Digging Deeper: “Fall and Winter Gardening”
will start momentarily …

Next Green Thumb Garden Tips Educational Series via Zoom

- **Thursday, July 28 (Noon-1 pm)** “Mushroom Cultivation, Carbon Sequestration and Regenerative Soil ”

Next Digging Deeper Educational Series at Woodcock

- **Saturday, August 6 (10:30 – Noon)** “Novel Small Fruits for the Home Gardens”

WSU EXTENSION
Clallam County

Fall and Winter Vegetable Gardens

A Digging Deeper Series Presentation

Bob Cain
Clallam County Master Gardener
July 16, 2022

Learning Objectives

Participants should by the end of this lecture:

- ❑ Gain an understanding of local climate and impacts on cool season gardening.
- ❑ Understand the limiting factors in cool season plant growth and how to manipulate them.
- ❑ Understand the importance of timing and scheduling in preparing a cool season garden.
- ❑ Know how to protect your plants while ensuring adequate light and heat and the wide range of options available.
- ❑ Have a review of vegetable varieties suited for local cool season gardens.
- ❑ Understanding the common pitfalls and misconceptions about cool season gardening.

Reasons to Consider starting a Fall/Winter Vegetable Garden

- First of all, some exercise for cold weather.
- Potential secure food supply in hard times.
- Think of it as a hedge against current food price inflation! Produce, even the humble lettuce have seen price increases of 13 to 20% recently.
- Winter can be a time when produce in the stores normally increases due to lower supply in the cold months.
- You can make it fun and interesting!

Why develop an All-Season Garden?

- It increases your ability to grow more produce.
- Efficient use of garden space that might otherwise be unproductive during the cold months.
- Some vegetables may actually taste better when harvested in the winter months.
- The techniques used in Fall and Winter vegetable growing are the same as needed to give Spring gardens a jump start.
- Even if you don't want to grow many vegetables over winter you can use the empty garden spaces to improve your overall soil quality by planting a fall cover crop such as vetch, peas, fava beans or various grains and grasses.

Cover Crops – aka Green Manures

Used alone or in mixes to aid soil fertility.

Nitrogen inputs - legumes such as Field peas and beans, fava beans, vetches and clovers. They covert nitrogen from the air into useful plant nutrient.

Organic matter addition

Usually grasses such as rye or grains such as oats to add bulk organic material and create open soil structure.

Soil Builder ® cover crop

What to Grow?

- Vegetables for the home garden come in two varieties: Warm season crops which need a soil temperature of about 55-60 °F and cool season crops which need a minimum temperature of 40-45 °F.
- For Fall/Winter vegetable gardening we will concentrate mainly on COOL SEASON VARIETIES.
- Typically this will include leafy greens, brassicas and cole crops as well as some root vegetables.
- We will discuss selection criteria later.

PNW Climatology

On the North Olympic Peninsula the climate gives us the opportunity to grow vegetables year round.

Our winters are typically mild, with a few cold snaps and many cool season vegetables are suited to that climate.

Growing and harvesting vegetables in these cooler months is certainly possible for the average gardener.

Where to Grow – location.

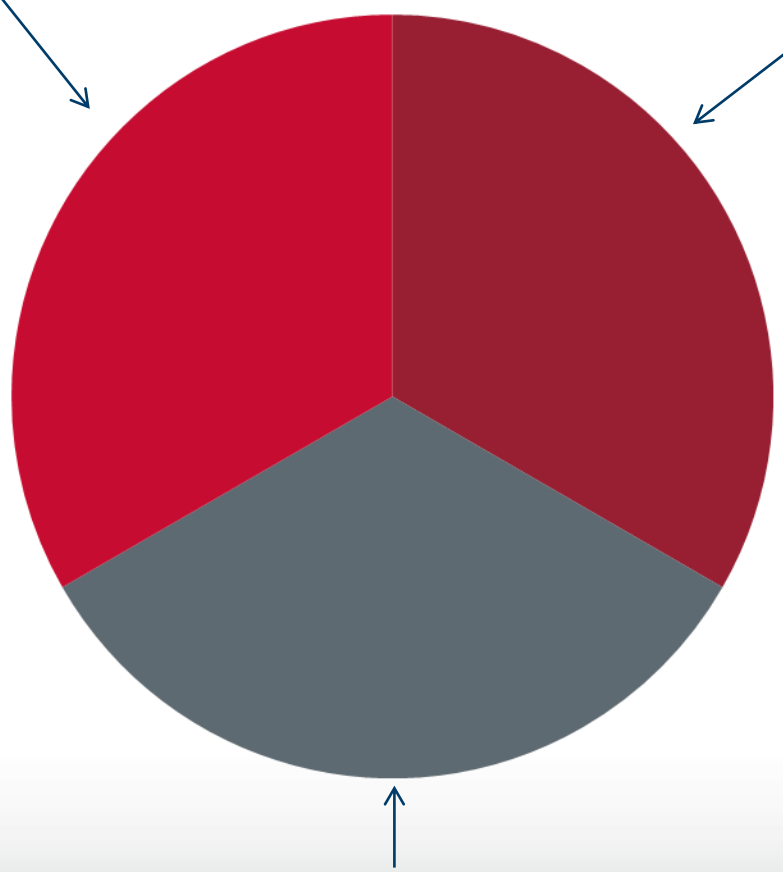
- Locate the warmest part of your garden (south facing wall?) with access to a water source.
- If possible the location should also be sheltered to minimize the effects of cold winter winds and altitude.
- Good drainage is also important since we get most of our rain over winter.
- Try to stay away from low spots or the base of slopes which can trap cold air.
- Despites these limitations, you can successfully grow vegetables in this period of the year.

The vegetable garden in Winter

Factors limiting plant growth

Heat - 40 °F minimum

Light at least 10 hours



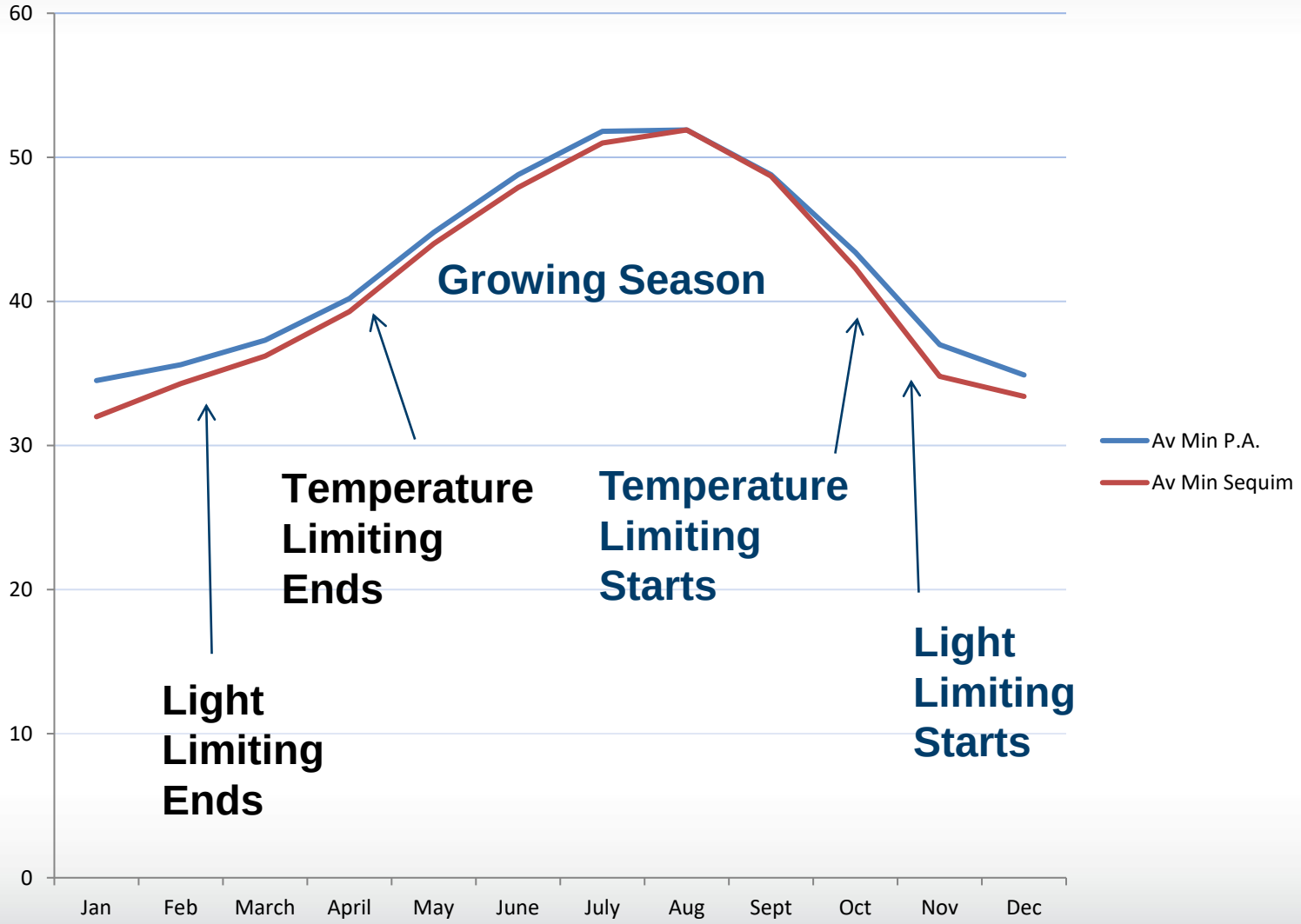
Water – as needed

Overcoming Limiting Factors

- **HEAT -** As Fall moves into Winter it is essential to provide protection to the plants as temperature drops. Mostly this involves supplying or trapping supplemental heat as well as cold and wind protection.
- **Light -** We cannot control this factor outside in the garden. In a hoop-house or greenhouse it may be possible to supply additional light.
- The best strategy is to make sure the plants are large enough and strong enough to survive.

Olympic Peninsula Climate

Historical Monthly Minimum Temperatures



Overcoming Limiting Factors

- **HEAT -** This factor becomes limiting from about Late October to Late March, April in an average year. After the soil warms in spring, growth can continue. We can sow earlier using the same techniques as we do for Fall/Winter or extend these protocols.
- **Light -** We need approximately 10 hours of daylight to keep photosynthesis going. Usually this is limiting between Halloween and Valentine's Day. Remember, however, light intensity decreases significantly in Fall.

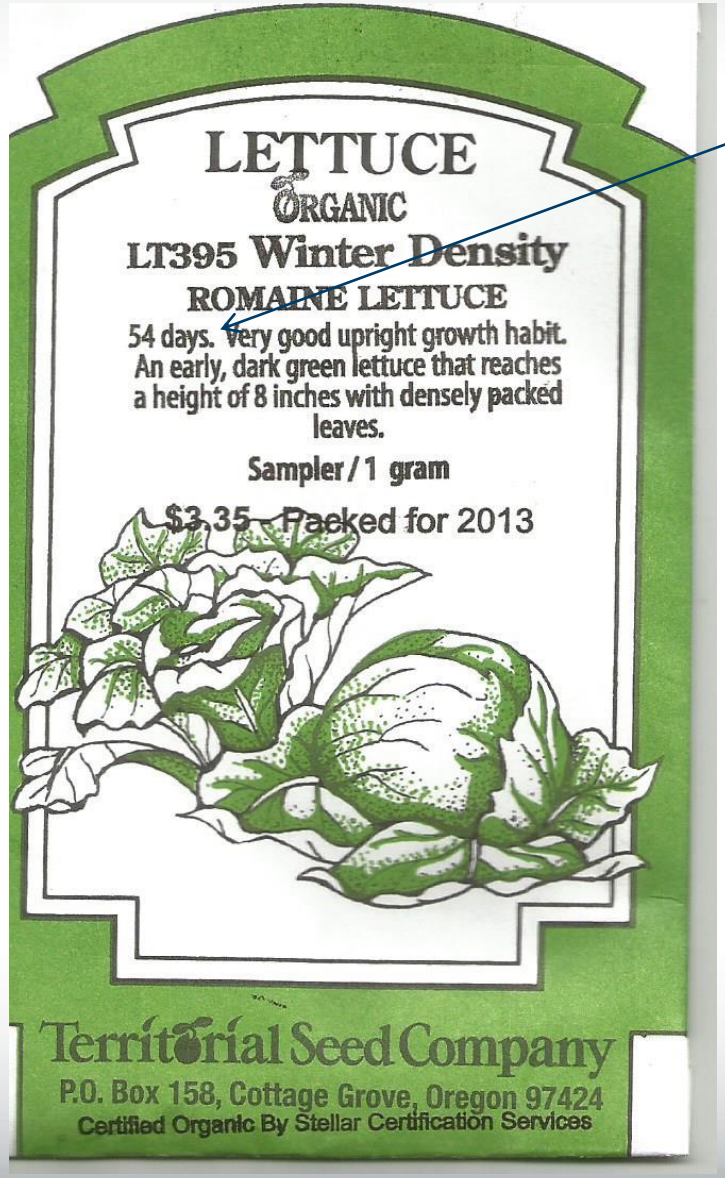
Overcoming Limiting Factors

- **SIZE -** This is a critical factor in successful Winter gardening. In order to survive and/or overwinter plants much reach 75% of full mature size by first frost (typically end October).
- Depending on the vegetable and number of days to reach maturity (DTM) this may mean stating seeds for transplants as early as June/July (for long maturing vegetables).
- This means that you should be planning and thinking about your Fall/Winter garden **NOW!**

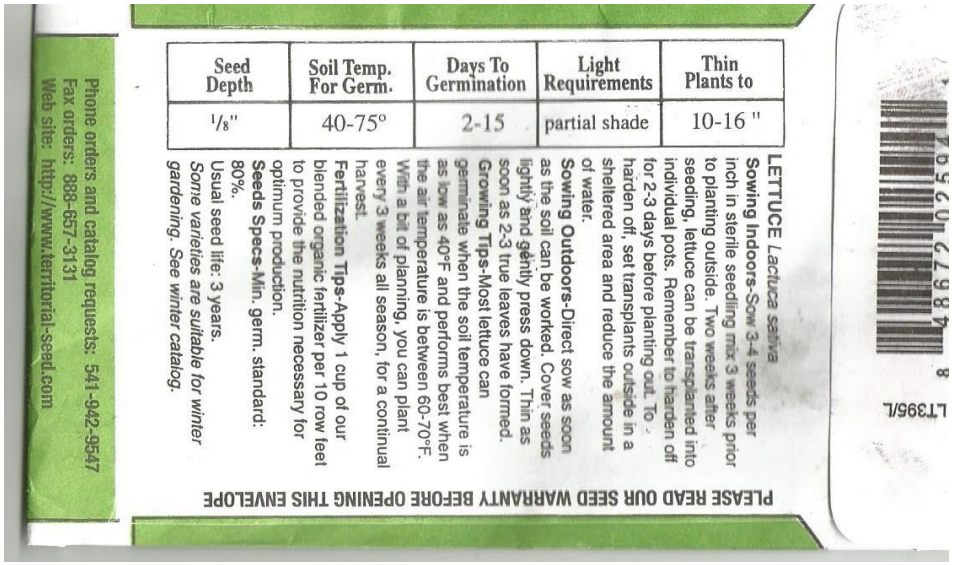
The importance of days to maturity.

- Fall harvested crops usually have shorter DTM than Winter harvested and overwintering varieties.
- Remember the number quoted in the DTM is what was seen in the field trials, often carried on in warmer areas, so add, at a minimum at least three to four weeks to the DTM to compensate for our cooler climate and decreasing day length.
- DTM data is found on most seed packets. Usually on the front but may appear on the back or embedded in text on the back side.

Days to Maturity (DTM)



DTM stated as 54 days



Seed Depth	Soil Temp. For Germ.	Days To Germination	Light Requirements	Thin Plants to
1/8"	40-75°	2-15	partial shade	10-16 "

PLEASE READ OUR SEED WARRANTY BEFORE OPENING THIS ENVELOPE

LETTUCE *Lactuca sativa*

Sowing Indoors-Sow 3-4 seeds per inch in sterile seedling mix 3 weeks prior to planting outside. Two weeks after seeding, lettuce can be transplanted into individual pots. Remember to harden off for 2-3 days before planting out. To harden off, set transplants outside in a sheltered area and reduce the amount of water.

Sowing Outdoors-Direct sow as soon as the soil can be worked. Cover seeds lightly and gently press down. Thin as soon as 2-3 true leaves have formed.

Growing Tips-Most lettuce can germinate when the soil temperature is as low as 40°F and performs best when the air temperature is between 60-70°F. With a bit of planning, you can plant every 3 weeks all season, for a continual harvest.

Fertilization Tips-Apply 1 cup of our blended organic fertilizer per 10 row feet to provide the nutrition necessary for optimum production.

Seeds Specs-Min. germ. standard: 80%.
Usual seed life: 3 years.
Some varieties are suitable for winter gardening. See winter catalog.

Phone orders and catalog requests: 541-942-9547
Fax orders: 888-657-3131
Web site: http://www.territorial-seed.com

LT395/L

Information on planting depth, germination temperature, etc. on back page

When to sow

- As a general rule of thumb you can calculate when to sow based on DTM and allowing for our climate.
- Add three to four weeks to the DTM to get a total number of days. Check the first frost date (about Halloween here). Take a cabbage with a DTM of 60 days +28 = 88 days. To hit 75% final size by first frost, calculate back 66 days from first frost. Sow the cabbage about late July, early August.
- Or follow the planting schedule in the seed catalogs.

Planting – Important Points

- **Starts or Direct sow? -** depends on crop and timing
- **Space plants** at least 8 from tunnel coverings to prevent freezing and tissue damage.
- **Final spacing:** In Fall and Winter garden beds it is critical to change the final spacing of plants. In the case of direct sowing, when thinning for a winter crop, remove plants to at least 150% of the recommended final spacing. For transplants, use this spacing for initial planting out. More room between plants is a necessity to improve air circulation to minimize fungal disease. It also allows better inspection for pests.

General Rules of Thumb for Planting

- For Fall harvesting, many vegetables are sown as transplants but direct sowing is still possible if the DTM is short. Sowing usually takes place around August.
- Winter harvested vegetables usually have a longer DTM (up to 120 days) so they are usually planted in June/July. Planting is still possible for some varieties n August if the DTM is relatively short or then can overwinter.
- These are generalizations and will vary with crop, variety and intended harvest period.
- Remember to pick varieties appropriate for the depth of your garden.

When to sow - a very rough guide

For a Fall harvest, sow in June/July:

Beets, Broccoli, Carrots, Cauliflower, Leeks, Lettuce. Corn Peas, Parsnips, Chard, Winter squash. Look for short DTM and avoid high temperatures to minimize bolting of lettuce and other greens and uneven germination.

For Fall/Winter and Overwintering vegetables sow in July to September:

Arugula, Fava Beans, Purple Sprouting Broccoli, Beets, Kohlrabi, Lettuce and Mustards, Carrots, Garlic, Chard, Kale, radish, Rutabaga, Turnip.

These are long DTM varieties. Many will sweeten after first frosts. Choose cold tolerant varieties and harvest roots no later than early Spring to avoid bolting and woody stems.

What to grow ? -A useful Resource

This tri-fold will be available at the extension office and covers the basics of planning and protection in your Fall/Winter garden.

It also contains a list of suitable vegetable varieties as well as when to sow and harvest,

Recommendations for the most suitable varieties for this area are also included.

Make sure it is the updated July 2022 version for the latest information.

What to sow Late July and early August

Broccoli

Direct sow or use transplants for a faster crop. Try Rudolph, Aspabroc or Thompson.
Purple Sprouting Broccoli will typically harvest in the spring.

Carrots

Use short DTM varieties for harvest before mid winter. Yaya and Danvers Half Long work well.

Nantes type carrots are best for Fall and Winter (more later).

Chiogga Beets

Try a mix for roasting on the cold winter days such as, Autumn Harvest blend or individual sowings of Chiogga, Touchstone Gold and Golden.

Beets

Regular beets for pickling should include Red Ace and Detroit Red.

Most Fall and Winter Beets are direct sown. Harvest before they get woody!

Chard

Direct sow. Some people have success with transplants. Bright Lights is always a favorite but don't forget Perpetual or Golden Chard.

Kale

Almost any variety of Kale will work here and stand the winter without protection. Try a mix for variety – Blue Curled, Redbor, Lacinato and Red Russian.

Green Onions

Direct sow in August. Favorites locally include White Bunching, White Lisbon and Red Baron (red)

Parsnips

Direct sow no later than early July. Germination takes a bit of time. This crop sweetens after frost. If overwintering cover with mulch. Try Javelin and Gladiator.

What to Sow in August

Rutabagas

An essential for winter soups and stews. Direct sow in July. Good bets are Joan, Marian and Magres.

Cover with a low tunnel after planting to discourage root maggot.

Turnips

Again a good fall/winter crop with some fast growing varieties such as Hakurei and Tokyo Cross. Other varieties take longer to mature, such as Purple Top White Globe and can withstand more cold. Cover as for rutabagas to discourage root maggot.

What to sow – August

Cabbages

For a fast Fall crop try Golden Acre. For Late Fall, Winter and overwintering try Savoy type cabbage such as January King, Tundra and Dutch Flatheads such as Green Mariner. Great cold tolerance.

Brussels Sprouts

(Transplants)

Plant early in June/July for Thanksgiving harvest and in August for Christmas/New Year Harvest. They take up a lot of real estate! Try Long Island Improved, Nautic and Redarling.

What to Sow August/September

Spinach

Direct sow in August/September. This leafy vegetable will require good protection for winter harvest. Olympia, Bloomsdale Savoy and Perseus all have good cold tolerance. A crop of baby spinach in the Fall is a bonus! Winter Giant has good cold tolerance.

Kohlrabi

Another relatively quick fall/winter crop. Direct sow in August. Harvest after first frost –can get woody if left later.

Try Superschmelz or Konan.

What to sow Late August and early September

Leeks (Set out transplants)

Put out transplants in August for Fall harvest – try Tadorna, Bleu de Solaise. For Winter and overwintering direct sow Musselburgh and Bandit then transplant starts at end of September.

An essential winter vegetable!

Garlic

Be sure to buy seed before end of August. Plant out end of September/Early October and mulch after first frost!

Hardneck, Softneck or Elephant the choice is yours.

What to sow September

Winter Lettuce

Direct sow or transplant in September. Start placing covers by end of October. Good varieties for this location – Winter Density, Continuity, Little Gem, Winterwunder and Merlot or Outredgeous (red).

Lettuce

Transplant in July or sow September. Oak Leaf, Flashy Trout Back, Rouge D'Hiver, Black seeded Simpson.

Direct sowing in July/August can be affected by "Thermal Dormancy".

What to sow September

Fall radish

Direct sow late August onwards to avoid bolting. French Breakfast, Cherry Belle and Dragon

Winter radish

Sow September. Some are quite cold tolerant and can be mulched for protection.

Try Winter Solstice, Roxanne, Runder Schwartzer Winter and Minowaze Summer Cross Daikon.

What to sow - September

Asian Greens /Mustards

Tough hardy little plants with good cold tolerance. Do best under tunnels.

Try Mizuna, Tah Tsai, Komatsuna, Bok Choy, Giant Red Mustards.

Lettuce Blends

Sow in rows August through September. Many are cut and come again and will last overwinter.
Try Mild Mesclun Mix, Yukon Winter Lettuce Blend and Provencal Winter Mix.

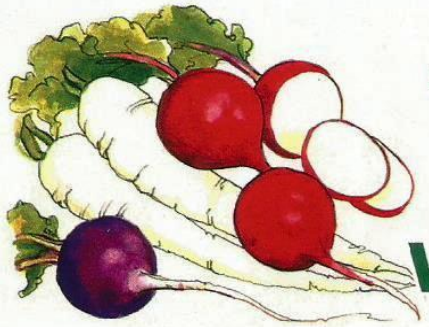
What to grow - September

Winter carrots

Sow in September, cover with floating row cover immediately! Mulch over winter if very cold.

Use long DTM varieties such as Merida, Eskimo and Giants of Colmar. Harvest before Mid March or they will get woody and start to bolt.

Scheduling Planting for Fall/Winter Gardens



TERRITORIAL
SEED COMPANY

Winter Gardening Chart

Vegetable	Sowing Date Range (May / June / July / Aug. / Sept. / Oct.)	Harvest	Max Storage Time	Storage Temp	Storage Humidity	Freeze Out Temp
Arugula		Winter-Spring	1 week	34–40°F	90–95%	5–10°F
Beets		All Winter	4-5 mo	34–40°F	90–95%	15–20°F
Beans, Fava		Spring-Summer	2 wks	34–40°F	Dry	10–20°F
Broccoli - Autumn Harvest		Autumn	2 wks	34–40°F	90–100%	Before Severe Frost
Broccoli - Sprouting		Spring	2 wks	34–40°F	90–100%	15–20°F
Brussels Sprouts - Autumn Harvest		Autumn	3-5 wks	34–40°F	90–100%	After Severe Frost
Brussels Sprouts - Winter Harvest		Winter	3-5 wks	34–40°F	90–100%	After Severe Frost
Cabbage - Late Summer Harvest		Late Summer	3-6 wks	34–40°F	90–100%	Before Heavy Freeze
Cabbage - Autumn/Winter Harvest		Autumn-Winter	5-6 mo	34–40°F	90–100%	Before Heavy Freeze
Cabbage - Winter Harvest		Winter	5-6 mo	34–40°F	90–100%	Before Heavy Freeze
Carrots		Winter-Spring	4-5 mo	34–40°F	90–95%	5°F
		Late Summer	3-4 wks	34–40°F	90–95%	10–15°F

Many seed catalogs have similar planting charts such as Johnny's, etc. Some will even calculate sowing times if you input the first frost date. Note the size of the planting windows – this reflects DTM in many cases.

Short Break

- Questions ?

Protection Strategies for Cold weather

Options:

- Row covers
- Cloches and low tunnels
- High tunnels
- Hoop-houses
- Cold frames
- Hybrid systems
- Unheated Greenhouses

Soil and Preparation

- When sowing a fall/winter crop remember that the previous crop in your rotation removed some nutrients which need replacement.
- Now is the time to amend with compost and fertilizers. Do not use high nitrogen fertilizers – these will produce soft leafy growth unsuited to winter conditions. Look for a low number for N **3**-5-7
- If leaving a bed empty sow a cover crop to improve the soil or cover the bed to minimize nitrogen loss for spring sowing and to control weeds.

Season Extension

- In order to successfully grow vegetables in the cool months we need to address the plants need for shelter and heat.
- In most cases this involves providing protection from cold winds and methods of creating a warmer growing environment for the plants while outside environmental conditions are unfavorable.
- In most cases, this involves providing an enclosure to shelter the plants and using active and passive trapping of solar heating.

Row cover selection

Agribond #	Weight (oz/Sq. Yard)	Light reduction (%)	Degrees of frost Protection	Cost for 83” x 50 ‘ ($ - no shipping)
AG-15	0.45	0	0	Pest protection 0nly
AG-19	0.55	15	4	20 (Insect and frost protection)
AG-30	0.90	30	4-6	25
AG-50	1.5	50	8	30

Material Selection – insulation properties

Material	Calm Weather Factor	Windy Weather Factor	Heat Loss (Keeping 350 cu.ft greenhouse at 50 °F)
Single layer glass Single layer PC Fiberglass Plastic film	1.2	1.4	21,000 - 24, 500 BTU/hr 6.1 – 7.2 KW
Double layer glass Double layer plastic film Double layer polycarbonate or acrylic	0.8	1.0	14,000 – 17,500 BTU/hr 4.1 – 5.1 KW
Triple wall poly carbonate (PC)	0.6	0.8	10, 500 – 14,000/BTU/hr 3.1 – 4.1 KW

One 55 gal drum of water if heated to 70 °F by the sun during the day will have 10,000 usable BTU for night release. Two would keep an average 6 x 8 greenhouse above freezing overnight

Early to Late Fall

- In early to late Fall Floating Row Covers may be useful.

Ground covers

- Sheets of plastic simply placed over the ground
- Advantages/
  - Disadvantages
    - Cheap and simple.
    - Easy to put down, move, take up, store.
    - Can freeze plants to sheeting.
    - Can break off delicate plants.

Floating Row Covers (Cont)

They will also work on elevated beds..

Cloches of all shapes and sizes

Originally glass
Expensive if glass is used
Glass can be problematic
Other material are more user friendly.
Good for all seasons

Cloches (continued)

Not very resilient in bad weather such as hail!

Hotcaps – an Inexpensive Option

- Homemade cloches
  - Plastic jugs and bottles
  - Readily available and replaceable
  - Cheap
  - All sizes
  - Some difficult to see through

Synthetic cloches

- Many options
- Cheap easy to replace
- Easy for the home gardener to make
- Reasonably effective

Season Extension - Examples

- There are many active solar options to trap heat:

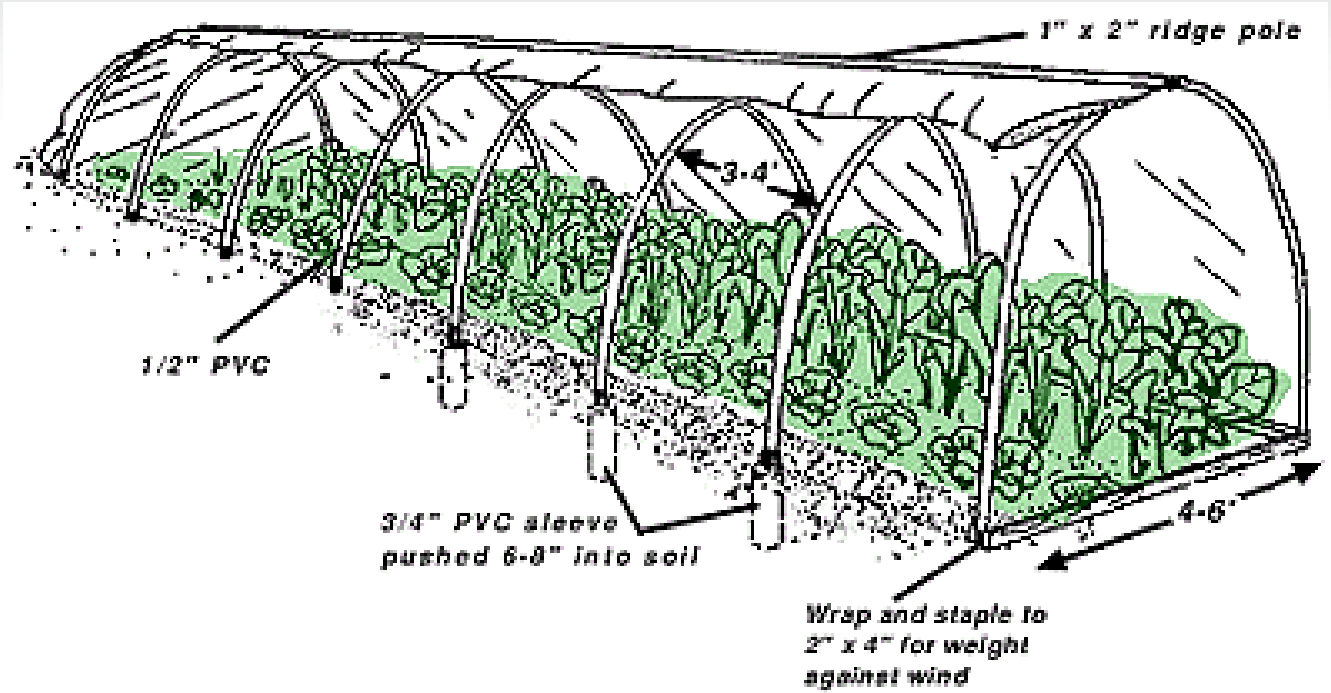
Cold frames in various forms

Even an indoor windowsill can work!

Low tunnels and cloches

Covers for existing raised beds –different materials will provide different heat retention and light penetration.

Low, Medium and High Tunnels



Low tunnels

- Easy to build and customize
- Adaptable to any size
- Must ventilate in warmer weather
- Easy to move and dismantle
- Good for crop rotation

Low tunnels

Low tunnels are commonly used in Fall and Winter vegetable growing.

The most common coverings are fabric or plastic.

Hops can be wire, PVC, electrical conduit or PEX.

Most allow the ends to be closed.

High tunnels and hoop-houses

Useful in home and commercial gardens

Issues to consider for tunnels

The amount of frost protection will be defined by the material used.

Be aware of snow load and the shedding ability of the material selected.

If possible stabilize with a horizontal bar.

Row covering in mid winter over 10’ x 4 raised bed. This was the only protection for crops in 2010 – all survived.

Portable ready to use tunnels

Mini-green houses

Covers easy to remove for gardening

More expensive to make

Harder to maintain in bad weather conditions

Easy to move for crop rotation

Cold frames, hotbeds and their kin

Cold frames are another box type enclosure to help retain heat and light!

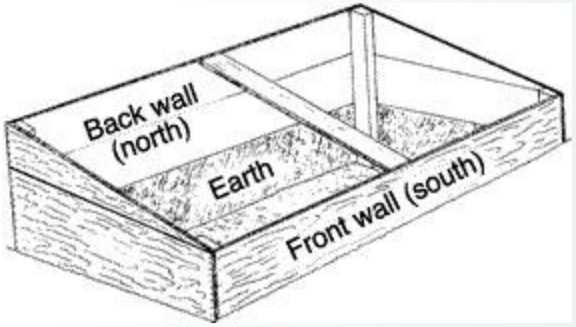
They can easily be ventilated and opened.

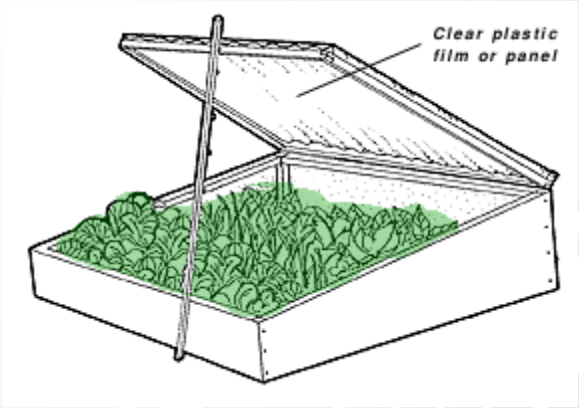
Maximize the amount of sun and therefore, heat by placing it to take maximum exposure to the winter sun.

If possible angle the collecting surface (glass, plastic) at 48 ° to maximize heat potential.

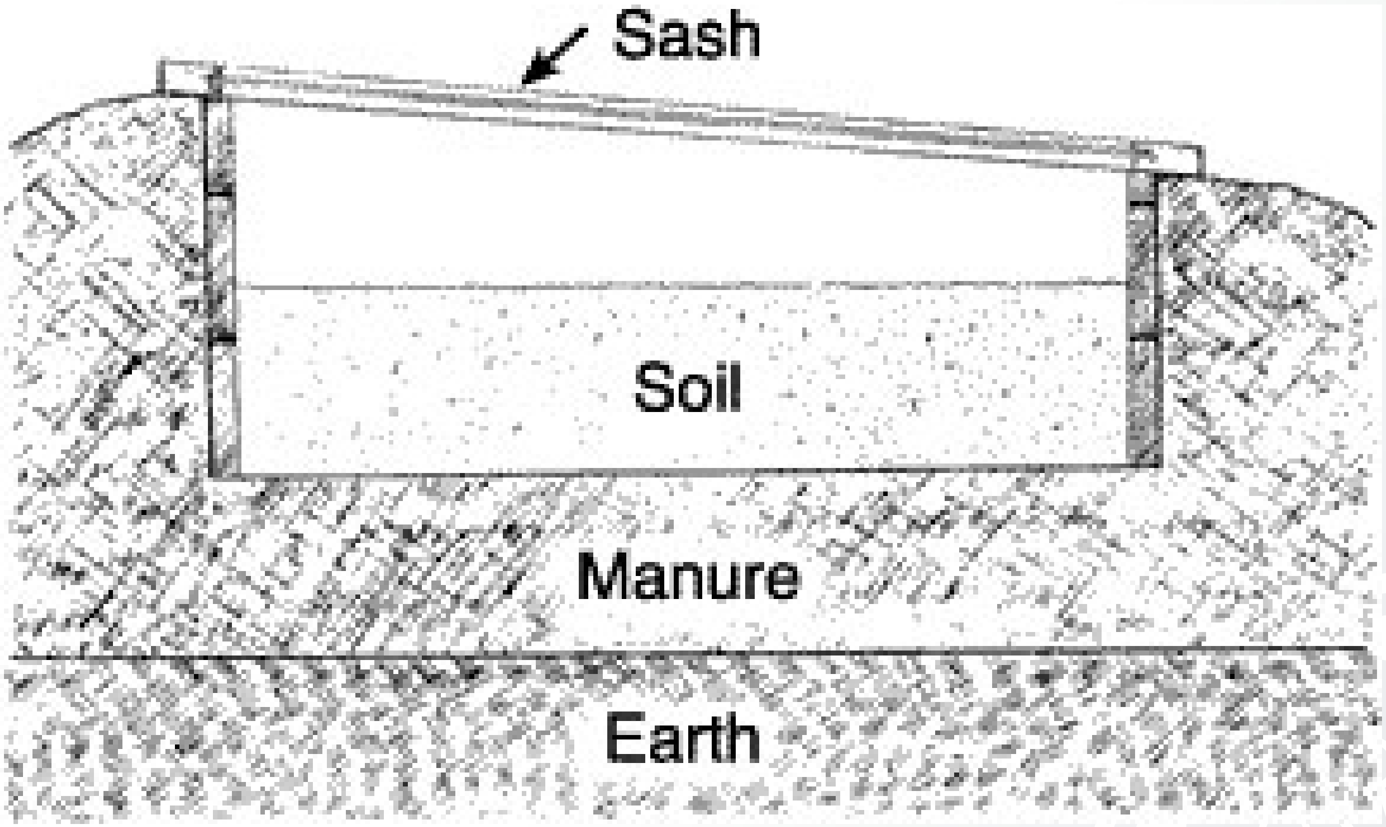
Cold Frames and Sun Boxes

- Cold Frames and Sun boxes
  - Hard safety glass or plastic sheet
  - Harder to move and store
  - Place by side of building for extra warmth and wind protection
  - In Sun Boxes – add layers to increase height as plants grow
  - Need to constantly manage ventilation or attach an auto vent





Extending the Season in a Hot Bed



Many materials can be used to construct cold frames

Cold frames can exist in many forms even hybrid designs

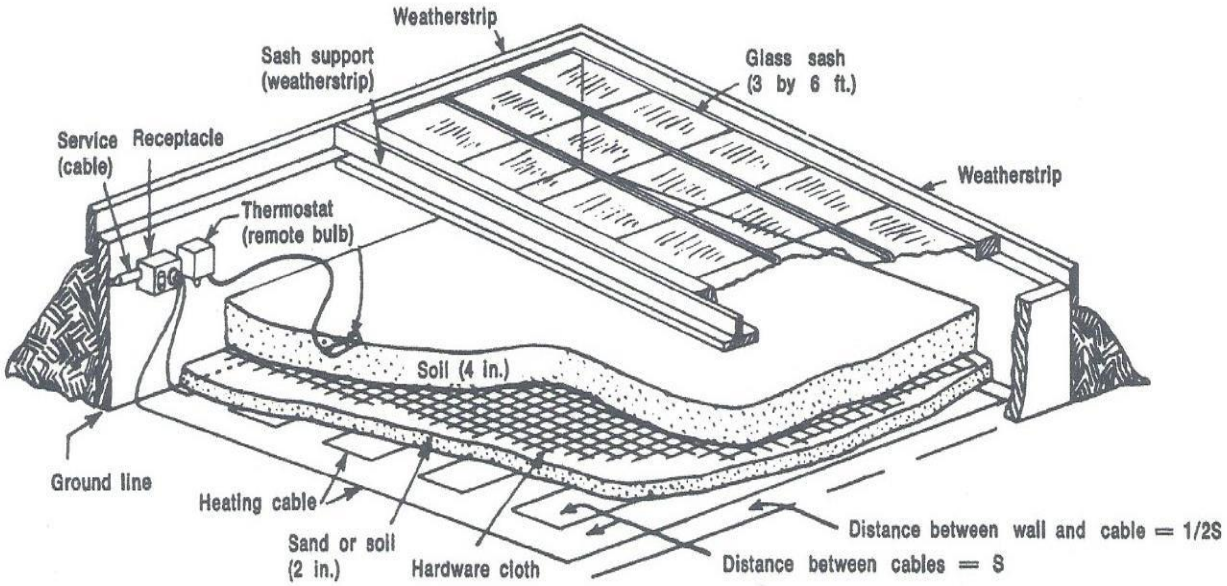
Season Extension – Hybrid Examples

- These are also passive solar options to redistribute heat:

In most cases, a water filled container absorbs daytime heat and releases it at night to raise the internal temperature of the cold frame, low tunnel, etc. Only fill the containers up to about 80% capacity! If extreme cold weather occurs and water freezes it will expand and split the container. For the same reason do not cap the containers.

Other options – heated cold frames

Be careful with electricity – best used for holding plants or starts. Turn off electricity before working in the frame.



Construction of an electrically heated hotbed.

From “Constructing Coldframes and Hotbeds” OSU Pub FS 246

Unheated Greenhouses

- Good option
- Amount of additional insulation depends on material of construction
- Number of options for adding heat:
- Chemical
- Water based

Troubleshooting and watering

- Ensuring your plants have enough water is just as critical in the colder months as it is in Summer.
- Do not overwater! High humidity and cold can lead to fungal diseases and rots.
- Check the soil moisture level frequently.
- Open the ends of low tunnels, open cold frames on mild days to ventilate the structures.
- Overwatering can lead to splitting in root crops such as carrots which can then rot and spread disease.

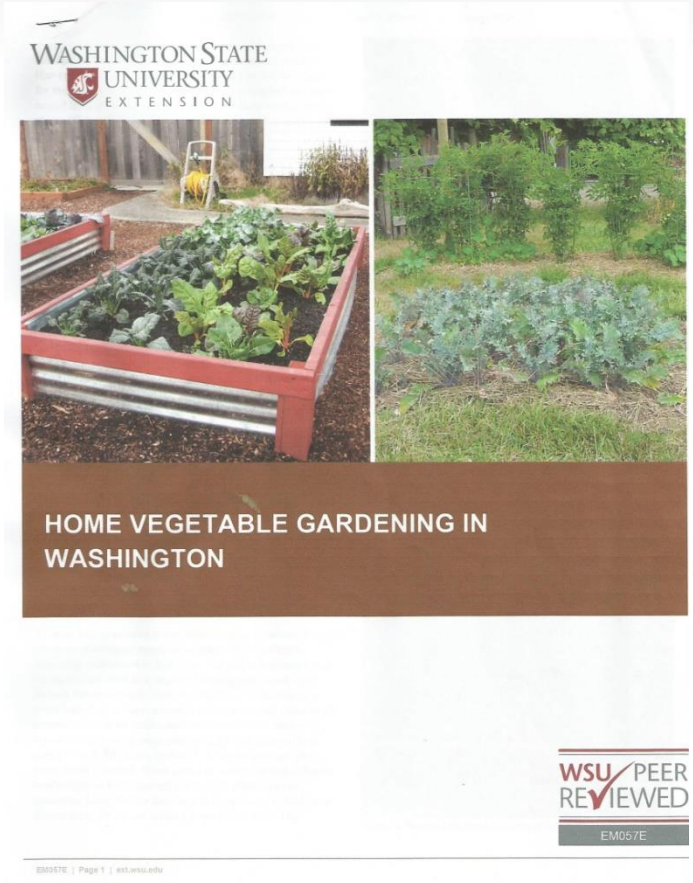
Troubleshooting and Pests

- Creating an appropriate winter habitat for plants also means we are providing potential shelter for pests over winter.
- The most common pests you will encounter are aphids, slugs and snails. Check for damage by chewing pests especially snails.
- Check for aphids frequently when ventilating tunnels and frames. Treat with insecticidal soaps as needed. Remember to close you frames and tunnels afterwards – birds will be hungry in winter!

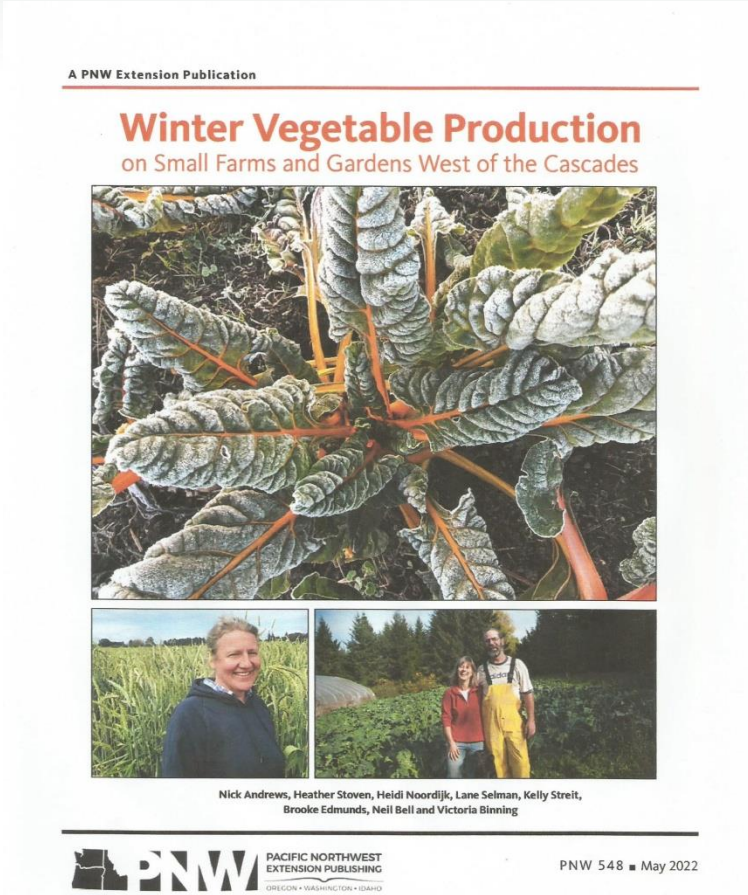
Give it a Try!

- Winter gardening does not require lots of room. In many cases a simple box, 4 foot square and 8 inches deep can supply vegetables in the winter if properly protected.
- Many vegetables and herbs will happily grow inside on a sunny windowsill.
- Don’t forget any unheated greenhouse as a source of winter food.
- Try it at least for one cool season to see if it will work for you!

Most Used Resources

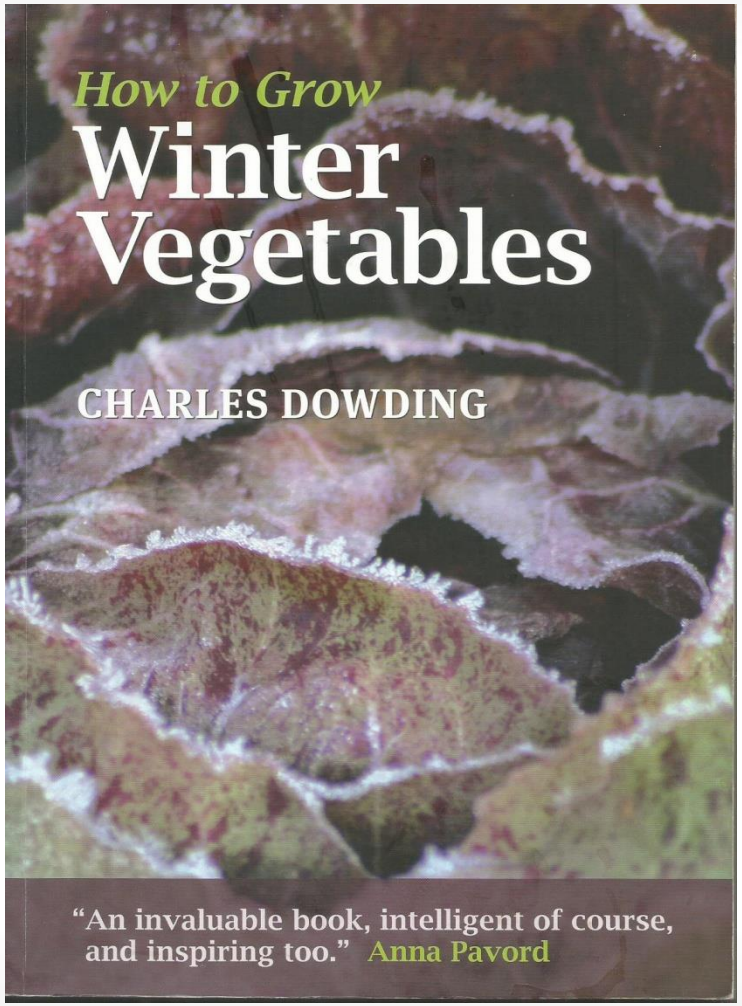


EM057E – excellent general resource with section on season extension.



PNW 548 – 2022 Update = excellent review of winter vegetable growing.

Most Used Resources



This is my go-to book for Fall and Winter gardening!

While written for the UK, all the information is directly applicable to the Peninsula.

Beautifully illustrated text with lots of information and suggestions. Comprehensive coverage of all vegetables, growing methods and monthly planting tables.

An absolutely invaluable how-to-guide.

Practical DIY Projects

- Constructing Coldframes and Hotbeds OSU Publication FS 246 (available online).
- A portable Field Hoop house WSU publication EB1825 (available online)
- A small Backyard Greenhouse for the Home Gardener, North Carolina Cooperative Extension Publication AG-426 (Available Online)
- Sun Boxes – A year Round gardening Tool. WSU Master Gardener Program Bulletin – Available at Extension Office
- Build an Easy Hoop house to Grow More Food, Mother Earth News, October/November 2011, p 42-48.(Available at NOLS)
- Cold Frames, Hot Beds Construction and Use Ohio State University HYG-1013-88 (Available online http://ohioline.osu.edu/hyg-fact/1000/1013.html.
- Weekend DIY Project: How to Build a Cold Frame. Mother Earth News,
- http://www. mother earthnews.com/print-article.aspx?id=2147497669

Resources

Fall and Winter Vegetable gardening in the Pacific Northwest,
OSU/WSU/UI publication PNW 548 (available online).
https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/pnw548.pdf

Short Season Vegetable Gardening OSU/WSU/UI publication PNW 497
https://catalog.extension.oregonstate.edu/pnw497

Home Gardens, WSU publication
http://pubs.cahnrs.wsu.edu/publications/wp-content/uploads/sites/2/publications/em057e.pdf

Growing Vegetables West of the Cascades , Steve Solomon, ISBN 10: I-57061-534-9. (Available at NOLS).

High Yield Gardening, M. B. Hunt and B. Bortz,
The 12 Month Gardener, Jeff Ashton, ISBN 1-57990-193-X
(Available at NOLS)

The Vegetable Gardener's Bible, E. Smith. (Available at NOLS) ISBN 0-87857-599-5. (Available at NOLS)

Four Season Harvest and The Winter Harvest Handbook, Eliot Coleman (Available at NOLS)

Additional Resources

Cold Climate Gardening,
Lewis Hill, ISBN 0-88266-41-7, May be out of Print, (1987)

How to Grow Winter Vegetables,
Charles Dowding, ISBN 978-1-900322-88-1, (2011)

Backyard Bounty – The complete Guide to Year –round Organic Gardening in the Pacific Northwest, Linda Gilkeson

Winter Gardening in the Maritime Northwest – Cool Season Crops for the Year Round Gardener
Binda Colebrook, ISBN 978-0-86571-708-4

Thank you! Questions?

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Or if you have questions later:
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