

# Meet the Brassica Brothers – Diverse and Delicious

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## Common Vegetable Crops in the family Brassicaceae and genus *Brassica*

(<http://en.wikipedia.org/wiki/Brassicaceae>; [http://en.wikipedia.org/wiki/Brassica\\_oleracea](http://en.wikipedia.org/wiki/Brassica_oleracea) )

The focus of this class is on the genus *Brassica* and the species *oleracea*. The following crops are are closely related.

1. Kale: non-heading; loose older leaves are harvested from the stem; several leaf types and colors such as Red Russian, Winterbor, Redbor, or Toscano; 55 to 65 days to harvest.
2. Collards: non-/heading; loose older leaves are harvested from the stem; looks like a cabbage but a tight head does not form. There are few types or cultivars. Champion is an example cultivar; 60 days to harvest. Collards are more heat tolerant or able to grow in the summer compared to others.
3. Cabbage: like collards, but a large “head” or single terminal “bud” of packed leaves forms; many types including green or red; smooth or savoy/crinkled/rough leaf; round, flat or conical shape; early or late season; 65 to 95 days to harvest (storage or sauerkraut types are long season);
4. Brussels Sprouts: tight lateral buds or “baby cabbages” form in the leaf axils between the main plant stem and the leaf petioles; short and tall (Diablo) varieties or growth habits; longer season to harvest, ranging from 90 to 110 days from transplant to harvest.
5. Broccoli: a terminal flower bud cluster is harvested while still tight and before the flowers fully develop and begin to open. single cut or multicut also brocollirabb; Example single head varieties are Diplomat, Gypsy and Green Magic; Days from transplanting to harvest 50 to 70 days.
6. Cauliflower: the “curd” or modified immature flower can be multiple colors – white, orange(Cheddar), purple (Graffiti) or green (Panther); Example white cultivar is Snow Crown. Range from 50 to 80 days from transplanting to harvest;
7. Kohlrabi: an enlarged above ground stem; white (Eder, Winner) or purple (Kolibri) varieties; 38 to 45 days to harvest if direct seeded or 25 to 30 if from transplants; Giant storage type is 80 days;

Other crops that are related: (the Brassica cousins for another class)

- Napa or Chinese cabbage as a heading crop;
- Pac choi, tatsoi, mei quing choi as heading crops or baby leaf salad greens;
- Mustard, arugula, mizuna, mibuna, komatsuna as bunching greens or baby leaf salad greens;
- Radish, rutabaga, turnip and horse radish as root crops;

## Questions to Address:

1. What to grow? (crop and varieties)
2. How many/much to grow?
3. When to grow them?
4. Where to grow them?
5. How to grow them?
6. How to harvest?
7. How to store / protect?
8. How to market?

## Crop Topics:

1. History, background and folklore (**What, Where, When, etc**)
  - Mostly from the Mediterranean Region
  - Used in Greek and Roman times and likely thousands of years before that.
  - The subgroups of the species *oleracea* were likely selected over time by gardeners; most likely kale and collards where used first; broccoli and cauliflower were selected next and hard cabbage and Brussels sprouts where selected most recently;
  - Most are biennials (grow one year, flower next, then die)
  - Flowers are insect pollinated; seed are easily collected from kale and radish;

- Good source of vitamin C, minerals and fiber as well as health promoting phytochemicals;
  - These crops do best in fertile, moist soils; kale can be quite easy and cauliflower challenging;
  - World record heaviest cabbage at over 135 lbs from Alaska.
2. Crop and Cultivar selection – **(What?)** how many types? Possible priority if space limited?
- How much garden space is available? Selecting which to grow will depend on personal eating preferences or for commercial sales the market preference and price.
  - It is reasonable to grow all of these in a small to midsize garden.
  - Kale and collards can be harvested over a much longer interval – months, by removing the lower leaves that mature. Kale may be the most space efficient.
  - Cabbage, broccoli and cauliflower are harvested once in a narrow window of a few weeks. Sprouts may emerge from a cut cabbage stump and branches may emerge after removal of a broccoli head.
  - Brussel sprouts can be harvested sequentially if the cool season allows, or all from the stalk at once. Short season (90 days) are usually shorter plants while longer season varieties are typically much taller plants.
  - If broccoli and cauliflower are not planted early in the cool season, maturation during the warm summer months is quick and flavor is not as good as summer planted crops for a fall harvest. Cools season maturity allows a longer harvest period and better flavor.
3. How many plants per person or family? (or yield per plant) **(How much?)**
- What type of preservation is possible besides eating fresh?
  - Cabbage will store well with refrigeration and can be held for several months;
  - Cabbage can be fermented into sauerkraut or kimchee;
  - Broccoli and cauliflower can be frozen or pickled;
  - Kale is being baked into “chips” – a form of dehydration;
  - A starting point for the leafy kale and collards might be 4 to 8 plants for a small family.
  - For broccoli and cauliflower spring plantings, the amount that can be eaten or processed in 1 to 2 weeks; while for fall plantings the harvest can be extended over 3 to 4 weeks.
  - Cabbage and Brussels sprouts can be harvested over 4 to 6 weeks in the fall.
4. What location and how much space per plant? **(Where?)**
- Full sun is best. Kale and collards, the leafy crops, will be more likely to tolerate some shade and provide a harvest. The “heading” crops or Brussels sprouts will not do well in shade or partial sun.
  - Plant spacing is important to get adequate “head” size for cabbage, broccoli and cauliflower. The more fertile the soil and the more water provided, the less space needed per plant. If you soil is less fertile and you don’t water very often, use the wider or larger spacing recommended.
  - Plants typically require about 1.5 square feet or 15” x 15” as a minimum and 2 square feet or 18” x 18” is recommended for large plants. In row spacing may be 18” and row spacing 24”.
  - Kohlrabi can be closer at 8” x 8” in fertile, irrigated soil and could need as much as 10” x 10” in unfertile or dry soil.
  - Kale and collards can be grown in the fall and spring hoophouse; broccoli, cabbage and cauliflower are not recommended for the hoophouse.
5. Rotation Considerations: With, Before or After What Crops? **(Where?)**
- Recommended to grow in an area where the soil is fertile and well prepared.
  - Application of compost prior to planting is recommended.
  - Can follow any plants in the rotation but crops following brassicas may be lower fertility requiring crops.
  - Not grown in area where other Brassica plants have been grown in last 2 or 3 years

6. How Long a Crop Time and **When** to Plant? (Cool or Warm Season?)

- Early start is important since growth is best in cool season.
- Transplants are recommended for all the crops and the appearance of the transplants is very similar for all seven of the crops.
- For Spring planting, seeds are usually sown in early March to provide 6 weeks of growth prior to transplanting to the field, usually in mid to late April. (4 weeks Mar + 2 Apr = 6 wks)
- Shorter season varieties are used for spring planting and longer season for fall planting.
- If transplants are available for purchase, field or garden planting can occur in April.
- For Fall planting, seeds are usually sown in early June and transplanted in July for a September and October harvest window. Approximately 3 months before the last frost date (possibly Oct 1) is recommended as a start time. (For example, July, August, September as 3 months after transplanting so start seed in June). Longer season varieties can be used.
- Kale and collards are generally more heat or high temperature tolerant while broccoli and cauliflower often do not produce quality crops under high temperature conditions.
- Brussels sprouts are only planted once for fall harvest. Crop time is longer so usually planted earlier than other fall brassicas crops.
- Spring Sowing

Crop	Indoor Seeding	Transplanting	Harvest
Kale (55+ days)	March/6 wks to transplant	Light frost; Late Apr/Early May	Late June, July, Aug
Collards	March/6 wks to transplant	Late may	Late June, July, Aug
Cabbage	March/6 wks to transplant	Light frost; Late Apr/Early May	Late June, July
Brussels Sprouts (90 days)	March/6 wks to transplant	Early May to June	Fall; lower buds 2"
Broccoli (55 to 75 days)	March/6 wks to transplant	Light frost; Late Apr/Early May	Dk green; before yellow
Cauliflower (55 to 75 days)	March/6 wks to transplant	Light frost; Late Apr/Early May	? while still young and firm
Kohlrabi (35 to 45 days)	March/6 wks to transplant	Light frost; Late Apr/Early May	Stems about 2" to 3" diameter

- Fall Sowing

Crop	Indoor Seeding	Transplanting	Harvest
Kale (55+ days)	June	July	Sept, Oct, Nov
Collards	June	July	Sept, Oct, Nov
Cabbage	June	July	Sept, Oct
Brussels Sprouts (90 days)	Same as spring	Same as spring	After frost, Oct, Nov
Broccoli (55 to 75 days)	June	July	Sept, Oct
Cauliflower (55 to 75 days)	June	July	Sept, Oct
Kohlrabi (35 to 45 days)	July	August	Sept, Oct

7. Propagation/Getting Started – Seeds, Sets and Transplants (**When and How?**)

- Seeds – germination percentage typically is good
- Seeds generally store well.
- Seeds can be collected – biennials so flowers and seeds in second season.
- Transplants are recommended for all and look very similar for all seven crops.
- Seeds will germinate fastest at a warm temperature (70°F)
- Transplants recommended to have 5 to 7 true leaves which requires 5 to 7 weeks (6 average).

8. Cultivation and training: Fertility, Irrigation (**How?**)

- As stated previously, well drained, fertile soils that are irrigated and minimal weeds are very helpful.
- Particularly with broccoli and cauliflower, if the fertility is low, the plants will remain small and not produce large heads.
- Brassicas are expected to perform better on higher pH soils (6.5 to 7.5)
- Potassium and calcium availability are important; boron and molybdenum deficiency can be seen in brassicas;
- Organic matter and fertility from compost also helps to increase water absorption and retention.
- Water availability is a key to maintaining growth – general recommendation of an inch of water per week applies for irrigation;
- Plastic mulch can help reduce weeding if used in a way that provides for irrigation.

- Late in the season the growing point of Brussel sprouts can be removed to facilitate maturing of the lateral buds. The young tender leaves that are removed are edible and can be used like collards.
- Cauliflower – buttoning, blindness, blanching
  - Buttoning – cold temperatures or stress of transplants results in a premature small flower that does not develop.
  - Blindness – stress of the transplants results in no flower forming
  - Blanching – as head forms, it is protected from light by covering with leaves to reduce light from reaching the head.

#### 9. Plant Protection – what herbivores, decomposers and predators to consider?

- Generally not bothered by deer and rabbits.
- Cabbage worms or looper – white winged moth as adult and green larvae as immature that feeds on the plants. Hand removal is effective for small numbers of plants if scouted regularly. *Bacillus thuringiensis* or Bt is applied if infestation is heavy.
- Aphids can also be problematic, particularly if introduced on transplants. Good idea to focus on aphid free or minimal aphid transplants. Natural predators can often manage or reduce the aphid population once the plants are in the garden. Another possible treatment of aphids is soap solution to wash them off the plants. Example soaps are Murphy Oil Soap, Dawn dish detergent or other dish detergents. A rate of 1 teaspoon to 1 tablespoon per gallon of water.
- Flea Beetles are best managed by keeping the garden free of debris or crops over the winter; plants left standing through winter with leaves collecting around them will increase probability of flea beetles over wintering and starting the season early.
- Foliar disease – generally not a problem.

#### 10. Harvest, Storage and Display

- Important to harvest in cool part of day (early morning) and to keep cool.
- If left too long cabbage heads may “split” – still edible, not as nice looking; cabbage is easiest to store and protect with refrigeration;
- Kale and collards can be harvested regularly by removing the oldest leaves; the leaves are often bunched with a rubber band than cooled immediately. Best stored in cool (40°F) or cold (34°F) conditions for longest quality.
- Broccoli is very perishable and will yellow and wilt at warmer temperatures; harvest while flower heads are still tight, before bloom.
- Cauliflower is harder to know when to harvest; if left too long it will get “mealy” or “ricey” / grainy and have a bad texture when eaten. It can be like an eggplant in that it goes bad before you realize it.
- Brussel sprouts are best harvested after cold temperatures and some frost since flavor improves. Can be stored in moist, cold environment either on or off the plant stem.

#### 11. Marketing, Economics and Value (What is the selling price or unit?)

- Leafy kale and collards typically sold by the “bunch” with 8, 10 or 12 leaves held together with a rubber band.
- Cabbage by the head or pound.
- Broccoli and cauliflower by the head.
- Brussels sprouts either off the stem by weight or still on the stem with leaves removed.

#### 12. Keys to Success

- Grow in cool weather
- Use transplants for easy scheduling and maintenance
- Provide high fertility and moisture
- Harvest at the “right” time.