs N/A in this trial was $248 while most cover crop treatments cost less than that per acre (Table 1).
- If leguminous cover crops are well managed, it is possible to meet all the nitrogen needs of a cash crop without adding phosphorus. This is what we saw in 2 out of 6 locations in this trial. So, add a legume to your fall rye or oats this year!
- It is possible to exceed sufficiency ranges for cash crop N requirements with the use of cover crops and/or compost, no commercial fertilizer necessary.
- Peak NO3 was released 4-6 weeks after cover crop incorporation or 2-4 weeks after additional N application on all farms. Growers can take an inexpensive soil nitrate (PSNT) test 4-6 weeks after incorporating cover crops to determine if they are in the sufficiency range for their cash crop (25-30ppm NO3), then make additional N applications only if necessary.

May 26, 2017. Crimson clover and vetch in the 'Farmer Choice' treatment at Tangerini Farm.

As a result of participating in this trial, farmers have implemented the following practices:

- Direct seed 2 weeks after or transplant 4 weeks after incorporating their cover crops in the spring to match the peak release of N with peak demand of N by most crops.
- Experiment with less nitrogen fertilizer and plant more legumes in their cover crop mixes. Some have started growing crimson clover in Massachusetts! It's beautiful, and with changing climate, seems to be surviving winters here.
- Take a soil nitrate test 4-6 weeks after incorporating cover crops in the spring to measure peak N release. Take more Soil Nitrate Tests, they only cost $8. Use this form for pre-sidedress soil nitrate test (PSNT) samples.
- Here is a surprise adoption from the trial: Plant tillage radish at 10bs/A for weed control! (photo)

April, 12, 2017.
Bottom plot: *Rye (70lbs/A) and vetch (20lbs/A)*
Middle plot: *tillage radish (10lbs/A), fria rye (6 lbs/A), crimson clover (4lbs/A). Tillage radish killed all weeds including the cover crops!*
Top plot: *no cover crop, just weeds.*
Surrounding Field: *Fria rye and crimson clover.*

This research was funded by:

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Thanks to the following farms for participating: *Langwater Farm, Lyonsville Farm, Many Hands Farm Corp, Tangerini's Spring Street Farm, and Twin Oaks Farm. Thanks to Seedway for providing the cover crop seed for this trial.*

--Written by Katie Campbell-Nelson

USING COPPER FUNGICIDES

Copper products play an important role in disease management in both conventional and organic systems. They are the most effective controls for most bacterial diseases. In organic production, copper products are the main protectant fungicide used in the control of diseases caused by destructive oomycete pathogens, such as those that cause late blight and downy mildews. There are more copper products becoming available, and it is helpful to understand the differences and benefits of different active ingredients and formulations. Solubility, phytoxicity, human health risks, impact on soil ecology, labeled crops and diseases, and efficacy are important considerations in using particular copper products.

How copper works. When copper (Cu) is mixed with water, copper ions (Cu^{2+}) are released into solution. Modern copper products typically use insoluble or "fixed" forms of copper, creating a suspension of copper molecules in the spray solution. These un-dissolved copper particles persist on plant surfaces after the spray dries and copper ions are released from these deposits each time the plant surface becomes wet. The gradual release of copper ions from the copper deposits provides residual protection against plant pathogens present on the leaf surface. Copper ions kill pathogens primarily by destroying cell membranes and proteins and by disrupting protein synthesis. Since the mode of action of copper targets such fundamental components of living tissues, it affects a wide range of plant pathogens including bacteria, fungi, and oomycetes, but can also damage plant cells and be toxic to humans and other non-target organisms. Achieving the best control without injuring plant foliage and fruit depends on the concentration and rate of release of copper ions on the leaf surface, which is determined largely by the solubility of the copper formulation.

Solubility.

- Less soluble (fixed) formulations release copper ions more slowly. This slow-release lowers the risk of phytotoxicity and provides longer residual activity. The following are **low-solubility active ingredients**: copper oxide (e.g., Nordox), copper hydroxide (e.g., Kocide, Champ), copper oxychloride (e.g., COCS and BadgeX2), and copper octanoate (copper ions linked to fatty acids to form a soap, e.g., TennCop, Cueva).
- More soluble formulations act rapidly but have higher risk of phytotoxicity and shorter residual activity. Basic copper sulfate and copper sulfate pentahydrate are highly soluble.

Metallic Copper Equivalent (MCE). Product labels list percent active ingredient (eg., 23.8% copper oxychloride or 98% basic copper sulfate), but this doesn't tell you the actual metallic copper by weight, as the formulation also impacts the total copper present. Look for the "metallic copper equivalent" listed below the active ingredients to determine the amount of actual copper by weight. A product with 40% metallic copper has 0.4 lb metallic copper per lb of product. The range in MCE among products is vast, ranging from under 1.8% to over 50% copper by weight, so it is important to consider the MCE because the effectiveness of a copper spray is highly correlated to the amount of copper applied.

Effects of pH, Spray Additives, and Weather

- Under acidic conditions, copper solubility and the potential for phytotoxicity increases. Spray solutions should be kept above pH 6-7, depending on the formulation, to prevent excessive amounts of copper ions from being released and possibly damaging fruit and foliage.
- Adding maneb or mancozeb to copper products as a tank mix increases the release of copper ions in solution. There are pre-mixed products available (e.g., ManKocide), or growers can make their own mixtures. This may be especially helpful for controlling bacterial diseases such as bacterial speck, spot and canker of tomato.
- Using an approved adjuvant or 'sticker' may help the product to be more rainfast. However, when stickers are used with highly soluble copper sulfate formulations, they can cause phytotoxicity.
- Finely ground compounds will be more active than coarser ground materials because the smaller particles result in better coverage of the leaf and are less likely to be removed from the leaf by wind and rain.
- Copper can accumulate on plant tissue when sprayed repeatedly to cover new growth and there is no rain. In this situation, after a rain event, a large amount of copper ions will be released and may cause phytotoxicity.
- The risk of plant injury increases when the spray solution dries slowly due to cool wet weather, as the duration of active release of copper ions on the leaf is increased.
- Always read the label instructions. When mixing, follow the tank mix partner instructions.
- For each product, application rates vary with crop and disease. The recommended rate for a given crop may have

a 2-fold difference between the high and low rates. Higher rates are recommended when disease pressure is high or conditions are especially favorable. Most products are labeled for a wide range of vegetable crops.

SAFETY

Human Health Hazards. Eye exposure is the most serious risk associated with using copper hydroxide. Eye damage can be irreversible. There is moderate risk from skin contact, ingestion, and inhalation. Products vary in EPA hazard rating most are "Warning" or "Danger," but Badge SC has a lower risk "Caution" label. The greatest health risk is to the person who mixes and sprays the material. Proper protective equipment must be worn when handling or applying copper products as with any pesticide or fertilizer. The required protective equipment is specified on the label and usually includes: long-sleeved shirt and long pants, chemical resistant gloves, shoes plus socks, **and protective eyewear.** Though not usually required, you may also want to consider wearing a respirator or dust mask, especially for mixing dry formulations. Dry product sometimes comes in a paper bag that has a tendency to leak out of the seams and needs additional containment such as a plastic bin.

Restricted Entry Interval (REI). Most copper products have an REI ranging from 24-48 hours, which means that workers are not allowed to go into treated fields to pick fruit or do any other field work for that duration of time. Plan your spray and harvest schedule to accommodate your marketing needs as well as the REI. Fruit may need to be polished before marketing, to remove the blue residue left on fruit.

Environmental Hazards. Some farmers have expressed concern about copper toxicity in the soil or with respect to soil microbes and earthworms. Additionally, copper can be very toxic to fish and aquatic organisms if drift and run-off occur. This should be a concern in sandy, acidic soils or near surface water. Copper is actually an essential plant micronutrient and, in New England, it is more often deficient than excessive in soils. The amount found naturally in soils in MA ranges from 0.1 to 8 ppm while nationally soils range up to 200 ppm. Crops remove less than 0.1 lb/A copper per year. Copper usually accumulates on the soil surface where it becomes chemically bound to organic matter and clay minerals. In acidic soils, the solubility of copper increases and toxicity or run-off may occur. An application of 1 lb of active ingredient per acre is estimated to raise the copper levels about 0.5 ppm. A single application of Nu Cop at 2 lb per acre with 77% active ingredient adds about 1.5 lb copper per acre to the soil, or could raise the concentration in the soil by 0.5 to 0.75 ppm. Therefore, the level of copper in soil would increase slowly over time, except in perennial planting systems such as apple orchards. In annual rotational systems, where copper applications might only be made on a small portion of crops, copper accumulation may be less of a concern. Nonetheless, copper use is regulated and certified organic farmers in the US are required to restrict their use of copper products. Regular soil tests should be taken and copper levels in the soil should be monitored.

Managing blights in organic tomato and potato using copper

Copper-based fungicides are labeled for use in organic systems and have demonstrated effectiveness in preventing late blight. Copper fungicides do not kill infections that are already present; they must be used preventatively in order to effectively protect plants from initial infections. Most pathogens have latent periods, when the plant is infected but does not show any symptoms. Thus, when symptoms appear, it is too late to protect the crop effectively–especially with late blight. Some strains of late blight are more aggressive than others and this will also influence the efficacy of copper spray programs. Regular applications of copper **will also help protect tomatoes from early blight and Septoria leaf spot**, which can progress rapidly and cause plantings to produce far less than their full yield potential.

Several copper products are OMRI-listed for use in certified organic production and are registered for use in Massachusetts check the OMRI website for updates or consult your certifier. As with insecticides, dry formulations are more commonly approved for use in organic systems. Note that OMRI approval is for specific formulations, and there are often multiple formulations with the same trade name (eg. Badge X2 and Badge SC, of which only Badge X2 is OMRI approved).

High Tunnel and Greenhouse Considerations

- Read the label to be sure that a product is not restricted from use in the greenhouse. Many copper products are.
- The same protective gear and restricted entry interval apply in high tunnels and greenhouses as do in the field.
- Apply with sides open for ventilation.

- Most labels require that in addition to the standard REI, an eyewash station and notice of eye risk should be available for 7 days after application.
- If you suspect late blight, have the disease identified. Fulvia leaf mold, powdery mildew, and Botrytis gray mold or ghost spot are common diseases in high tunnel tomatoes and can look very much like late blight under certain conditions.
- If tomatoes (or other crops on which copper is used) are grown in the same area year after year, and copper is used, build-up in the soil is more likely. Include copper levels in your annual soil testing. Rotate to other crops!

-- S.B. Scheufele and R.Hazzard. Adpated from T. Zitter & D. Rosenberg, Cornell Plant Pathology, E. NY Commercial Horticulture Weekly Vegetable Update. June 26, 2013.

Events

TODAY! UMass Extension Vegetable Program Research Tour and Round Table

Featuring presentations on the following topics:

- Cucurbit downy mildew resistance in cucumbers - Sue Scheufele
- Pollinator protection in butternut squash - Sue Scheufele
- Mulches for flea beetle control in brassicas - Sue Scheufele
- Natural predators of cabbage aphid - Sue Scheufele
- Corn genetics - Madelaine Bartlett
- Organic fertilizer effects on yield and nitrate in lettuce varieties - Omid Zandvakili
- Fusarium wilt of basil - Kelly Allen
- Bee size and disease transmission - Lynn Adler
- State incentives for solar photovoltaic arrays on farms - Zara Dowling & River Strong

When: Thursday, August 16th, 2018 from 4:00 PM to 7:00 PM (Rain date: August 16th)

Where: UMass Crop and Animal Research and Education Farm, 89-91 River Rd., South Deerfield, MA 01373

CLICK HERE TO REGISTER: https://www.surveymonkey.com/r/X3JYR55

Click here to request special accommodations for this event.

Reduced Tillage and Transplanters for Vegetable Farmers

Featuring: Farmer Jim Ward and his reduced till vegetable cropping systems which he has practiced for over 10 years with the help of an Unverferth Deep Zone Tiller, Davidian Farm's two-row Monosem vacuum precision planter mounted with Dawn Biologic roller crimpers (first ones in the state!), the UMass Research Farm's grain drill and roller crimper, and Brookdale Fruit Farm's new line of no-till transplanters from Checchi-Magli. There will also be demonstrations on Soil Health with Maggie Payne, Soil Scientist at NRCS.

When: Tuesday, August 28th, 2018 from 4:00 PM to 7:00 PM

Where: Ward's Berry Farm, 614 S Main St., Sharon, MA 02067

CLICK HERE TO REGISTER: https://www.surveymonkey.com/r/XF8JQYD

Click here to request special accommodations for this event.

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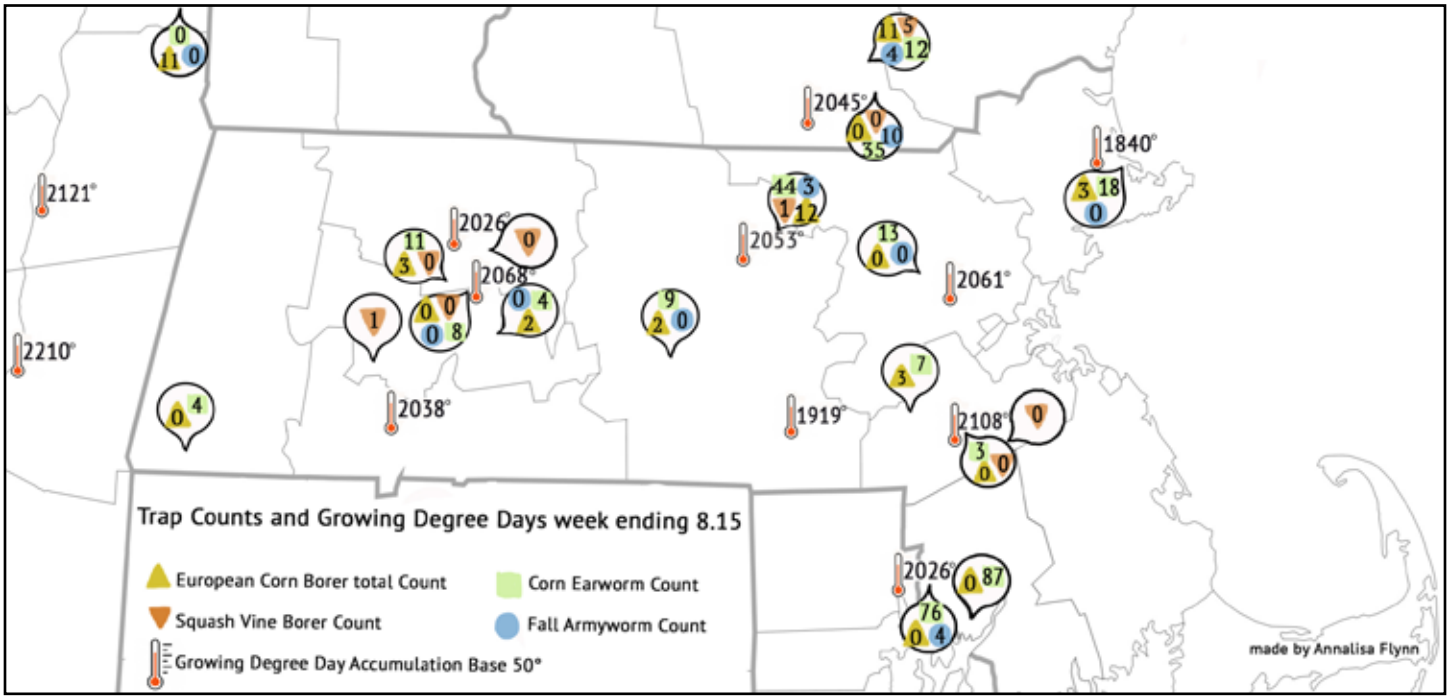

Vegetable Notes. Katie Campbell-Nelson, Genevieve Higgins, Lisa McKeag, Susan Scheufele, co-editors.

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