



VEGEEdge

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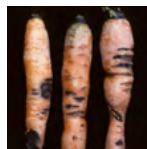
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High Salt Soil? Act Now to Improve Soil Health

Judson Reid, Cornell Cooperative Extension, Cornell Vegetable Program

High tunnel soils are susceptible to salt build up, which over time can decrease economic sustainability of vegetable crops such as tomatoes. These salts can be introduced with irrigation water, fertilizers or composts. Since the soil is not receiving any rain or snow, the salts are not leached or diluted as they would be in a field setting. Further, the higher temperatures in tunnels evaporate more water from the soil, leading to further salt concentration. By this time in the season, salts are often visible as a white crust on the soil surface (Fig. 1).

Why does this matter? Salt concentrations in the soil induce drought stress for vegetable crops and lead to foliar burning, root rots, and nutrient deficiencies. Farmers respond to nutrient deficiencies with more fertilizers, which often leads to further salt problems. Plant health spirals downward dragging yield and quality along.

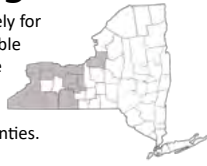


Figure 1. Higher temperatures in tunnels leads to further salt concentration, with the salts here visible as a white crust on the soil surface. Photo: Judson Reid, CCE Cornell Vegetable Program

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About VegEdge

VegEdge newsletter is exclusively for enrollees in the Cornell Vegetable Program, a Cornell Cooperative Extension partnership between Cornell University and CCE Associations in 14 counties.



The newsletter is a service to our enrollees and is intended for educational purposes, strengthening the relationship between our enrollees, the Cornell Vegetable Program team, and Cornell University.

We're interested in your comments. Contact us at:
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Information provided is general and educational in nature. Employees and staff of the Cornell Vegetable Program, Cornell Cooperative Extension, and Cornell University do not endorse or recommend any specific product or service.

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Help us serve you better by telling us what you think. Email us at cce-cvp@cornell.edu or write to us at Cornell Vegetable Program, 480 North Main Street, Canandaigua, NY 14424.



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Our next issue of VegEdge newsletter will be produced on November 1, 2023.

SAVE THE DATE
EMPIRE STATE
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How can we prevent excess salts in high tunnel soils?

First, an annual soil test should include a soluble salts test. This inexpensive addition to a standard soil test will give us an EC, or electrical conductivity value in mmhos/cm. In short, salts conduct electricity in soil solution and EC gives us a snapshot of their relative concentration. As reported in mmhos/cm, we'd like to see values under 1.0 for soil based production (Fig. 2). Fall is a great time to take an EC test, because it gives us time to manage the salts before next tomato season.

Element	Value	Element	Value	Element	Value
Soil pH	7.8	Zinc (Zn), lbs/acre	18	% OM	11.3
Iron (Fe), lbs/acre	8	Aluminum (Al), lbs/acre	6		
Manganese (Mn), lbs/acre	58	Soluble Salts, mmhos/cm	2.5		

Figure 2. Along with high pH and organic matter, the EC level in this soil is excessive. Values under 1.0 are recommended for soil based production.

To reduce problematic salt levels in the soil, leaching is the most effective option. This can be achieved a couple of ways. Some growers, with access to running streams, ponds or deep wells will flood their high tunnel each fall with several inches of water to dilute salts and move them deeper in the soil profile. Another approach is to remove the plastic (for polyethylene covered tunnels) every three years, which is often the rated effective life of the covering. If removed in the fall, we can have up to 15 inches of water move through the soil profile in a typical New York winter. This is generally enough to reset problematic high tunnel soils in our experience.



Figure 3. Multiple foliar nutrient deficiencies and marginal burning on tomatoes is caused by excess soil salt levels, with high pH also contributing. Photo: Judson Reid, CCE Cornell Vegetable Program ●

New Updates on FSMA Exclusion and Qualified Exemptions

Robert Hadad, Cornell Cooperative Extension, Cornell Vegetable Program

I am sure by now all are familiar with some of the important points in the Food Safety Modernization Act (FSMA) regulations regarding farms and where they fit into the grand scheme of things. Some farms that are growing less than \$25,000 in produce (increased to \$31,000 due to inflation) are Excluded (running average over 3 years). Those farms with more than baseline but less than \$500,000 (\$640,000 with inflation) of produce PLUS the value of any agricultural food grown with more than 50% sold to a Qualified End User within 275 miles are Qualified Exempt.

What has recently changed is pressure from FDA for inspectors to make sure farms in either of these categories can prove their exclusion or exemption. Inspectors will be looking for annual updating of attestation forms and may require review of sales records of produce and/or agricultural food sold. This means farms need to keep a running tally of their in-season sales and be able to identify who is or isn't a Qualified End User. Since these categories are figured on a 3-year running average, previous years' sales records (if available) will need to be on hand or if starting from scratch, keep current records ready for use.

If selling produce as retail through farmers markets and CSAs or restaurants, inventory sheets of crops brought to the markets, dates, amounts sold, value of produce sold. These sales are to Qualified End Users. If selling to a food hub or distributor, or to other farmers who sell it elsewhere, these sales figures count toward sales to not-Qualified End Users. The percentage of Qualified End User Sales must be greater than 50% of total sales in order to fall into the Qualified Exempt category. If you also raise livestock, eggs, and other agricultural food, the value of these sales must be added in with your produce and separate out the retail sales from sales to distributors.

Farms growing produce for the various produce auctions around the state also need to keep track of their sales through record keeping. Distinguishing Qualified End Users from distributors who buy your produce is necessary in order to figure out Exclusion, Qualified Exemption, or not. Produce auction management should be able to identify distributors on their buyer number lists and provide a designation on the produce grower's auction day sales tickets. Growers will need to keep the tickets for their records. It is a good idea to tally up sales by any distributor on their sales tickets. Keep this running tally in their records. Also needed is a tally of total sales of produce. Subtracting distributor sales from total sales will give sales to the category of Qualified End User. Again, more than 50% sales to Qualified End Users are needed to go towards Exclusion or Qualified Exemption.

If you have any questions about Exclusion or Qualified Exemption, please contact Robert Hadad at 585-739-4065 or rgh26@cornell.edu ●

Detecting Carrot Root Decay at Harvest

Julie Kikkert, Cornell Cooperative Extension, Cornell Vegetable Program

Harvest may be the time when decay of carrot roots is first detected. Affected roots can continue to degrade and it is important to avoid long term storage. Keep notes of problems observed this fall and plan for a minimum three-year rotation out of susceptible crops in future years. Grains are the preferred rotational crop. For assistance with disease identification, contact your local vegetable crops Extension Educator.

Cavity Spot

Symptoms are irregularly shaped and sunken brown lesions that run across the tap root. Roots may become infected at an early stage, but symptoms become visible only after a considerable time. Susceptibility increases as the carrot matures and older carrots can become symptomatic quickly. The disease is thought to be associated with high soil moisture either early or late in the growing season, as well as with high nitrogen levels.



Cavity spot caused by *Pythium* spp. Photo: Lindsey du Toit, Washington State University

Crater Rot

Crater rot can be common in New York when conditions are warm and moist, especially when carrots are grown in short rotations with other susceptible hosts. Infections begin on the tap root, often where lateral roots emerge. The lesions enlarge and develop into brown and black sunken cankers. The lesions may penetrate several millimeters into the taproot, which distinguishes them from cavity spot lesions which are much shallower. Foliar blight and crown rot are the same disease expressed on the plant in different locations. Crown rot can result from infections on either the crown or on the main root. Early symptoms are horizontal dark brown lesions, which can later develop into black sunken cankers that may penetrate several millimeters into the taproot and petioles. Tops may die in patches in the field. Infections can occur early in the season but may not be detected until much later. The fungus easily spreads from plant to plant and thus, high plant densities and narrow row spacing will increase the severity of the disease, especially under moist conditions. Excessive hilling under moist conditions will also increase disease.



Crater rot caused by *Rhizoctonia solani*. Photo: Robert L. Wick, Univ. Massachusetts

Black Spot Disease

First reported in the United States in 2015 in carrots grown in Essex County, NY, the disease is now widespread in New York. In roots, lesions first appear as small, dark spots on the surface. Later, circular dark brown to black lesions develop and may coalesce to cover large areas or the entire root. The pathogen is believed to only affect carrots.



Black spot of carrots caused by *Rhexocercosporidium carotae*. Photo: Sarah Pethybridge, Cornell

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Cottony Rot/White Mold

This disease more commonly shows up in storage, however, it can be found in crops in the field. Cottony rot is characterized by a cotton-like, white growth on the lower plant parts and roots. The fungus mounds up and turns black into the characteristic overwintering structures called sclerotia. The pathogen has a wide host range including snap beans, dry beans, soybeans, cabbage, lettuce and sunflower.



Cottony rot also known as white mold caused by *Sclerotinia sclerotiorum*. Photo: William M. Brown, Jr., Bugwood.org

Soft/Wet Rot

Bacterial soft/wet rots most commonly occur in storage but may be found in the field under very wet fall conditions. The pathogenic bacteria are widespread in soil and enter the root after there has been previous damage from root cracking, insects, or fungal infections. The tissues disintegrate quickly and turn into a soft, slimy mass.



Watery and slimy carrot suspected to have bacterial soft rot that invaded the root in an open wound. Photo: Julie Kikkert, CCE Cornell Vegetable Program ●

Late Season Aphid Control on Greenhouse Cucurbits

Judson Reid, Cornell Cooperative Extension, Cornell Vegetable Program

With more growers extending the season this fall, we see some pests moving indoors on the late plantings. Greenhouse cucumbers are an example, as the outdoor crop is diminishing in abundance and market prices support the investment in season extension. Aphids in particular are attracted to this crop. Here we'd like to highlight that some of our common field insecticides for aphids on vine crops are prohibited from indoor use. However, BELEAF 50 SG (flonicamid, Group 29) does have a specific greenhouse cucumber section on the label. The field rate of 2.8 – 4.28 oz per acre is scaled down to 0.065 – 0.1 oz per 1000 sq ft in at least 0.25 gallons spray water per 1000 sq ft. (do not exceed the point of runoff). If identification of aphid species has not been confirmed, the manufacturer recommends the higher rate. Allow a minimum of 7 days between applications. ●

Erie County November 2022 Storm Fund Now Open for Applications

CCE Erie County

Eligible farms and agribusinesses are now able to submit an application to the Erie County November 2022 Storm Fund, which will provide forgivable grants up to \$200,000 to a farm or agribusiness to recover from November Storm damage. The objective of the program is to indirectly provide grant funds to eligible farms and agribusinesses throughout Erie County to assist them with covering the cost of capital damages to buildings, structures, machinery, or equipment resulting from the 2022 November Storm that were not be covered by insurance or a Small Business Administration (SBA) Loan.

Applications will be accepted and approved on a rolling basis for up to 1 year, or until all such funds are allocated. All applicants will need to submit proof that damages occurred between November 16-21, 2022 as a result of the November 2022 Storm, and that eligible repairs were not covered by an insurance settlement/payment or an SBA Loan. Applicants will need to submit copies of insurance claims and correspondence from the insurance company confirming which costs are not covered by insurance.

Application forms to participate in the program are available at www.ecswcd.org.

While the application process is being handled by the Erie County Soil & Water Conservation District, if you have any questions prior to submitting your application, you are welcome to call or text John Whitney, CCE Erie County Agriculture Educator, at 716-796-3204 (cell). ●

Thoughts on Recent Developments in Weed Control Technology

Lynn Sosnoskie, Cornell

While many crops in the US are reliant on herbicides for weed management, specialty crop growers have more limited access to chemical control methods and lower thresholds for risk of loss or damage to their high-value crops. The evolution of herbicide resistance, a changing regulatory environment, and shifting public perceptions about pesticides can also affect herbicide use. Labor is also regularly employed for weed control; across the US, specialty crop operations have the highest labor costs as a proportion of total gross farm income (20 to 35%).

Given the growing constraints on specialty crop production, many companies have entered the agricultural technology sector with the intention of developing and marketing novel tools to improve weed control while simultaneously reducing or eliminating the need for synthetic herbicides and extensive hand weeding crews. This includes firms like Burro, Farm-ng, and Naïo Technologies (autonomous platforms and weeding robots); K.U.L.T., Stout, and Farmwise (vision-guided cultivation technologies); Verdant Robotics, Ecorobotix, and Mantis (targeted/precision spraying); and Carbon Robotics (laser weeding), among many others. A good visualization of the crop robotics landscape can be found at The Mixing Bowl: <https://mixingbowlhub.com/crop-robotics-2022-beyond-the-valley-of-death-2/>.

FIRA USA is a new ag tech showcase event and was held September 19-21, 2023, in Salinas, California, with two days of field demonstrations and panel discussions focused on the adoption of novel technologies in specialty crops. Some companies are actively working in commercial fields while others are finding their footing. Many are concentrating their efforts in Western US production systems, which are markedly different from Eastern farms. Based on presentations at the meeting and conversations with attendees, the industry will need to address some barriers before most technologies can be widely and successfully deployed in New York State.

Current Barriers

COST

Of the weeding units themselves, which range in price from tens of thousands of dollars to over \$1 million, but also parts and services, particularly if companies do not have local bases of operation. Would the adoption of novel technology require significant changes to production parameters, necessitating the acquisition of additional equipment (e.g., altered row spacing/planting leading to the purchase of new planters and harvesters)?

ADAPTABILITY AND VERSATILITY

Western and Eastern US farms can differ greatly with respect to soils and terrain, weather patterns, field sizes and shapes, available capital, etc. Have these technologies been thoroughly and successfully evaluated under local conditions? If not, how much work needs to be done to assure New York growers that the tools can be successfully integrated into current crop management programs? Does the equipment have utility across multiple crops or is it specialized for a unique set of production conditions.

INFRASTRUCTURE AND LABOR

Are New York's cellular and internet services sufficient to support the needs of current and future novel technology? GPS with RTK correction availability? Do farms have personnel with mechanical, electronic, and programming skills to operate and service new technology?



A tractor mounted [WeedSpider](#) robotic weeding unit from SeedSpider. This model features mechanical weed removal implements although a vision-guided spray system is under development. *Photo: Lynn Sosnoskie, Cornell*



The Farmwise [Vulcan](#) precision robotic weeding unit. Cutting knives are guided around crops using a camera-based system. *Photo: Lynn Sosnoskie, Cornell*



[Ecorobotix](#) camera and spray nozzle system. Individual nozzles are turned on when a weed is detected. *Photo: Lynn Sosnoskie, Cornell*

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What To Do if You're Approached by a Company

1. Engage, repeatedly, with companies before committing; ask for demonstrations across production conditions and environments. Collect your own data about performance and crop safety. Compute ROI for yourself and do not accept numbers blindly. Discuss the possibility of buy back programs to protect against obsolescence.
2. Understand that reducing costs may not be truly feasible; controlling costs may be a more realistic goal.
3. Acknowledge that technology companies, despite their engagement with the industry, may not fully understand specialty crop problems. As the target audience for novel technology, growers should work with industry partners to develop and refine tools, but don't do a company's R&D for them. Partnerships can be rewarding, but don't become over extended.
4. Many companies can provide growers with data derived from in-field operations; but data is not the same as information. Learn how accessible your field records will be and how best you can integrate them into your weed management plans.
5. Risk will be part of the process but don't get over extended. Consider if you are a candidate for direct sales vs service contracts. If you want to own, have a team in place that is comfortable using and servicing the technology. This will likely require familiarity with mechanics, electronics, computer programming, and data analysis.
6. Don't forget that companies are balancing the needs of their customers with the needs of their investors, which can lead to tension.

Our Commitment to New York Growers

Cornell University is committed to working with companies to evaluate the performance of novel technologies in specialty crops; plans are underway to test new platforms in research trials in 2024 and 2025 to enhance grower knowledge of and comfort with new weed control tools. ●

Discrimination Financial Assistance Program Accepting Applications

Attention farmers, ranchers, and forest landowners who experienced discrimination from USDA farm lending programs prior to January 2021:

USDA's [Discrimination Financial Assistance Program](#) is now open. Application details (in English and Spanish), office locations, and local events are listed at [22007apply.gov](#). Filing an application is FREE and does not require a lawyer.

Application deadline: October 31, 2023. ●

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VegEdge is the highly regarded newsletter produced by the Cornell Vegetable Program. It provides readers with information on upcoming meetings, pesticide updates, pest management strategies, cultural practices, marketing ideas, and research results from Cornell University and Cornell Cooperative Extension. VegEdge is produced every few weeks, with frequency increasing leading up to and during the growing season.

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