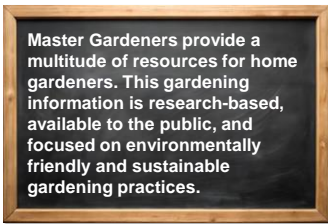


1

Notices



2

Tonight's Topics

- Introduction to the Brassica family
- Preparing the growing site
- Leafy Greens
- Buds and flowering heads
- Root Crops
- Pests and Diseases
- Resources

My co-presenter, Hillary Miller, will share ideas for tasty, nutritious recipes and how to encourage youth to be adventurous with veggies throughout the presentation.



3

GROWING BRASSICAS IN THE PNW IS LIKE GROWING SEAWEED IN THE SEA, IT'S THE WAY THINGS WERE MEANT TO BE.

CALEB POPPE,
EVERGREEN STATE COLLEGE, OLYMPIA WA,
NOVIC DAUGHTER FARM

[HTTPS://WORDPRESS.EVERGREEN.EDU/CHICORY2020/2020/09/01/GROWING-BRASSICAS-IN-THE-PNW/](https://wordpress.evergreen.edu/chicory2020/2020/09/01/growing-brassicas-in-the-pnw/)



Photo Hilary Miller

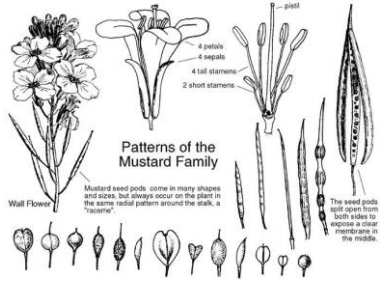
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Photo Credit: Bob Krabben

5

The Mustard Family (*Brassicaceae/Cruciferae*)



6

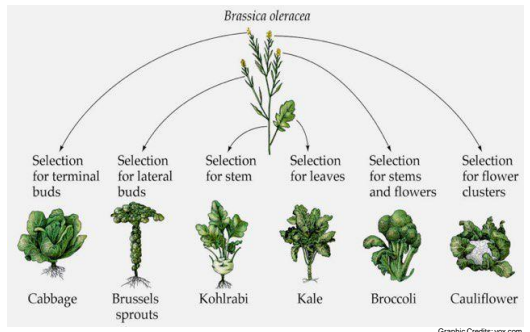
Brassicaceae Includes Many Vegetables

- Arugula (*Eruca vesicaria* and *Diplotaxis tenuifolia*)
- Broccoli (*Brassica oleracea*)
- Brussels sprouts (*Brassica oleracea*)
- Cabbage (*Brassica oleracea*)
- Cauliflower (*Brassica oleracea*)
- Collards (*Brassica oleracea*)
- Horseradish (*Ammoracia rusticana*)
- Kale (*Brassica oleracea*)
- Kohlrabi (*Brassica oleracea*)
- Mustard greens (*Brassica juncea*)
- Pac Choi (*Brassica rapa*)
- Radish (*Raphanus sativus*)
- Rutabaga (*Brassica napus*)
- Sea kale (*Crambe maritima*)
- Turnip (*Brassica rapa*)



Photo Credit: Sue Kraemer

7



Graphic Credits: vox.com

8

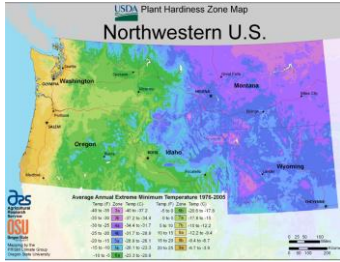
Growing Brassicaceae Preparation

Climate, Soil, and Site

9

Understand Your PNW Climate
Most Brassicas are considered cool crops

- We are in Zone 7-9 – (5-20° F).
- We have 2 short growing seasons for cool crops (greens, brassicas, radishes, carrots). Be aware of microclimates.
- Generally a wide variety of soils with a low pH
- We have a dry season that can last from June to September.



10

Choosing a Garden Site

Your site needs:

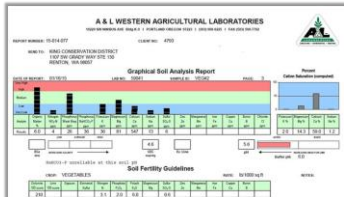
- Sunlight
- Access to water
- Level soil
- Good drainage



11

Preparation-Soil

- Have a soil test completed. King Conservation District gives residents free soil tests.
- Follow amendment directions in the report to address nutrient issues.



12

Preparation



Photo credit: Sue Kraemer

Start Some Varieties Indoors & Prepare Outdoor Beds

- Indoors:
- Heated mats not necessarily needed for crops that can tolerate coolness
 - Grow lamps
- Outdoors:
- Direct sow under row cover

13

Kids can help prepare the soil



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14

Growing Brassicaceae Leafy Greens

Arugula, Collard Greens, Kale, and Mustard Greens



15

Kale

(*Brassica oleracea*)

- Kale
 - Winterbor
 - Redbor
 - Red Russian
 - Dwarf Green Curled
 - Dwarf Scotch Curly
 - Lacinato
 - Dazzling Blue
 - Scarlet



16

Collards

(*Brassica oleracea*)

- Collard Greens
 - Champion
 - Flash
 - Old Timey Blue
- Perennial Collards
 - Purple Tree Collards



17

Kale and Collards

(*Brassica oleracea* and *Brassica napus*)

Soil Temp for Germ.	Seed Depth	Days to Emergence	Thin Plants To	Row Spacing	Seed Life	Fertilizer Needs
55-75°F	1/4"	5-17	12-24"	18-36"	3 years	Medium

from Territorial Seeds

- Start indoors February to May for April to mid-July transplanting
- Direct seed March to mid-July for summer to winter harvest (row cover recommended)
- Direct seed or transplant in August for winter harvest



Photo Credit: Sue Kraemer

18

Kale can survive our winters



Photo Credits: Sue Kraemer

19

Kale and Collards
Biennial: lateral buds in spring



Photo Credits: Sue Kraemer

20

Kale and Collards
(*Brassica oleracea* and *Brassica napus*)

- Edible flowers the next spring!
- Early pollen for bees



Photo Credits: Sue Kraemer

21

Mustard Greens and Pac Choi
(*Brassica juncea* and *Brassica rapa*)

Soil Temp for Germ.	Seed Depth	Days to Emergence	Thin Plants To	Row Spacing	Seed Life	Fertilizer Needs
40-75°F	1/4"	2-15	6-18"	9-18"	3 years	Medium

- Direct seed early spring or late summer
- Very easy to grow!
- Avoid heat to prevent bolting (considered annual)
- Harvest young leaves or full heads



22

Arugula

- Direct seed early spring or fall
- Best directly sown
- Most tolerate moderate frosts
- Harvest frequently and when young
- Flowers are edible!
- Wild Arugula can be invasive



23

Brassica Greens

- One of the most cost-effective vegetables!
- Harvest leaves from the bottom up at any size
- Cool weather and frost bring out best flavor
- Stores well in refrigerator



24

How to Prepare Kale for Sweetness



Photo Credits: Sue Kraemer

25

Nutrition and Recipes!

- Arugula**
- Choose bright green, crisp leaves in bunches.
 - Serve fresh in a winter salad. If too bitter, mix with sweeter greens like butter lettuce.
- Mustard seeds and greens**
- Look for bright green leaves.
 - Cut greens in strips and place in a large pan with lid.
 - Add an inch of low-sodium chicken broth.
 - Cover and cook until al dente. Remove and reduce liquid.
 - Pan roast mustard seeds in a small skillet and add to any dish or salad dressing.



Photo Hillary Miller

26

Favorite Recipes

Kale pasta



Photo Credits: cookpad.com

Kale, bacon, and sun-dried tomatoes

Arugula salad



Photo Credits: foodnetwork.com

Arugula, olive oil, lemon juice, and Parmesan cheese

27

Substitute arugula for basil on pizza



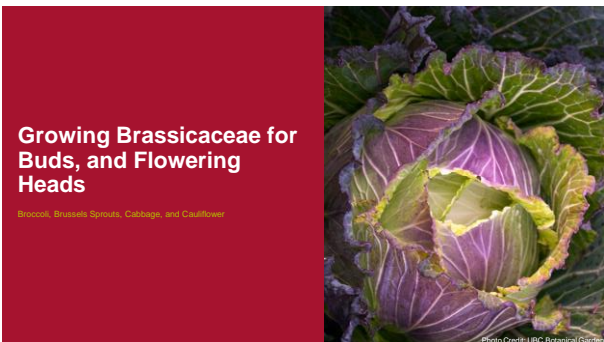
28

Do I see something GREEN??



This Photo by Unknown Author is licensed under CC BY

29



30

Broccoli

(*Brassica oleracea*)

- Broccoli
 - Umpqua
 - Thompson
 - Waltham
 - Green Magic
 - Emerald Jewel
- Brokali or sprouting broccoli
 - Atlantis
 - Apollo



Umpqua



Apollo

31

Broccoli

(*Brassica oleracea*)



- Harvest when heads are tight and dense
- Cut side shoots to promote production
- Stores well in refrigerator

32

Cabbage

(*Brassica oleracea*)

Soil Temp for Germ.	Seed Depth	Days to Emergence	Thin Plants To	Row Spacing	Seed Life	Fertilizer Needs
55-75°F	1/4"	5-17	18-24"	2-4'	3 years	Medium

- Direct seed March – June (not recommended for fall planting)
- Start indoors 4 – 6 weeks before transplant in March through June



Charmant



Ruby Ball

33

Cabbage
(*Brassica oleracea*)

- Early types grow fast, so harvest promptly
- Include 2 or 3 wrapper leaves when cutting heads
- Early types store for 1-2 months at 36°F
- Later types up to 6 months at 36°F



Photo Credit: frugapostate.com

34

Cauliflower
(*Brassica oleracea*)

Soil Temp for Germ.	Seed Depth	Days to Emergence	Thin Plants To	Row Spacing	Seed Life	Fertilizer Needs
55-75°F	1/4"	5-17	12-24"	18-36"	3 years	High

- Direct seed April – June (not recommended for fall planting)
- Start indoors 4 – 6 weeks before transplant
- Blanching for some varieties: to ensure completely white heads, tie the inner leaves around the head when it starts to form



Snow Crown

Graffiti

35

Cauliflower
(*Brassica oleracea*)



- Harvest heads when florets are tight and dense
- Overmature florets will separate
- Stores well refrigerated

36

Brussels Sprouts
(*Brassica oleracea*)

Soil Temp for Germ.	Seed Depth	Days to Emergence	Thin Plants To	Row Spacing	Seed Life	Fertilizer Needs
55-75°F	1/4"	5-17	24"	18-36"	3-4 years	High

- Direct seed: not recommended
- Start indoors 4 – 6 weeks before transplant
- Start May-June for transplanting June-August for fall crop
- Timing is important: follow variety specific instructions



Rubine Hestia

37

Brussels Sprouts
(*Brassica oleracea*)

- Best after couple of frosts
- Mature buds will be about 1 to 1½ inches
- Harvest from the bottom up
- Or, mature entire stock by cutting off top at growing point
- Store refrigerated



38

Nutrition and Recipes!



- Brussels sprouts**
- Look for the smallest, tightest buds available.
 - Avoid yellowing leaves. Taste becomes strong when past their prime.
 - Stir-fry with a few tablespoons of olive oil or butter in a hot wok or fry pan, stirring constantly.
 - Add fresh herbs and toasted nuts.

Cauliflower

- Look for creamy white florets, green bunches with a little curl at the ends.
- Yellow or wilted leaves will be bitter.
- Make a hearty homemade soup or bean stew and add kale in last half-hour.
- Peel leaves from stem to use raw in salads.
- Sauté onions and garlic and add greens, continuing to cook until wilted.



Photo: Lisa Pineda

39

Who Loves Broccoli?



- Total annual consumption (fresh and frozen)
- From around 1 lb/person in the 1960s to 8 - 9 lbs/person today
- Health benefits
- One cup provides more than 100% of vitamins C and K
 - Good source of vitamin A, fiber, folate and potassium

Photo credit: Creative Commons

40

Alternatives to Traditional Broccoli!

- Broccoflower**
- Choose firm, compact heads that are brightly colored.
 - Toss with a bit of olive oil and whole garlic cloves.
 - Bake at 400 degrees until tender.
- Romanesco and broccoli raab**
- Choose tender, firm stalks and tight, compact buds.
 - Cut into bite-size pieces and blanch.
 - Sauté onions and garlic and then add a low-sodium pesto.
 - Add broccoli and toss with penne pasta.



41

Growing Brassicaceae Root Crops
RADISHES, RUTABAGAS, AND TURNIPS



42

Turnips and Rutabagas
(*Brassica rapa* and *Brassica napus*)

Soil Temp for Germ.	Seed Depth	Days to Emergence	Thin Plants To	Row Spacing	Seed Life	Fertilizer Needs
55-75°F	1/4-1/2"	5-17	6-8"	12-16"	3 years	Low

- Direct seed spring through summer
- Sow turnips July-early Sept for fall/winter crop
- Sow rutabagas in July for fall/winter crop
- Thin when form two true leaves
- Harvest when small for sweetness
- Pick young turnip greens
- Store refrigerated



Purple top turnip
(*B. rapa*)

Joan rutabaga
(*B. napus*)

43

Radish
(*Raphanus sativus*)

Soil Temp for Germ.	Seed Depth	Days to Emergence	Thin Plants To	Row Spacing	Seed Life	Fertilizer Needs
55-75°F	1/2"	4-11	1-2"	8-12"	4 years	Low

- Direct seed spring to early summer
- Direct sow mid-August to early September for fall crop
- Extend harvest by planting every two weeks
- Thin promptly when form two true leaves
- Avoid dry or crowded conditions (slow growth, pithy, hot)
- Harvest young
- Let a few bolt - green seed pods are edible
- Remove tops before refrigerating



Cherry Belle

Daikon

44

Radishes

- Let flower and reseed over winter
- Flowers are edible
- Hybrids will give you surprises!



Photo Credit: Sue Kraemer

45

Horseradish
(*Armoracia rusticana*)



- Perennial for years of harvest
- Fertilize top 3-4 inches of soil and dig shallow trench
- Space 1 to 2 feet apart and cover with 2 inches soil
- Will grow fast and spread
- Harvest in fall and winter after leaves have died back

46

Nutrition and Recipes!

Turnip roots and greens

- Choose roots that are heavy for their size and still have crisp leaves.
- Eat raw with veggie dips.
- Add to hearty soups and stews.

Rutabagas

- Select roots that are firm, solid and heavy for their size.
- Dice small.
- Steam in microwave for 10 to 15 minutes.
- Mash with warmed milk and roasted garlic.



Radishes

- Choose firm radishes with crispy leaves, which are also edible.
- Slice thinly and toss in a salad.
- Serve as a crudité with low-salt dip.

47

Brassicaceae Pests and Diseases



48

Integrated Pest Management (IPM)

- **Identify** pests
- **Prevent** problems before they start
- **Monitor** with careful observation
- **Control** with mechanical and biological practices first (not eradicate)



Photo Credit: Wikipedia
Braconid wasp *Aleiodes indiscretus*
laying eggs in a caterpillar



Photo Credit: Sue Kraemer

49

Careful Observation



50

Clubroot

- **Affected Crops:** all members of the family
- **Prevention and Control**
 - Rotate crops
 - Check pH: above 6.8
 - Provide adequate calcium and magnesium
 - Provide drainage
 - Remove weeds



Photo Credit: agric.wa.gov.au



Photo Credit: hortfiles.extension.org

51

Downy Mildew

Affected Crops: broccoli, Brussels sprouts, cabbage, cauliflower, and kale

Prevention and Control

- Rotate crops
- Avoid overhead watering
- Give plants plenty of space
- Remove diseased plants and plant parts (don't place in home compost!)



52

Aphids

Affected Crops: all members of the family

Prevention and Control

- Remove plant debris
- Avoid high levels of nitrogen
- Encourage natural enemies
- Spray off with water hose
- Control honeydew collecting ants



53

Cabbage Maggot

Affected Crops: Brussels sprouts, cabbage, cauliflower, broccoli, mustards, radish, and turnip

Prevention and Control

- Rotate crops
- Reduce weeds
- Row covers



54

Flea Beetle

Affected Crops: all family members

Prevention and Control

- Reduce weeds
- Row covers



Photo Credits: wsu.edu

55

Cabbage Worm

Affected Crops: all family members

Prevention and Control

- Use row covers
- Remove debris
- Attract beneficial insects



Photo Credits: territorial seed garden planner

56

Pests and Diseases

Mystery four-legged creature!



Photo Credit: Sue Kraemer



Photo Credit: Sue Kraemer

Physical barrier: "blackberry defense"

57

Questions?



58

Resources

- Home Vegetable Gardening in Washington, #EM057E
- Radish Fact Sheet #FS127E
- Mustard Seeds:
<https://boulder.extension.colostate.edu/wp-content/uploads/sites/7/2020/04/August-2019-Community-Garden-Newsletter.pdf>
- HortSense:
<http://hortsense.cahnrs.wsu.edu/Search/MainMenu/WithFactSheet.aspx?CategoryId=5&PlantDefId=44>
- Territorial Seeds: www.territorialseed.com
- Seed Savers Exchange: www.seedsavers.org



Photo Credit: Sue Kraemer

59

Resources continued

- <https://wordpress.evergreen.edu/chicory2020/2020/09/01/growing-brassicas-in-the-pnw/>
- www.nwkidney.org
- <https://www.westsideseattle.com/ballard-news-tribune/2020/01/27/basics-brassicas>
- <https://eatfresh.org/discover-foods/broccoli-cauliflower/>
- <https://eatfresh.org/discover-foods/cabbage/>
- <https://www.ars.usda.gov/news-events/news/research-news/2017/heat-tolerant-broccoli-for-the-future/>
- <https://www.britannica.com/topic/list-of-plants-in-the-family-Brassicaceae-2004620>



Photo Credit: Sue Kraemer

60



Thank You!
And now for some closing announcements before questions...

61



Upcoming Presentations



Growing Groceries
2025 Cool Season Series
Wednesdays 7:00pm-8:30pm

Date	Class
Wed, January 22	Vegetable Gardening in the PNW
Wed, February 5	Early Starts, Early Harvests
Wed, February 19	Essential Culinary Combinations
Wed, March 5	All About Brassicas
Wed, March 19	What's a Garden Without Tomatoes?
Wed, April 2	Beacon Food Forest: Seattle's Communal, Edible Landscape



PNW Garden Savvy
2025 Series 1
Saturdays 9:30am-10:30am

Date	Class
Sat, January 11	Tips for New and Experienced Gardeners
Sat, January 25	Growing Roses in Today's World
Sat, February 8	Balcony to Backyard: Climate Adapted Gardening in the PNW
Sat, February 22	Wildlife Friendly Gardening for Natural Pest Control
Sat, March 8	Best but Unusual Companion Plants for Rhododendrons
Sat, March 22	Mastering Mason Bees: Essential Insights for Successful Spring Pollination



More info: <https://kingcounty.mastergardenerfoundation.org/education>

62



Master Gardener Resources



Ask a Master Gardener
Visit: <https://extension.wsu.edu/king/ask-a-master-gardener>

Become a Master Gardener
For information on King County Master Gardener training (including signing up for the email notification list), visit: <https://extension.wsu.edu/king/gardening/become-a-master-gardener>

Applications for the 2026 class will open in September 2025

63

Thank you for the support!



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<https://extension.wsu.edu/king/gardening>
• Demonstration Gardens
• Plant Clinics
• Education Outreach
• Science-based Publications



Master Gardener Foundation of King County
<http://www.mgffc.org>
• Fundraising for these programs

More information about growing groceries:
<https://kingcounty.mastergardenerfoundation.org/education/gg/>
