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# Ashland & Bayfield Counties ***AGRICULTURE NEWSLETTER***

Brought to you by the University of Wisconsin-Madison, Division of Extension

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***Special High  
Tunnel Edition***

*Plus other news and info...*

*Greetings,*

*UW Extension is pleased to bring you this edition of the Ashland/Bayfield Counties Agricultural Newsletter to the farmers, gardeners, and homesteaders of the Chequamegon Bay region of northern Wisconsin.*



**Extension**

UNIVERSITY OF WISCONSIN-MADISON  
BAYFIELD COUNTY

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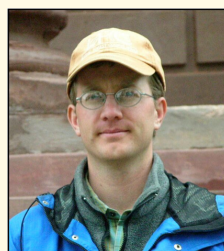


## Ashland/Bayfield Ag Extension Staff

We are pleased to present the Ashland/Bayfield Agriculture Newsletter. The stay-at-home orders associated with Covid-19 have limited our ability to hold in-person events. So, we are bringing back the local agriculture newsletter to provide you with news and research-based information.

Agriculture in Ashland/Bayfield Counties is very diverse so we'll try to provide something for everyone. For this first issue, though, we focus on high tunnels. With more than 30 farms with high tunnel greenhouses in our region, it is getting to be a popular way to grow food.

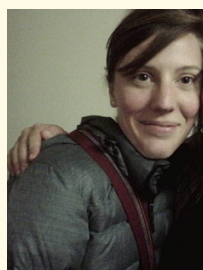
What are high tunnels and why are they so popular? High tunnels are unheated greenhouses usually built with a steel frame and a plastic film covering. They provide a warmer and protected growing environment that makes it easier to grow just about anything. Here in the north we have four seasons: winter, mud, three-days-of-sun, and mud. These high tunnels make it possible to grow loads and loads of food regardless of our challenging growing conditions. Imagine, ripe tomatoes in July!



### **Jason Fischbach**

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Jason has been in the Agriculture Agent position since 2007 with a focus on fruit crops, nutrient management, commercial horticulture, and recently hazelnuts. He is currently Co-Leader of the Upper Midwest Hazelnut Development Initiative, and in 2020, 80% of his time will be dedicated to helping develop the emerging hazelnut industry in Wisconsin.



### **Sarah DeGraff**

Agriculture Educator  
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Extension is pleased to welcome the new Agricultural Extension Educator, Sarah DeGraff, to the Ashland and Bayfield County team. Sarah hails from Grand Rapids, MI and has experience working on and managing vegetable farms as well as running vegetable variety trials through UW-Madison on the Spooner Agricultural Research Station in 2019.





# F.E.A.S.T. by the Bay – Online

Promoting YOUR Local Food Business  
During COVID-19

[www.feastbythebay.org](http://www.feastbythebay.org)

You may have heard of FEAST by the Bay, a local food resource organization for the Chequamegon Bay region. You may even have your farm listed on the site. You may never have heard of FEAST...

Now, in response to COVID-19, the site is getting a makeover in order to advertise, promote, and drive consumer traffic to your farm and business.

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(F.E.A.S.T. By The Bay is an alliance of organizations, individuals, businesses, producers, and consumers united under the common cause of developing a stronger, healthier, and more just food system in the Chequamegon Bay region.

F.E.A.S.T. encompasses the key features of a strong local food movement:

**Food Sovereignty**  
**Education**  
**Access to Food**  
**Sustainable Farming**  
**Traditions)**

If you are a local food producer, have a CSA, own a local food retail business or restaurant and would like to have your business listed on the FEAST website, please follow this [link](#) to send us the following information:

- Your farm / business name
- Your farm / business logo (or a photo if you don't have a logo)
- A short informational paragraph about your farm / business offerings
- A link to your farm / business website (you can add more than one link)
- Your contact information for the best way for local consumers to contact you

**\*Please note that only businesses located in Ashland, Bayfield, and Iron Counties will be listed.**







# High Tunnel Vegetable Production at Great Oak Farm

- Sarah DeGraff

Trellised cherry tomatoes ready for picking....in early July

Local farmer Chris Duke of Great Oak Farm in Mason, WI shares his thoughts on the specifics of high tunnel management gained through years of work and experience.

Sarah: How many high tunnels do you currently have that are, or will be under production this season?

Chris: I have five. My heated propagation house is a 26x48 Farmtek model I got used for cheap. I worry about it a lot with snow load, as it is round topped and needs to be manually cleared off often. This is hard, frustrating, and cold work. I also have a used 12'x96 Farmtek (also round). It has limited utility that way - I can't rotate tomatoes/cukes through there as it's too low for good trellising - but works for spinach, collards, chard, peppers, etc.

The only reason I got the Farmtek tunnels was because they were very cheap and I had more time than money then, and I figured if I got 2 years out of them they would pay for themselves.

I also have a 21x96 Harnois tunnel, but it's too short in my opinion, and with a round, low profile is often completely covered in snow during the winter. My favorite tunnel is a 30x96 Harnois - nice high sides, tall ceiling peak, and roll up sides for easy ventilation. I also have a 30x96 Rimol, but the sides are a little short and despite its gothic shape, it needs lots of attention in the winter to keep snow plowed from the sides so it doesn't build up and start weighing down the roof.



Though high tunnel greenhouses are surprisingly durable, they will collapse under heavy snow loads. The key is removing the snow from near the sidewalls so the rooftop snow can slide off.

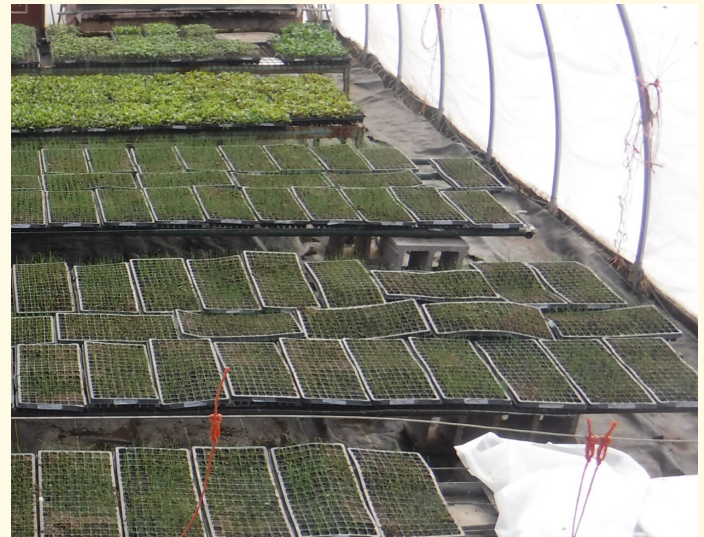




Kale, beets, and transplanted peppers on May 13 in an unheated high tunnel....impressive.

Sarah: How do you manage your high tunnels in terms of winterization and snow load?

Chris: I try to keep snow no deeper than 3' on the sidewalls of all tunnels. All my tunnels run East-West, to maximize winter sun exposure to the South. When snow is very high, it blocks the sun from entering the tunnel. This keeps soil temps cooler and crops in the shade – NOT ideal. When the snow melts, if sidewall snow is under 3 feet deep less meltwater to seeps into the tunnel, so the beds on the sides of the tunnel are warmer and drier and more hospitable to plant growth.

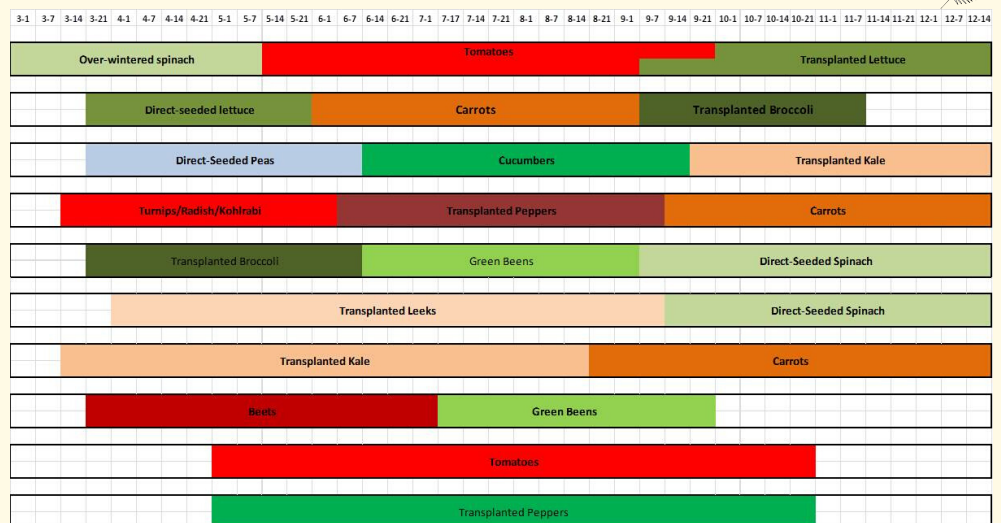


On the round topped propagation house, I have to manually clear off the snow with a roof-type of snow shovel or it would collapse. I have seen it sagging after a big storm if I am not removing snow right away.

Sarah: How often do you replace plastic? Do you have a tried and true method for patching/mending the inevitable tears that occur?

Chris: About every 6 years. Greenhouse tape works OK, but seems to degrade faster in the sun than the original plastic. Sometimes I have even stitched (with thin wire) pieces of old plastic over tears when it's too cold or wet for tape to stick. My granny (a quilter) would be proud!

High tunnel greenhouses provide a longer growing season, which means there are lots of options for crop sequencing in the same year. To the right are some suggested options.



# Growing Spinach in the Winter

- Jason Fischbach

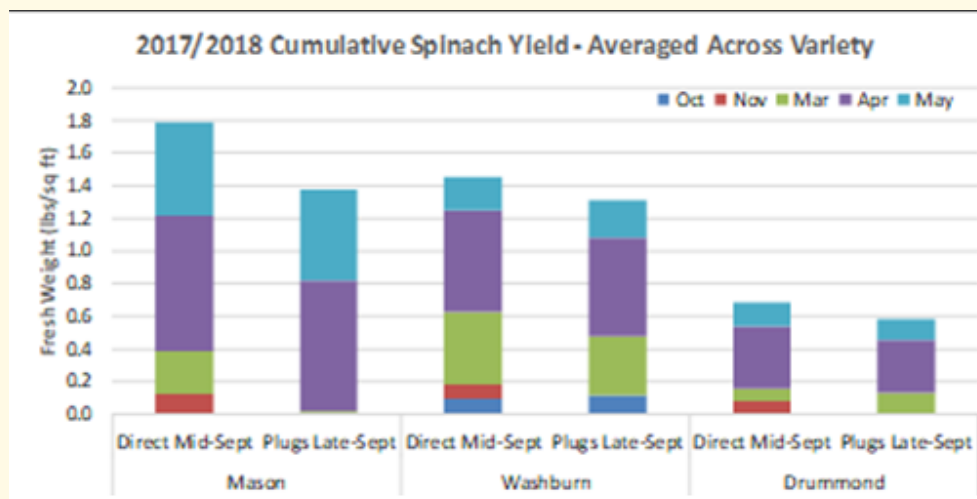
Yes, it's barely even spring, but now is the time to start thinking about winter spinach production in your high tunnel greenhouse.

UW-Extension, in cooperation with Great Oak Farm, River Road Farm, the Washburn School District, and the Drummond School District implemented a two-year research project from 2016 to 2018 investigating the potential of winter spinach production in unheated high tunnel greenhouses. We evaluated different spinach varieties to determine yield potential and we evaluated how planting date and supplemental heat and light affected yield.

In general, the results demonstrate that growing spinach over the winter months in high tunnels in far Northern Wisconsin without any added heat or light is possible and can be a good source of income for commercial growers. Full results from the trials and a how-to guide are available at the Bayfield County UW-Extension website. The graph below shows the yield potential of spinach grown at three locations during the winter of 2017/2018. Total harvested yield ranged from 1.8 to 0.6 lbs/sq ft.



Though often called “winter” spinach, 80% or more of the production at each location occurred March through May with April being the most productive month. At an average yield of 1.0 lbs/sq ft, a bed 3' wide and 96' long bed will produce 288 lbs of spinach. That's plenty of spinach for yourself, your neighbors and your neighbor's neighbors. At a wholesale price of \$4.50/lb that is \$1,296 of potential revenue.





In a winter spinach system, the spinach is either direct seeded or transplanted in the fall. The goal is a plant density of 9 plants per square foot (4" in-row and 4" between-row spacing). Ideally, the spinach is transplanted by the end of September or direct seeded by September 15.

Spinach germination in the fall is tricky, and though direct seeding is cheaper and easier, there is no recourse for a failed germination in the fall. For this reason, if starting seeds in plug trays and transplanting is an option, it is definitely recommended. There are 60+ spinach varieties available, so choosing the right one is a challenge.

Our studies evaluated six different varieties and found that 'Corvair' performed the best, which is consistent with other studies in the US. The How-To guide at the Bayfield County website includes a full list of available varieties.


If establishment goes well and the fall temperatures stay mild, a first harvest is possible in October and then likely a second harvest in late-November or early-December. The plants then go dormant well into March. Once the days lengthen and the sun gets brighter the spinach resumes growing and can be picked every 10-14 days into May. By then the spinach bolts and aphids become a major problem, but by May you're sick of spinach and it's time to plant a different crop anyway.



**Photo 1.** Transplanting spinach as compared to direct seeding is more expensive but it allows planting later in the fall and an optimized 4" plant spacing as shown here. These three middle rows were harvested by pinching individual leaves keeping the younger leaves intact and free to grow for a return harvest.

Spinach can be harvested with a scissors by cutting everything above ground. The spinach will regrow, but the cutting damages the young leaves and can degrade quality. A better, though more time-consuming approach, is to hand pluck the largest leaves. This allows the intact young leaves to keep growing for later harvest. Floating row cover should be used from October through April to help protect the spinach. It can stay on pretty much all winter long but should be removed during the day when temperatures in the high tunnel exceed 50F. The soils will get dry in the fall and especially in March and April, thus it is crucial you have a way of watering when it is winter outside the high tunnel.





# Strengthening Our Local Food Network

- Kellie Pederson, Bayfield County Community Development Educator

In this uncertain time, we can see so clearly how important our connections with neighbors, family and friends are in conjunction with our own self-reliance. As Extension Educators working within the world of food and agriculture, our job is to support the creation of a more robust and resilient food system, and at the heart of any resilient system is a complex network of relationships.

The strength of these relationships is key to resilience. Over the past decade, our food system has grown steadily and intentionally across the region, adding new farms and value-added producers, new markets, new CSAs and new venues and models for consumers to access food. When viewed as a whole, we see that we have a remarkable diversity of food system supports that are uncommon in such a small rural region. Yet, based on feedback from our farmers and consumers, it appears that our food system still isn't as "successful" as we had hoped.

Over the past year, as we've sat down with many local producers, puzzling out next steps and asking the question, how do we take the next leap, together? In convening groups around this question, a few things have come clear:

1. Everyone is dealing with very similar issues.
2. While food system stakeholders might know "of" each other, few have met face-to-face.

While the first point was not a surprise, the second point was. We often describe the areas as "close-knit", but when it comes right down to it, many folks are not acquainted with each other, even though they are working in the same (very small) industry, share the same customers, and have many of the same challenges. Even fewer stakeholders have talked with others about solutions to common problems. Only a handful of folks in the food system actively work together. This insight has led us to some research around a concept termed "dynamic clusters".

A dynamic cluster is a group of businesses in the same industry and geographic area that, while competitive, share information and resources, and actuate an economic advantage based on intentional collaboration. In a dynamic cluster, a core part of the resulting economic advantage comes from resilient relationships within the network.



Based on the concept of dynamic clusters as an accurate model for the food economics of the region, we thought it would be useful to get a better sense of our collaboration and connectivity by using a tool called Social Network Analysis (SNA). SNA is a diagnostic tool to map the social relationships within our local economic system. Using SNA can help us understand how resilient our relationships are and where we have room to grow. Key stakeholders in the regional food system are being asked for assistance with this project.

**If you're interested in taking part in this project, participating is easy!**

**Step One:** Fill out a short online survey. It will take about 10 minutes. The survey will help us make a map of the producers in our food system. ([To receive a link to complete this survey, please email: sarah.degraff@wisc.edu or kellie.pederson@wisc.edu](#)).

**Step Two:** In May, a second survey will be disseminated. This one will be a chance to identify the participant's social connections within the network and will help us as a community understand how we already work together, and how we might work better in the future in order to create an even stronger, more resilient, and more economically robust food system.



## NW Wisconsin Hazelnut Growers Cluster

The annual global farm gate value of tree nuts is estimated at \$42 billion dollars, but unfortunately, WI doesn't participate in that sector of agriculture at all. What's ironic is that Wisconsin has had a nut producing plant in its own backyard, but it's been largely ignored. American hazelnut is a shrub that grows throughout northern Wisconsin. It produces edible and very tasty nuts, but they are generally too small for commercial production. In 2007, Jason Fischbach launched the Upper Midwest Hazelnut Development Initiative (UMHDI) along with his colleagues at the University of Minnesota, UW-Madison, and UW-Stevens Point.



After more than a decade of work, the UMHDI has developed improved plant material capable of supporting commercial production in Wisconsin. Now, the goal is to get the plants to growers and train them to grow hazelnuts. To that end, we have recently launched the NW Wisconsin Hazelnut Growers Cluster. If you have an interest in growing hazelnuts please go to [www.midwesthazelnuts.org](http://www.midwesthazelnuts.org) to learn more.



# Garlic in the High Tunnel?

- Jason Fischbach

Growing space in a high tunnel is expensive real estate compared to a regular farm field. For that reason it's important to grow high-value crops that can't otherwise be grown outside in the field. Garlic is one of our most dependable and easy-to-grow crops outside so why would we ever grow garlic in the high tunnel? Well, there might be a couple of reasons. First, with our recent pattern of cold wet springs the garlic is growing more slowly in the spring and the heads (and cloves) aren't getting as large. Second, options are somewhat limited for low-growing crops to plant along the edges of high tunnels. Third, garlic matures earlier in the high tunnel which means you can get garlic to market sooner. Fourth, the garlic is larger, which means more weight and more revenue. Fifth, every garlic harvest includes some small heads that really aren't saleable. Planting the small cloves from those small heads in the field usually means small heads again. But, by planting them in the greenhouse it might be possible to turn waste into gold.



To test this crazy idea of garlic in a high tunnel, I planted small garlic cloves on November 3 in two rows along the south edge of the high tunnel. Spacing was 4" between cloves and 12" between the rows. No straw mulch was applied. The next summer the garlic was harvested on July 12 (when the outside garlic was still flowering). 90% of the heads were 2.5" or larger in diameter. Total dried head weight from the 76' bed was 78.5 lbs. At a wholesale value of \$6.50/lb that works out to \$3.35/sq ft. Not bad for some small cloves that would otherwise have been composted.



## Collaborative Hay and Livestock Marketing...Are You Interested?

Our region may not be so good for producing cash crops, but we can produce amazing forages. We can also produce nice feeders and stockers. Creating a "brand" for our region's forages and livestock and working together to develop and access markets could be a benefit to farms in our region. If you're interested in exploring this idea please contact Jason Fischbach at 715-209-2715.





# Seed to Kitchen Collaborative Brings Knowledge to Fruition



- Sarah DeGraff

The Seed to Kitchen Collaborative (SKC) is an ongoing research program through the University of Wisconsin that conducts organic vegetable variety trials on organic farms to assess the overall production, disease, storage, and flavor of various crops in order to determine the best crops for each local growing region. (For an in-depth statistical report of tomato variety trial management and results, click [HERE](#)).

College students, research professors, extension agents, farmers, and farm-to-table chefs grow and sample carrots, tomatoes, melons, potatoes, peppers, and more throughout the state, take data on pest and disease resistance, growing conditions, and yields at harvest, then host chef and public tasting events to survey which varieties of a given crop feel, look, and taste the best. This mountain of data is then compiled, analyzed, and posted on the [Seed to Kitchen Collaborative website](#), while the produce itself is donated to local food banks and school programs.

The result: a broad view of which varieties of a given crop grow, taste, and sell best in a given WI growing zone over the years – without farmers having to take on the financial risk associated with testing out newly-released seed varieties.

The variety – Negovia carrots, for example – is listed on the SKC website along with cumulative ratings from survey data, summarized notes from the growing season, and links to companies that sell the particular variety of organic seed.

During the 2020 growing season, local farmers in Ashland/Bayfield counties will host on-farm vegetable trials with spring and fall broccoli, small butternut squash, mini peppers, and bunching carrots. The peppers and carrots will be grown both in-field and in high tunnels to compare disease resistance and overall production. If Covid-19 restrictions allow, our plan is to host a field day later this summer so growers and gardeners can see these trials in action.

If you're curious about the ongoing goals of the SKC or the variety trial results, you can access the information [HERE](#). If you'd like to contribute to the Collaborative by participating in the on-farm trials in the future, please click [HERE](#) to learn more!





# Worth the Salt?

-Printed with permission from Elsa Sanchez

Soil management in a high tunnel environment presents unique challenges for growers. It's easy to create a build-up of salt and nitrogen simply by adding amendments necessary for optimal plant growth and production. Even if growers test their high tunnel soil for mineral and salinity levels, they may miss another opportunity to manage salt input by failing to test salinity in their irrigation water. The greatest issue, however, generally comes from the lack of proper drainage at the site.

Determining the upper threshold of soil salinity can be difficult, as each crop tends to have a different tolerance. Even the sight of salt buildup on top of the soil at the end of the season does not necessarily indicate an issue.

Once crops begin to show signs of stress, however, the problem may be too extreme to address in time to mitigate the negative effects on the current crop succession. Excess salts can cause drought-like plant stress, interfere with seed germination, and inhibit plant growth. The best way to ensure salinity does not reach above threshold level is to monitor levels in each high tunnel throughout the growing season.

## Tips to Decrease Soil Salinity:

1. Only place high tunnels in areas with good drainage to promote leaching.
2. Monitor the soluble salt levels of the soils so you will know when you need to act.
3. Use irrigation water with low salt levels.
4. Avoid the overapplication of nutrients. Soluble salt levels can be limited to some extent by applying only the amount of nutrients plants need.
5. Select fertilizers with low salt indexes; limit the use of organic nutrient sources containing animal manures.
6. Use a sprinkler irrigation system to establish seedlings. Seedlings are more sensitive to high soluble salt levels than mature plants.
7. Rotate crops based on salinity tolerances.
8. Leach out salts. As a general guideline for leaching out soluble salts from the top foot of soil, apply 6 inches of water to leach about 50% of the salts, apply 12 inches to leach about 80% of the salts and 24in to leach about 90%.



One tool for this job is an electrical conductivity meter, which sells for under \$100 and measures the ability of a solution to transmit an electrical current. (This is measured in deciSiemens per meter, or dS/m). The higher the salt level, the greater the current.

PhD Eli Sanchez has well-researched instructions for reducing soil salinity in high tunnels:

"If the tops of the tunnels cannot be removed, leaching soluble salts with irrigation is also an option. This can be accomplished with any irrigation system. The hours required to apply 1 inch of water through a trickle irrigation system depending on the width of the mulched bed.

In the high tunnels at Penn State's Center for Plasticulture we use a trickle tape with a 0.40 gpm/100ft flow rate and mulched beds that are 2.5ft wide. So, we need to run the irrigation system for 6.5 hours to apply 1 inch of water and 78 hours to apply 12 inches of water.

Soil texture (i.e., sand, loamy sand, sandy loam, clay loam, silt loam) is another factor affecting the length of time that an irrigation system needs to be on to apply 1 inch of water. The maximum number of hours for trickle irrigation systems to apply 1 to 1.5 inches of water based on soil texture."

– Elsa Sanchez, PhD, Associate Professor of Horticulture Systems Management, Penn State University Extension.

## Salinity Tolerance of Common High Tunnel Vegetables

Crop	Threshold EC (dS/m)	Threshold 10% Loss	Threshold 25% Loss	Threshold 50% Loss
Beets	5.3	8.0	10.0	12.0
Broccoli	2.7	3.5	5.5	8.2
Carrots	1.0	1.7	2.8	4.6
Cucumber	2.5	3.3	4.4	6.3
Lettuce	1.3	2.1	3.2	5.2
Bell Peppers	1.3	2.2	3.3	5.1
Radishes	1.2	2.0	3.0	8.0
Spinach	3.7	5.5	7.0	8.0
Tomatoes	2.5	3.5	5.0	7.6

# Information & Resources

## High Tunnel Informational Resources

- High Tunnels Joint Extension Program: [LINK](#)
- Pennsylvania University Extension High Tunnel User Manual: [LINK](#)
- Kansas Rural Center : Growing Under Cover Newsletter and Manual: [LINK](#)

## General Farming Podcasts

- SARE Podcast: [LINK](#)
- NEW! MOSES Podcast: [LINK](#)
- Farm Commons podcast provides information on common legal questions farmers have during COVID19. [LINK](#)
- The AgroForestry Podcast: [LINK](#)

## Local Farming Resources

- FEAST by the Bay: [LINK](#)
- Bayfield County Extension: [LINK](#)
- Ashland County Extension: [LINK](#)

## UW-Extension Virtual Events

- Virtual Gardening Series:  
Thursdays from 6 - 7pm  
April 23: Fruit Tree Grafting  
April 30th: Gardening on Clay Soil  
May 7th: Growing Awesome Tomatoes  
May 14th: Caring for Young Fruit Trees  
Register [HERE!](#)

Join the **Wisconsin Crop Manager** email list by sending a blank email with no subject line to: [join-wisconsincropmanager@lists.wisc.edu](mailto:join-wisconsincropmanager@lists.wisc.edu).



**Download Vinder to your phone today – the local, virtual market for your produce! Click [HERE](#) to learn more!**

