Cool Season Vegetable Gardening

Cool season growing requires a different perspective about the how, what and especially the when of gardening…it is a step beyond the traditional, one-time plant the garden approach to a potentially year-round effort that adapts to changing seasonal conditions, utilizing various methods of environmental protection and season extension, with an emphasis on planting adapted, cold tolerant vegetable crops.

What a concept - more time to garden!

- Extending the season of gardening:
    - On both ends: An earlier spring, a later fall
    - and in-between: the winter months?
- Intensive horticulture = more produce
    - year-long planting / harvesting
    - successive planting schemes
    - increased diversity of crops
- In most practical applications: cool season growing makes the spring earlier and fall longer.
- Best results integrate using cold tolerant species with environmental protection / modification

A change in how we look at gardening ….

- Food production - an integral part of life
- Cool season gardening makes possible a year-round approach to growing food
- no looking to " next season"– always in it

planning, planting, growing and harvesting continuum

Beyond

- beyond traditional, one-time summer plantings
- growing what is best adapted to the current season

It is "Eating Fresh" more often than not:

- fresh vegetables at non-typical times
- less reliance on canned / frozen produce

Not being content with the weather:

- proactive improvement of environment: soil / air temp
- utilizing technology / tools: plastics makes it possible

The benefits of cool season gardening

Cool season vegetables grow best in cool temperature regimes

- Less plant stress = higher quality produce
- stronger / more vigorous growth
- increased flavor

- less pest damage
- bigger and better yields

- Better climate / time to be outdoors
- Less concern with watering / drought
- Increased skills, satisfaction, a uniquely rewarding experience

Provides valuable, fresh, flavorful produce before the summer garden comes in and after it has played out – with right protection even into the winter months

Extended garden season = extended economical benefit
- produce for fresh eating and preservation directly offsets high food costs and reduces grocery bills
- cool season + warm season = double the produce
- ex: $2.00 investment for a 6 -pack of broccoli plants could return 4 -6 heads worth $6-18.00, plus side-shoots. A $2.00 package of broccoli seed can return 2 -3 dozen heads

<u>Examples of fall garden benefits:</u>
<u>Brassicas:</u>
- reduced worm pressure
- even growth/maturity

<u>Spinach:</u>
- frost improves flavor
- fall planting = no bolting

<u>Considering the costs of gardening….</u>
Yet growing your own produce does have expenses:
- investment in garden tools / gadgets / and other equipment
- annual supplies: seed, transplants, fertilizers, pest control products
- your time investment: taking care of the garden - but less time in the cool season garden (fewer weeds & insects)
- consider facility, time and other cost requirements of preservation: refrigeration, canning, freezing

<u>Maximizing the full potential of the garden</u>
Recognize distinct summer, spring fall growing seasons
- USDA zone maps indicate both winter cold and summer heat potentials
- garden activity calendars based on ave frost dates and number of summer growing days

“Cool” seasons are in a continuum with the “normal” summer gardening season – ahead and behind it
- Big differences between spring and fall!!
- light quality & quantity, air and soil temperature, soil moisture considerations

- summer crop precession / succession
- pest pressure changes

Cool season Spring; Cool season Fall – they are different

- Average dates for last and first frost most important to consider for cool season gardening scheduling
  - dates change from south to north
  - average date is not recorded last, first dates

Spring:

- Ave day last frost vs. last frost free day
- characterized by cold to warm progression
- days getting longer

Fall:

- earliest first frost recorded vs. Ave first frost date
- characterized by warm to cold progression
- days get shorter

Characteristics of the Spring Season

- Less emphasis on timing and concern with crop days to maturity (DTM)
- Air temps at planting cold
- Soils are cold, but gradually warm
  - affects seed germination, growth / rooting speed
  - affects nutrient availability: phosphorus
- Soils are usually wetter
  - affects ability to work soils & time plantings
  - increases potential for soil diseases: seed rots, damping-off
  - spring rains reduce watering needs
- Protection early can increase air and soil temperatures / promote seedlings
- Day length gets longer
  - gradually more growing time
  - crops day length sensitive? spinach and onions
- Transition from Spring to Summer creates wide air temperature swings
  - rapid heat accumulation / slowdown = stress
  - variable maturity rate affects quality of produce
- Insects easily controlled, build quickly
- Weeds germinate as soil temps rise
- Time & focus shift to summer crops
- Spring is greater gardening challenge!

Characteristics of the Fall Season

- Its more about the timing
- Late summer is usually target date for seeding or transplanting:
  - finding space?
  - consider DTM!! – from seed, from transplants

- buying vs. growing plants, seed available?
- warm to hot temps, drier soils
- rapid germination, good early growth
- water is important for establishment
- fertilizer needs higher
- insect, weed pressure initially strong, but declines

- As crops develop & mature:
  - day temps get mild to cool, nights cool to cold
  - days get shorter, sun lower - less light, less intensity & less time to grow
  - soils gradually cool
  - insect pressure declines, winter weeds germinate
  - growth slows, delayed harvest DTM
  - more even temps, less fluctuation = ideal conditions for maturity & maximize quality
  - some crops: frost can enhance sugar / flavor
  - hard freeze (<25F) can cause damage
  - protection often needed at later stages to ensure maturity or extend harvesting period

<u>Maximizing the full potential of the garden</u> – What to grow?

- Utilization of genetically adapted crops which thrive under cool, cold and even freezing temperatures,
  - classified as “frost tolerant” or “very hardy”
  - also cold / damp soil tolerant
  - thrive under less light intensity
  - note variety within species differences!
- Focus on planting timing to maximize growth and reach full maturation / quality:
  - before its too hot or too cold
  - know variety days to maturity (DTM)
  - seeding vs. transplanting DTM
  - site readiness?
  - using season extension, protection tools

<u>What differences to consider between cool season crops?</u>

- Frost Tolerant vs. Very Hardy species
  Frost Tolerant: ~28 -32 degrees
  Very Hardy: mid to upper teens
- Degree of heat tolerance: spring-crop harvesting and planting in late summer
- Variation between varieties in same species: i.e. “winter types”
- Also consider:
  growth stage: germinating seed vs. transplant vs. root, bulb or tuber set into ground
  plant part: leaves vs. bud, flowers; roots vs. tops

Vegetable Cold Tolerance and Planting Guidelines

Frost Tolerant vegetables

From **SEED:**
- Lettuce/endive
- Beet
- Swiss Chard
- Carrot
- Parsnip
- Radish
- Mustard
- Arugula
- Green onions

As **TRANSPLANTS**:
- Cauliflower
- Chinese cabbage-
- Leeks

SPRING Planting Date:
- 2-4 weeks before Ave. last frost

FALL Planting Date:
- 8-10 weeks before Ave. first Frost
- 30-40 DTM: 4-6 weeks
- Lettuce 5-10 weeks

Notes for both types:
- Varieties vary in DTM & cold tolerance
- Sow transplants in cells (spring, fall) or seedling beds (fall) 4-7 weeks before transplanting date
- Fall: target DTM no more than 2-3 weeks past average last frost
- Fall: add 1-2 weeks on DTM estimates regardless of planting date

Very Hardy vegetables

From **SEED:**
- Collards
- Peas
- Turnips
- Rutabaga
- Kohlrabi
- Kale
- Salsify
- Spinach
- Winter radish
- Corn salad

As **TRANSPLANTS**
- Cabbage
- Broccoli
- Brussels sprouts
- Potato
- Parsley
- Onion (bulbs, sets spring)
- Garlic (bulbs, fall)
- Horseradish (spring)
- Asparagus (spring)
- Rhubarb (spring)

SPRING Planting Date:
- 4-6 weeks before Ave. last frost

FALL Planting Date:
- 8-10 weeks before Ave. first frost
- Spinach/turnips 6-10 weeks

What are “Cole” crops?

AKA: Brassica , Crucifer, Mustard family

- Backbone of the cool season garden – prefer cool weather
- Cabbage, broccoli, cauliflower, Brussels sprouts, kale, collards, kohlrabi, turnips, rutabaga, radish, horseradish, ustard greens, garden cress, Chinese cabbage, bok choi / other oriental greens

Other cold tolerant crops and families

- Goosefoot family - spinach, beets, chard
- Sunflower family - lettuce, dandelion, salsify, artichoke
- Parsley family - carrots, parsley, parsnip
- Allium family: onions, leeks
- Nightshade family: potatoes
- Valerian family: corn salad
- Legume family: peas

Promotion, Protection, Prolonging

We can modify and create garden “microclimates” to encourage and protect growth and extend harvest / ensure maturity of vegetable crops when seasonal climatic conditions are less than conducive

- Covering plants and / or growing areas to affect immediate air and soil temperatures
    - protect cold, drying winds
    - greenhouse effect warms & also increased CO2
    - use plastics, glass, fiberglass, fabrics
    - can supplement heat using gas or electric inputs
- Soil modifications
    - raised beds for rapid warming
    - organic matter for drainage
    - covering areas to keep soils dry and plantable
- Covering can also exclude pests

Using season extension tools in cool season vegetable growing:

- Modifying the environment:
    - when its not the right time or right crop
    - when it is the right crop and time: improve conditions
- Allows earlier than recommended spring planting of frost tolerant, and hardy vegetables as well as warm season crops
    - promotes soil warming using raised beds, cold frames,
    - black and clear plastics
    - deflects damaging frost on new seedlings
    - hard freeze protection
- Promote growth and protect in fall and winter
    - increase air temperatures, promoting growth & moderating hard freeze events
    - soil frost / freeze protection: mulches for roots
    - for mid-winter: cold hardy vegetable protection

Season extension is nothing new under the sun

- Practiced around the world for centuries
    - means of survival
    - common aspect of food production
    - broadens food-crop species utilization
- In our country:
    - cold frames, coverings used since colonial times: protecting seedlings and getting early starts to big summer gardens
    - processing / preserving historical garden focus
    - fresh vegetables viewed as a seasonal food
    - past 50 years: importing has changed this perspective
- Season extension dominates commercial vegetable production in countries with high populations and small land mass
- Commercial growers in the US regularly use environmental modification to promote plant growth

Sequential planting: how does it fit with cool season gardening and season extension?
- Several plantings of same crop:
    - timed direct seedings or transplanting
    - plant on ideal target date, and just before, just after
    - way to “hedge” on weather
- Maximizes yield of a crop for a given area/time
- Allows more opportunity to harvest a quality product
    - if missed ideal harvest time, a second, third chance
    - might escape an insect or disease problem
- It maximizes productivity potential of a specific crop and increases its “season of use”
- Using early and late planting dates, “extends” harvest period in traditional sense

Start Simple: Develop a Planting Plan
- Consider your space
- Consider your time
- Consider your utilization plans: vegetables you like / amounts
- Consider crop cold adaptability
- Crop yield potential, plant size, days to maturity:
    - amount of area to plant
    - row and in-row spacing
    - timing of seeding, transplanting
    - succession planting plans
- Sketch it out, make written plans

Starting Simple: Plant a “Fall” Garden
- Harvest in October-November
- In late summer plant (August):
    - Seed: radish, lettuce, carrots, spinach, peas, beets, turnips, chard, kale, collards
    - Transplant: broccoli, cabbage, cauliflower, Brussels sprouts, lettuce, kohlrabi

- Bulbs: garlic (Sept/Oct planting)
- select known cold hardy varieties
- first frost: cover with floating row cover
- mulch root crops

- For over-winter spring harvest of spinach and garlic protection
- use straw mulch and floating row covers

Starting Simple: the “Spring” Garden
- Harvest in May-June
- Create raised beds in previous Fall when soil is dry
- Sow seed, transplant:
- late Feb - March
- Seed: radish, lettuce, carrots, spinach, peas, beets
- Transplants: broccoli, cabbage, onion
- Sets/tubers/crowns: onions, potatoes, asparagus, horseradish
- sow transplant trays: 5 -7 weeks ahead (January!)
- potatoes: allow to “ green”
- select known cold hardy varieties
- Cover with row cover or plastic tunnel
- Provide for ventilation on warm days

Summary
- Try to think outside traditional gardening to utilize the “full” season with cool season crops
- Use adapted crops and varieties
- Utilize new, old, and be creative with season extension technologies
- Integrate crop adaptation with technology
- Broaden your experience and increase your garden skills

Maximizing Garden Potential: Focus on Adaptation
- Utilize crop families and their genetic adaptation potential to the fullest:
- understand temperature requirements
- know variety characteristics: i.e. “winter” types
- Timed planting and harvest periods:
- take full advantage of day length, light quality and soil temperatures - in relation to specific crop growth characteristics and adaptability
- make earlier and later plantings than normal
- use sequential plantings to maximize full range of growing season
- use inter-planting for shade / heat protection of cool season crops in summer

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Resources:

A few suggested seed sources for cool season vegetables
- Nichols Garden Nursery: Albany, Oregon. 1-800-422-3985
http://www.nicholsgardennursery.com/
- Territorial Seed Company: Cottage Grove, Oregon. 1-800-626-0866
http://www.territorialseed.com/
- Johnnys Selected Seed: Winslow, Maine. 1-877-564-6697
http://www.johnnyseeds.com/
- Harris Seeds: Rochester, New York. 1 -800- 544-7939
http://www.harrisseeds.com/
- Stokes Seeds: Buffalo, New York. 1 -800- 396-9238
http://www.stokeseeds.com/

USDA Gardening Information:
http://www.usda.gov/wps/portal/!ut/p/_s.7_0_A/7_0_1OB?navid=GARDENING&parentnav=CONSUMER_CITIZEN&navtype=RT

Plant Disease Index:
http://ohioline.osu.edu/hyg-fact/3000/index.html

Arizona Master Gardener Manual:
http://ag.arizona.edu/pubs/garden/mg/

Ohio Master Gardener Training Manual and Online Resource Center:
http://www.hcs.ohio-state.edu/mg/manual/index.htm

First Fall Frost in Illinois
www.isws.illinois.edu/hilites/press/images/fallfrost01B.gif

Average Last Frost in Illinois
www.isws.illinois.edu/hilites/press/docs/spring_frost2002.pdf

Growing Season - Average Number of Days
www.isws.illinois.edu/atmos/statecli/Frost/growing_season.htm