

Of Cabbages & [January] Kings



Linda Gilkeson, Ph.D
www.lindagilkeson.ca

Brassica (Mustard/Cabbage) Family:

Mainstays of a coastal garden

Cabbage, broccoli, cauliflower, Brussels sprouts, kale, Chinese cabbage, leaf mustard and other greens, radishes, turnips, rutabagas, winter radish/Daikon



Life Cycles

Annuals flower & produce seeds in same growing season

- Summer broccoli & cauliflower, Chinese cabbage, leaf mustards

Biennials take 2 years: leaf growth in 1st season; flowers & seeds in 2nd season

- Kale, cabbage, winter broccoli & cauliflower, Brussels sprouts
- Flowering is induced by a period of cold (called vernalization): usually winter, but can be a spring cold spell



Life Cycles

'Virtual' perennials: Hardest varieties survive mild winters to grow indefinitely

- Sprouting broccoli, kale, some leafy greens

All life cycles can be disrupted by heat waves, frost, cold snaps, drought stress, low soil fertility

3-year-old purple sprouting broccoli



Growing conditions

- Provide **fertile soil**, rich in organic matter, with a good supply of nitrogen (liquid fertilizer in mid-summer, if needed)
- Maintain soil **pH 6.5-7.5** with lime amendments
- Keep plants **well watered**:
 - These don't tolerate dry conditions any time
 - Adequate water is **most critical** when heads are developing (Cabbage may only produce tiny heads in hot, dry condition)
- **Mulch** to keep soil moist & cooler in summer



Growth temperatures

- Best in cool weather (60-80°F); optimum for most < 65°F
- All tolerate light frost & some are extremely hardy, overwintering reliably outdoors
- Growth disorders occur in heat waves:
 - >80°F: Heads may be malformed or don't form at all
 - >60-65°F: Leaf mustards, radishes, Chinese cabbages go to seed (the warmer it is, the faster they bolt)

For a *really persnickety* plant,
try growing Romanesco →



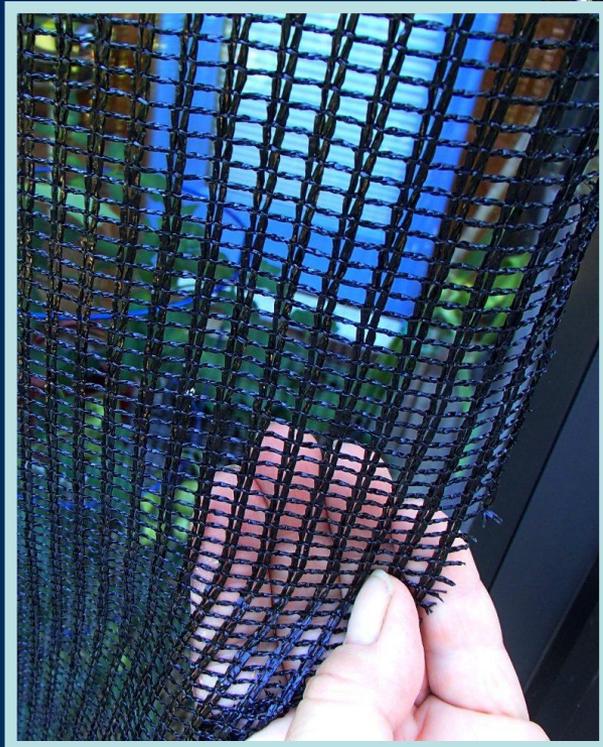
SO....be ready for heat waves *any time*

- Shade seedlings & mature plants on hottest days
- Sprinkle fine mulch around seedlings to cool soil; maintain thick mulches on older plants
- Increase irrigation if possible



Shade cloth is useful

- You might want to invest in horticultural shade cloth (30-50% shade factor) for use on cabbage family during heat waves
- Knitted polyethylene better than woven polypropylene products



Planting Schedules

February/March	Indoor sowing: Summer cauliflower & broccoli, early cabbage
April/May	Direct sowing: Summer & fall cabbage, broccoli, cauliflower, kale Root crops, Chinese cabbage, leafy greens
Late May/ Early June	Brussels sprouts Long season/winter cabbage (120-180 day)
Mid- to Late June	Winter broccoli, winter cauliflower Medium season/fall cabbage (90 day)
Early July	Kohlrabi, rutabaga
Late-July to early August	Fast cabbage (50 day), kale, Chinese cabbage, hardy leafy greens, broccoli raab

Problems: Planting too early

- Cold injury to growing points causes 'blind heads', 'button heads' in cabbage family



Headless cabbage



Headless cauliflower

Bolting biennials: Planting too early

- 2-3 weeks exposure to 40-50°F can vernalize cauliflower, cabbage; only takes 1 week for kohlrabi
- Only happens if plant is large enough to sustain flowers
 - Cabbage family seedlings with more than 5 leaves
- Sow annuals early (Chinese cabbage, mustard greens)
 BUT
 consider early sowing of biennials an experiment



Easiest spring harvests

- The more wintering crops you have, the less you need to sow early
- Overwintered plants have big, deep roots & grow rapidly after February
- **Bonus:** Spring flowers of biennials attract pollinators, aphid predators and other beneficial insects

Fill your 'living refrigerator'
by October →





Interplanting champs

- Early spring lettuce between large Brassica plants
- Summer cucumbers with taller overwintering plants
- Early cabbage & cauliflower between winter broccoli or Brussels sprouts



More Interplanting

Lettuce, cauliflower, green sprouting broccoli ○

Cucumbers (a cool summer mulch) for winter cabbage



What about crop rotation?

Brassica family at risk from root maggots, soil-borne diseases:

- Manage diseases with 4-5 year rotation (7 years for clubroot)
- For root maggots only 2-3 months required

Note: Self-sown plants “count” – don’t let kale, mustard greens, etc., drop seeds everywhere

Remember: Turnips, radishes, many leafy greens are in this family



Successful winter crops

- Good drainage is essential: You may need raised beds to ensure roots are not sitting in water
- Protection from weather: against foundations, rock walls, under roof overhangs



Stake for wind & snow

- Large cabbage family plants are top heavy with narrow stems
- Use garden stakes, tomato cages, branches



Temporary covers for Arctic outbreaks

- Use sheets of plastic or tarps held down with rocks & boards
- Optional: supports under plastic to shed precipitation



When to Cover?

- Leafy greens: forecast for below 23°F with no snow cover
- Winter broccoli, cauliflower, cabbage: below 16°F
- Don't worry about kales or hardiest Brussels sprouts



Broccoli : Easiest to grow*

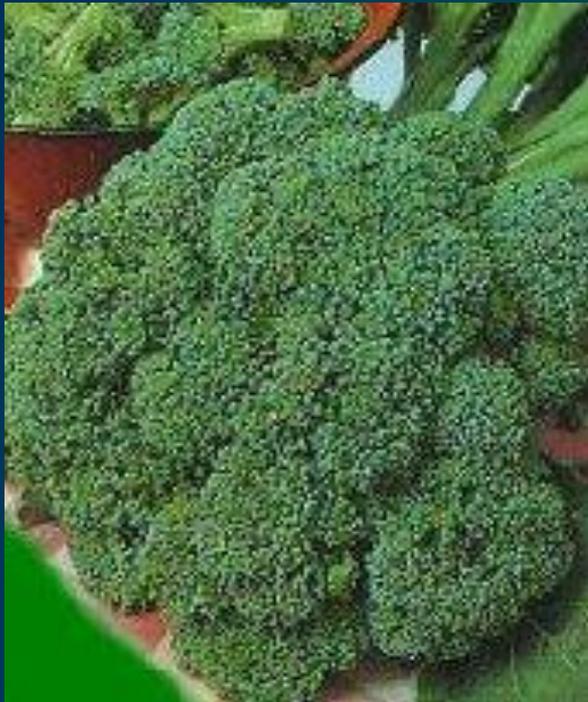
- Least sensitive to heat and poor growing conditions, but production slows in hot weather
- Keep broccoli picked:
 - harvest before buds show yellow
 - stops producing if left to form seeds
 - If you can't use the harvest, pick anyway (freeze surplus or compost)

*Does not include Romanesco 'broccoli', which is actually a cauliflower

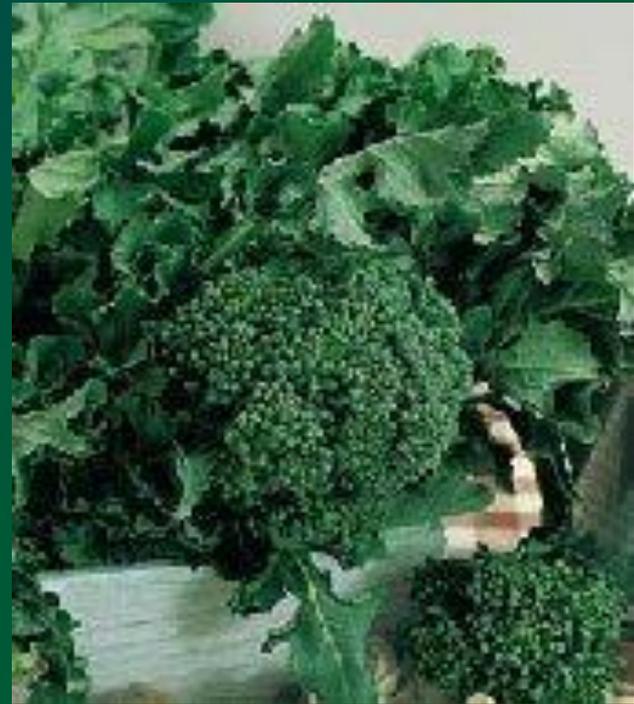


Summer Broccoli Types

- **Central head:** Large heads, usually some smaller side shoots; smaller plants [e.g., 'Goliath']
- **Green sprouting:** Small central head, many large side shoots all season; huge plants; very productive in small spaces; often survives milder winters [e.g., 'Calabria']



Central head



Green sprouting

Winter Broccoli

Biennials with small central heads, many side shoots
late February to June:

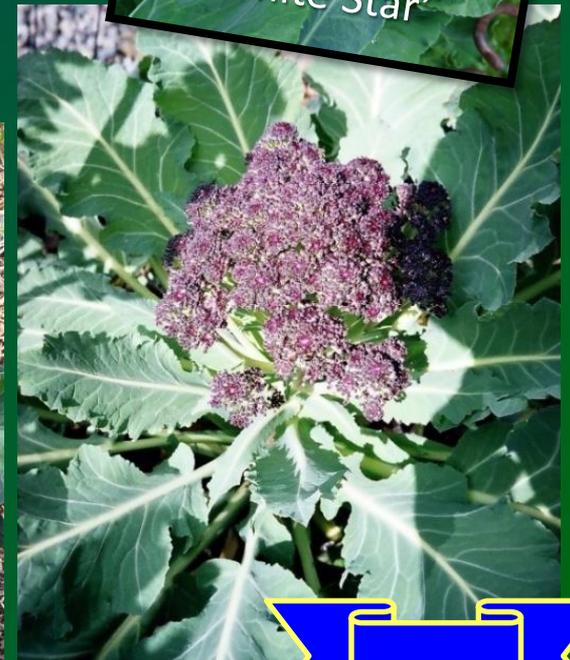
- Very frost hardy, surviving most winters
- Sow in mid-June for harvests next spring
- Plan for about 25% losses over winter



'Extra Early Rudolph'



'Cardinal Late'



'Red Spear'

Best

The confusing PSBs

- “Purple sprouting broccoli” used to only refer to hardy biennial varieties: flowers produced after winter
- ‘Summer Purple’ sprouting broccoli now available: it *should* act like annual broccoli, but seems highly variable
 - If yours doesn’t make florets the first year, keep it over winter for a spring crop



Brussels Sprouts: *A tricky biennial*

- Likes 60-65°F; hates heat & drought
- Hardy to 14°F; some tolerate even colder: 'Roodnerf' withstands 0°F
- Hybrids easier to grow: 'Churchill', 'Gustus', 'Oliver', 'Vancouver'
- For best flavour, harvest after sprouts have been well frosted



Brussels Sprouts: Winter care

Tall, top-heavy plants
must be well supported
to survive winter winds,
& heavy, wet snow



Brussels Sprouts: timing is everything

- To avoid aphid damage, sow late May to early June so sprouts form in October
- BUT sowing after mid-June won't allow enough time to produce sprouts (if they don't make sprouts in the fall, they never will)
- Pinch tips of plants by end of September to force sprout formation



Brussels sprouts bonus crop

- In spring, overwintered plants grow sweet, tender shoots all along the stem
- Shoots grow on vernalized plants whether or not they produced sprouts



Cabbage

- Huge number of varieties: Savoy, red, ballhead types; spring, summer, fall & winter varieties
- Days to harvest vary widely: 45-210 days
- Check variety description to know when to start seeds
- Prevent mature heads from splitting in fall rain by disrupting roots (twist or cut feeder roots)



Savoys are fast growers



Splitting head

Fast cabbage

Sweetheart cabbages are very sweet & crisp

- Small heads grow in 45-60 days
- 'Caraflex F1', 'Greyhound', 'Jersey Wakefield'
- Plant in early spring or late summer (late July)



Winter Cabbage

- Some need 120-210 days to harvest: sow late May to early June
- After freezing weather wait until head thaws before harvesting (can take a week)



Danish Ballhead



January King



Langedijker Red

Cauliflower

- Annual varieties produce heads in the same season
- Sensitive to heat, cold, lack of fertility, uneven watering
- Curd quality is best in cool conditions
- Keep sun off of white heads, but not coloured heads (purple, yellow, lime green varieties)



Effect of hot weather on cauliflower heads

Sown 12 days apart, but
harvested same day after
hot weather (>85°F)

'Ricey' heads in response to
just a few days of high
temperatures



Winter cauliflower:

IMHO the best cauli you will ever eat

- Hardy biennials form curds in early spring after a winter chill
- Sow in June for harvests next March onward



Galleon



Purple Cape

What happens when you plant summer cauliflower for winter

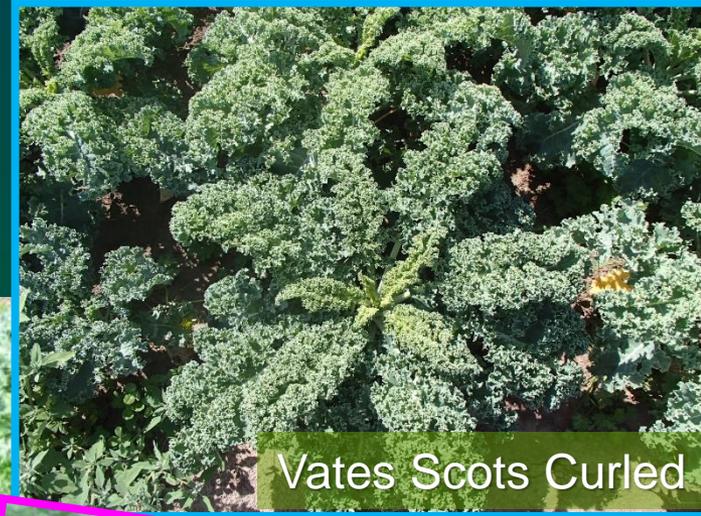
- Beware nurseries selling summer varieties in August & September

Cold causes 'button' heads
in summer varieties →



Kales

- Plants stay in garden all year round from spring planting; sow more in July for winter harvest
- Green, red, purple, smooth, frilly, cut, palm leaved-try them all!



Novelty crosses

- Nice to try, but don't expect too much...and they are all hybrids so you can't save seeds
- 'Purple Peacock': Broccoli + 2 kales cross
- 'Kalettes': Kale-Brussels sprout cross



Don't forget kohlrabi

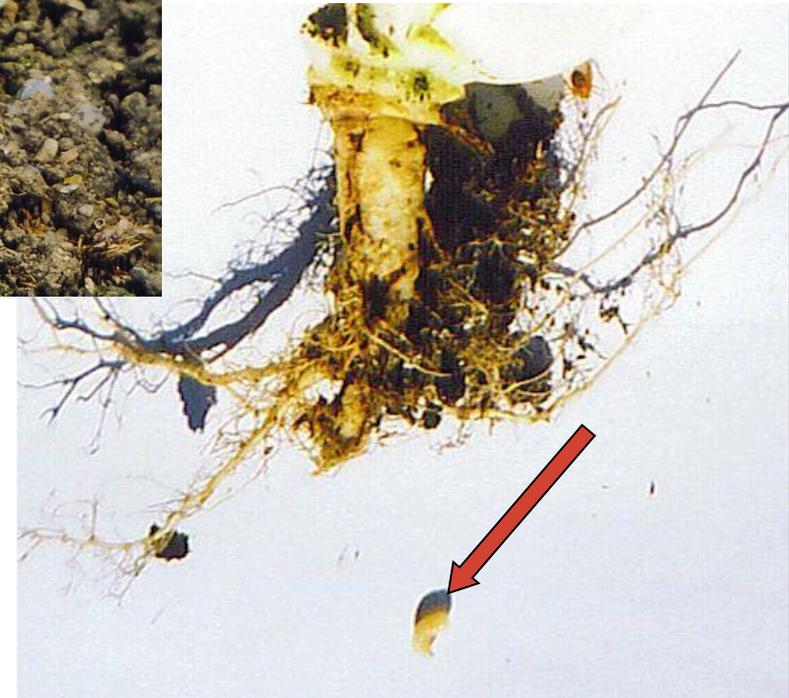
- Sow early to mid-July
- Grow like turnips, thinned to 4-8 inches apart
- Pull out any that don't form bulbs
- 'Superschmelz' is excellent



Pest & Diseases

Cabbage Root Maggot

- 2-3 generations per season
- Late summer generation is most damaging for overwintering crops



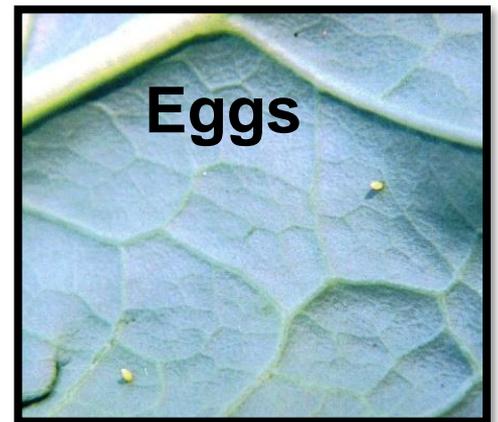
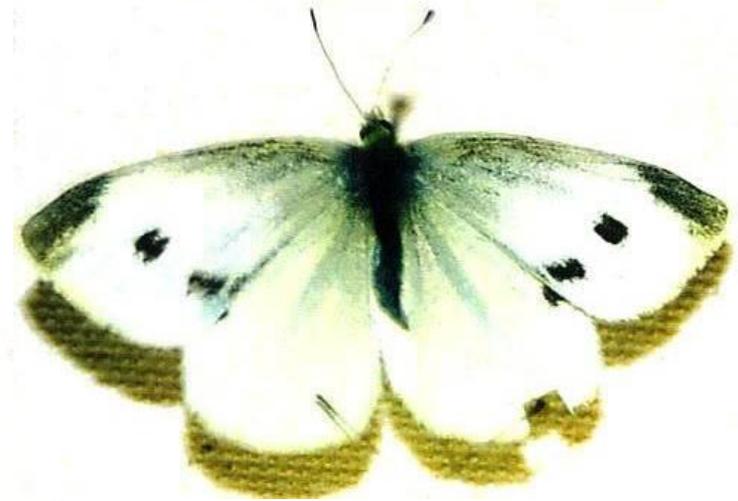
Cabbage Root Maggot

- **For large plants:** At planting time install barrier at soil line
- **For root crops & leafy greens:** cover with insect netting or floating row cover before seedlings emerge
- Leave barriers in place until end of October



Imported Cabbageworm: *White Cabbage Butterfly*

- Protect natural enemies (wasps, birds)
- Handpick eggs, larvae
- BTK (*Bacillus thuringiensis*) sprays as a last resort



Bacillus thuringiensis (BTK)

- Controls common species of caterpillars that attack cabbage family: Imported cabbageworm, diamondback moth
- Only infective for a few days after spraying
- Apply after caterpillars have hatched & are consuming leaves



Aphids

- Attract natural enemies: a large number of species eat aphids
- Water sprays, done twice, 2-3 days apart are effective
- Keep plants well watered (aphids thrive on drought stressed plants)



*Tiny flowers fit
insect mouthparts*



Crucifer/Cabbage Flea Beetles

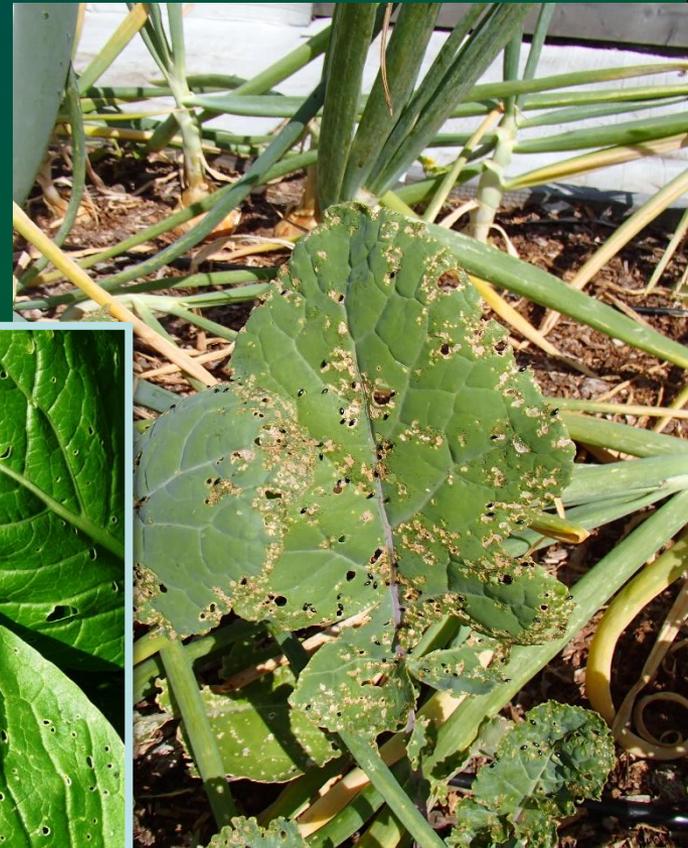
One generation per year:

- Overwintering adults emerge & feed on plants in early spring
- They lay eggs in roots & larvae feed there until mid-summer
- Adults emerge late summer & feed on leaves, but don't lay eggs
- In the fall, they move to debris piles, field borders to overwinter



2 Basic strategies

1. Prevent overwintering beetles from reaching crops in spring:
 - Remove host weeds (e.g., wild mustards) before April
 - Cover crops with insect netting for May & June
 - **OR** sow late (mid-June)
2. Control adults in late August before they migrate to overwintering sites
(pyrethrins sprays)

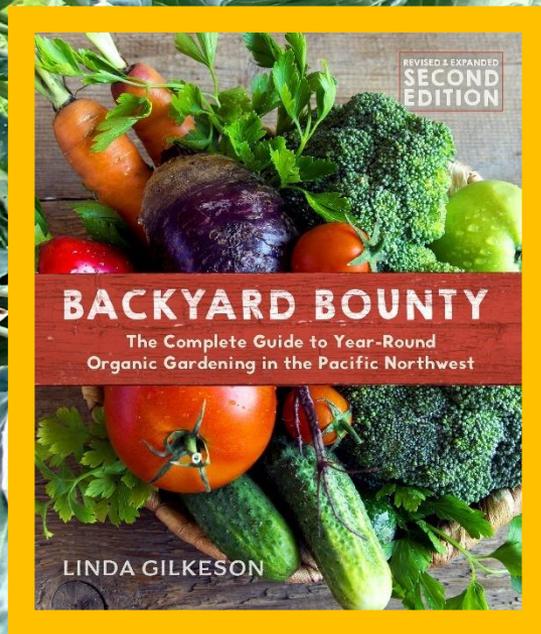


Trap plants: Leaf mustards

- Lure adults away from cabbage, cauliflower, broccoli, Brussels sprouts
- Provides a site where adult beetles can be destroyed by sprays in late summer



Happy Gardening!



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Additional Pests & Diseases

Large Yellow Underwing Moth

'Climbing Cutworms'

- Especially damaging to leaves of overwintering cabbage family
- Feed until late April/early May
- Search on plants just after dark to catch cutworm



Powdery Mildews

- Many different species of fungi: common in late summer & fall on many plants
- Infection increases in humid, but dry weather; spores can't germinate in wet conditions
- New leaves after fall rains start are fine & overwintered plants are not infected in the spring



Clubroot of Cabbage

- Plasmodium (an amoeba, not a fungus)
- Resting spores last 4-20 yrs in soil & produces active spores in presence of Brassica family roots
- Infections develop tumour-like masses
- Thrives at moderate temperatures (68-75°F), in wet, acid soils (pH<6.5)



Clubroot of Cabbage

Prevention: Avoid bringing it to your garden!

- Clean & sterilize borrowed/rented cultivating equipment
- Do not accept plants from other gardens
- Grow your own seedlings
- Buy starts grown in soilless mixes



Managing club root

- Lime to raise soil pH above 7.2
- Use > 7 year crop rotation
- Plant fast-maturing crops early, while soil is cool
- Clean & sterilize tools after use in infected soil **OR** keep separate tools for infected beds
- Experiment with *Bacillus subtilis* root dips [Serenade[®], Natria[®]]
- Look for clubroot tolerant cultivars (only a few available)

Never move soil to other gardens on plants, tools, boots even if you haven't grown cabbage family for years

Clubroot tolerant cultivars

- Nappa cabbage: 'Bilko', 'Jazz'
- Cabbage: 'Tekila'
- Rutabagas: 'York', 'Kingston', 'Marion', 'Laurentian'
- Daikon: 'Miyashige' is immune
- British, Dutch seedhouses list: Cauliflower, broccoli, cabbage, Br. sprouts



Resistant cabbage from infected soil



Roots of resistant cauliflower from infected soil

Beware other hosts for clubroot

- Spores can infect some grasses, strawberry, red clover, corn poppy, dock, mignonette (these do not show root tumors)
- These allow Plasmodium to survive and build up in the soil

