The 12-Month Vegetable Garden
How You Can Enjoy a 365 Day Harvest

Patrick Byers
Regional Horticulture Specialist
University of Missouri Extension

Outline
• Section 1: Getting started
• Section 2: The wonderful world of vegetables
• Section 3: The winter vegetable garden

Setting the Stage
• What are your goals?
  – A salad now and then
  – Growing a major part of your food
• What are your assets?
  – You – time and knowledge
  – Your growing space
  – Your living and storage space
• Do you have a network?

Why Grow Your Own Vegetables
• Freshness
• Money savings
• Variety
• Health
• Activity
• Self sufficiency

Impact of a Vegetable Garden

Harvest from 4’x24’ Bed

- Lettuce – 3 spring salads, 8 fall salads
- Cucumbers – 118
- Green beans – 8.5 lbs
- Tomatoes – 218
- Bell peppers – 30
- Onions – 12 green + 13 small bulb
- Eggplant – 40
- Broccoli – 8
- Cauliflower – 5
- Radish – 5 bunches
- Herbs
  – Basil – 8 bunches
  – Parsley – 11 bunches
  – Sage – 2 bunches
  – Rosemary – 1 bunch
- Flowers
  – zinnias (7 bouquets); sunflower (38)

The Harvest – Value

- Lettuce – 3 spring salads, 8 fall salads $20.06
- Cucumbers – 118 $85.00
- Green beans – 8.5 lbs $14.36
- Tomatoes – 218 $109.00
- Bell peppers – 30 $20.70
- Onions – 12 green + 13 small bulb $3.38
- Eggplant – 40 $15.92
- Broccoli – expected 8 $7.16
- Cauliflower – expected 5 $4.14
- Radish – expected 5 bunches $5.59
- Herbs
  – Basil – 8 bunches $19.92
  – Parsley – 11 bunches $8.69
  – Sage – 2 bunches $4.98
  – Rosemary – 1 bunch $2.49
- Flowers
  – zinnias (7 bouquets); sunflower (38) $59.00
The Harvest

Total value of harvest: $384.11

What do You Need to Garden?

- A place to grow – sunlight, water, air, and soil
- Knowledge and time
- Hand tools – spading fork, hoes, shovel/space, trowels
- Power tools?
- Supplies – hoses, sprinklers, sprayer, hoops, row cover
- Nice things to have
  - Extra refrigerator
  - Freezer
  - Dehydrator
  - Pressure cooker
  - Vegetable storage areas

Planning the Vegetable Gardening

- Sunlight
  - Full sun is best
  - You can grow veggies in the shade but...

Planning the Vegetable Garden

- Sunlight
- Water
- Air
  - Allow for good air movement around the garden
  - Allow for proper spacing among plants
- Soil
  - Well drained
  - Not compacted
  - 3-5% organic matter
  - Moderate fertility
  - pH 5.5-7.0

Planning the Vegetable Gardening

- Sunlight
- Water
- Soil
  - Well drained
  - Not compacted
  - 3-5% organic matter
  - Moderate fertility
  - pH 5.5-7.0

Planning the Vegetable Garden

- Sunlight
- Water
- Air
- Soil
  - Well drained
  - Not compacted
  - 3-5% organic matter
  - Moderate fertility
  - pH 5.5-7.0
Planning the Vegetable Garden

- The soil test!
  - At the beginning
  - Every 2-3 years

The Basics of Vegetable Gardening

- Where to place the garden
  - Full sun
  - Close to a water source
  - Close to the house
  - Protected from winds

Site Problems

- Soil problems – compacted, heavy, poorly drained, rocky, pH issues
  - Soil amendments, especially compost
  - Provisions for drainage
  - Raised bed gardens

Site Problems

- Shortage of water
  - Irrigate with water efficient irrigation – soaker hose, drip hose
  - Use mulches

Site Problems

- Shortage of space
  - Edible landscaping – you CAN eat the flowers!

Site Problems

- Shortage of space
  - Container vegetable gardens
    - Large containers are best
    - Use soilless growing media
    - Watering important
Site Problems

- Shortage of space
  - Succession planting, companion planting

Planning the Vegetable Garden

- Start with vegetables that taste good fresh!
  - Tomato
  - Asparagus
  - Sweet corn
  - Peas
  - Green beans
  - Lettuce
  - Summer squash
  - Green onions
  - New potatoes

Planning the Vegetable Garden

- What should you grow?
  - Plant what you like to eat!
  - Consider that some vegetables require lots of resources (space, water, time) – corn, winter squash, sweet potatoes
  - How about a network of gardens?

Planning the Vegetable Garden

- How much should you plant?
  - How much can you take care of?
  - What are your goals?

Planning the Vegetable Garden

- Choose cultivars that will grow in your area
- Check out the MU Extension Vegetable Planting Calendar – see http://extension.missouri.edu/explorepdf/agguides/hort/g06201.pdf
Planning the Vegetable Garden

- Plant cool season vegetables at the proper time

Planning the Vegetable Garden

- Plant warm season vegetables at the proper time

Planning the Vegetable Garden

- Distribute your harvest over a longer period of time
  - Plant short, medium, and long season cultivars
  - Succession plantings
    - May 1 – Green bean planting 1
    - June 1 – Green bean planting 2
    - July 1 – Green bean planting 3
    - August 1 – Green bean planting 4

Planning the Vegetable Garden

- Know the days to harvest for your vegetables
Planning the Vegetable Garden

- Plant perennials in permanent homes out of the way
  - Asparagus
  - Rhubarb
  - Horseradish

Planning the Vegetable Garden

- Seed
  - Use fresh seed
  - Plant properly
  - Store unused seed
  - Saving seed?

Planning the Vegetable Garden

- Why is crop rotation important?
  - Rotation focuses on not planting vegetables in the same place in the garden for consecutive growing seasons
  - Benefits of rotation
    - Less problems with diseases that are found in the soil
    - Decreased insect problems
    - Utilize nutrients already in soil provided by previous crop

Planning the Vegetable Garden

Planning Rotations – Patrick’s Garden

<table>
<thead>
<tr>
<th>Rotation</th>
<th>Spring</th>
<th>Summer</th>
<th>Fall</th>
<th>Winter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Garlic</td>
<td>Garlic</td>
<td>Roots</td>
<td>Roots</td>
</tr>
<tr>
<td>2</td>
<td>Roots</td>
<td>Tomato/kin</td>
<td>Tomato/kin</td>
<td>Greens</td>
</tr>
<tr>
<td>3</td>
<td>Greens</td>
<td>Vines</td>
<td>Vines</td>
<td>Roots</td>
</tr>
<tr>
<td>4</td>
<td>Roots</td>
<td>Beans/misc</td>
<td>Cole crops</td>
<td>Greens</td>
</tr>
<tr>
<td>5</td>
<td>Greens</td>
<td>Spring</td>
<td>roots/beans</td>
<td>Garlic</td>
</tr>
</tbody>
</table>

Planning the Vegetable Garden

Planning Rotations – Year 1

Bed 1
- Garlic – Garlic – Roots – Roots

Bed 2
- Roots – Tomato – Tomato – Greens

Bed 3
- Greens – Vines – Vines – Roots

Bed 4
- Roots – Beans – Cole crops – Greens

Bed 5
- Greens – Roots – Beans – Garlic
Planning the Vegetable Garden

Planning rotations
• Rotation 3 (greens-vines-vines-roots)
  – Previous fall – planted winter greens, harvest through winter and into current spring
  – Plant parsnip seed April 15 at end of bed, harvest in fall and winter
  – Plant cucumber April 1 (inside), May 1, and June 1; continuous harvest from June 15 to September 1
  – Plant zucchini May 1 and June 1, harvest July-August
  – Plant carrots July 15, harvest in fall and winter
  – Plant other winter vegetables as needed

• Rotation 5 (greens-spring roots/beans-garlic)
  – Previous fall – planted winter greens, harvest through winter and into current spring
  – Plant carrots, beets, radish on March 15, harvest June 1
  – Plant more carrots on April 1, harvest June 15
  – Plant green beans on April 15 (inside), May 1, June 1, and July 1; continuous harvest from July 15 to September
  – Plant garlic on September 15

Starting Seed Indoors

• Why?
• Vegetables to consider
• When should I plant?
• What should I plant in?
• What type of growing media?
• The process...
• Hardening off

Starting Seed Indoors

• Why start seed indoors:
  – To get a jump on the season
  – To have transplants to fit into rotations
  – Best use of expensive seeds
  – Natural part of saving seed
Starting Seed Indoors

- Vegetables to consider:
  - Tomato
  - Pepper
  - Vine crops
  - Cole crops
  - Onions
  - Chard, spinach, lettuce
  - Herbs like parsley and basil

Starting Seed Indoors

- When should I plant?
  - Generally, plant 4-6 weeks before you plan to plant in the garden
  - Example:
    - Plant kohlrabi seed on March 1 for a planting date of April 1
    - Plant cucumber and tomato seed on April 1 for a garden planting date of May 10
    - Plant head lettuce and spinach on August 1 for a planting date of September 1

Starting Seed Indoors

- What should I plant into?
  - Sanitation is critical – use new containers, or sanitize reused containers (for a gallon of sanitizer, mix 1 1/2 cups bleach with 14 1/2 cups water)
  - Planting containers
    - Flats or pans
    - Cell packs
    - Pots

Starting Seed Indoors

- Direct seeding into a flat

Starting Seed Indoors

- Seeding into cell packs
- Seeding into pots

Starting Seed Indoors

- The germination and growing media
  - Sterile and fine texture
  - Well drained but holds moisture
  - Mixtures with soil – consider sterilizing (2 hours at 170°F)
  - Soilless mixtures

Starting Seed Indoors

- The process
  - Plant seed at the proper depth
  - Good germination depends on:
    - The right temperature
    - The right humidity
    - Water from below or use mist bottle
Starting Seed Indoors

- Hardening off seedlings
  - Prepare seedlings for garden conditions:
    - Wind
    - Temperature fluctuations
    - Direct sun
    - Lower humidity
  - Gradually expose seedlings to outdoor conditions

Planting Seed Outdoors

- Plant at the proper time
- Plant at the proper depth
- Plant at appropriate density
- Avoid crusting of the soil – mist daily

Planting Seed Outdoors

- Germination time varies
- Thinning may be necessary
- Planting plan
  - Plant seed in rows – space rows appropriately
  - Plant seed in beds
    - Proper spacing can be a challenge

Planting Transplants

- Purchasing transplants can save time and energy
- Purchase good quality transplants
  - Disease/insect free
  - No nutrient issues
  - Well grown
  - Not leggy or over-mature

Preparing a New Garden Site

- Destroy perennial weeds
- Amend the soil as directed by soil test
- Apply compost
- Turn or till the soil initially

Planting Transplants

- Plant in the garden at the proper time
  - Remember frost dates!
  - Remember soil temperature!
  - Don’t plant too early!
What About Raised Beds?

- Excellent growing environment
- Well suited for 12 month gardening
- Build out of durable materials

Garden Layout Tips

- Plant perennials together on one side of the garden or in a different spot to avoid interference with working.
- Group quickly maturing crops together or plant them between rows of crops that mature later. (Interplanting/Succession)
- Plan the distance between rows according to cultivation methods. No sense in planting if you can’t get between the rows!

Pest Control/Prevention

- Dispose of crop residue (leftovers)
- Rotate Crops
- Use “treated” seeds
- Use “resistant” varieties
- Purchase healthy transplants
- Use limited chemicals if necessary

Vegetable Classification

- The part that you eat
  - Root Crops- carrots, onions, radishes, turnips, parsnips, rutabaga
  - Green part (stems, flowers, leaves, immature fruits) – lettuce, cabbage, greens, broccoli, okra, asparagus
  - Fruits and berries – tomatoes, peppers, eggplant, squash, melons, corn

The Wonderful World of Vegetables

Patrick Byers
Regional Horticulture Specialist
University of Missouri Extension
Vegetable Classification

• Season of production
  – Cool season
    • Spring
    • Fall
  – Warm season
    • Summer

Vegetable Classification

• Life cycle
  – Perennial
  – Annual

Vegetable Classification

• Family relationships
  – Cole crops - broccoli, cauliflower, cabbage, brussel sprouts, kale, collards, radish, turnip
  – Alliums – onion, garlic, leek, shallot
  – Legumes- peas, beans
  – Vine Crops- pumpkins, squash, melons, cucumbers
  – Solanaceous crops – tomato, potato, eggplant, pepper
  – Other- lettuces, sweet potato, corn, okra, asparagus, rhubarb

Cole Crops

• All members of the mustard family, Brassicaceae, and of the genus/species Brassica oleracea L.
  – B. oleracea var. capitata: cabbage
  – B. oleracea var. botrytis: broccoli, cauliflower
  – B. oleracea var. caulo-rapa: kohlrabi
  – B. oleracea var. gemmifera: brussels sprouts
  – B. oleracea var. acephala: collards, kale

Cabbage

• Cabbage types
  – Green
  – Red
  – Savoy

Broccoli, Cauliflower, Brussel Sprouts, Kohlrabi
Leafy Cole Crops
- Kale
- Collards
- Bok choy
- Mustard

Root Cole Crops
- Radish
- Turnip
- Rutabaga

Cole Crops
- Culture
  - Most are cool season crops, doing best in temperatures of 60-65°F; grow for spring or fall crops
  - Most will not tolerate hot temperatures – bolt, develop strong flavors, refuse to develop

Legumes
- English peas
  - Standard peas
  - Edible pod peas

Legumes
- Green beans
  - Bush beans
  - Pole or vine beans
  - Green, yellow, purple
**Legumes**

- Southern peas
  - Black eyed peas
  - Purple hull peas

- Many different types of seed beans!
  - Lima
  - Navy
  - Kidney

**Legumes**

- Culture
  - Warm season (green beans, beans, southern peas) and cool season (English peas)
  - Usually direct seeded
  - Harvest before seed is mature (green beans, English peas, southern peas) or when seed is mature and dry (beans)

**Alliums**

- Bulb onions
  - White
  - Red
  - Yellow
  - Shallots

**Alliums**

- Garlic
  - Soft neck
  - Hard neck
  - Elephant garlic

- Bunching onions
- Leeks
- Chives
### Alliums
- Cool season crops
- Most are grown from sets (small plants) or bulbs
- Often planted in spring for harvest in summer and fall (garlic is exception, planted in fall)
- General culture
  - Well drained soil
  - pH 5.5-7.0
- Challenges
  - Bulb rots
  - Bulbs that don’t keep

### Root Crops
- Carrot
- Parsnip
- Salsify
- Beet

### Root Crops
- Culture
  - Most are cool season crops; optimum temperature: 60-70° F
  - Most are direct seeded
  - Most do best in lighter soils
  - Harvest when large enough to eat

### Greens
- Lettuce (many types)
  - Leaf lettuce
  - Head lettuce
- Specialty greens

### Greens
- Chard
- Spinach

### Greens
- Culture
  - Most are cool season crops
  - Usually direct seeded; sometimes transplants are used
  - Shallow rooted and fast growing
  - Preferred pH 6.0-6.8
  - Grows best when temperatures are between 65-75°F during day & 40-45°F at night
- Challenges
  - Bolting (premature flowering) can be a problem
Asparagus

- Culture
  - Perennial cool season vegetable
  - Deep rooted
  - Direct seeding is not recommended; plantcrowns; greenhouse grown transplants can be used
  - Male cultivars are superior

Rhubarb

- Types of rhubarb
  - Red stalks
  - Green stalks

- Culture
  - Cool-season perennial
  - Leaf blades contain a toxin called oxalic acid and are not edible!
  - Prefers well-drained soil & high organic matter
  - Can be grown from seed, but best to plant crowns
  - Fall is the best time to divide

Vine Crops

- Squash
  - Summer
  - Winter
- Pumpkin
- Melon
  - Cantaloupe
  - Watermelon
- Cucumber
- Gourd

- Culture
  - Warm season crops
  - Usually direct seeded (can use transplants for earlier crop)
  - Often planted in hills
  - Vine types and bush types
  - Harvest at proper time

- Challenges
  - Insect pests
  - Diseases
Tomato

- Fruit characteristics
  - Color
  - Use
  - Heirloom vs standard

Pepper

- Fruit characteristics
  - Bell peppers
  - Banana peppers
  - Hot peppers

Eggplant (Aubergine)

- Fruit characteristics
  - Oval
  - Asian
  - Fruit colors
    - Purple
    - White
    - Striped

Tomato, Pepper, Eggplant

- Culture
  - Warm season crops
  - Often started from transplants
  - Optimum temperature: 65-85° F
    - 65° nights are ideal
    - Temps >90° affect fruit set
    - Fruit ripening: temps >85° inhibits lycopene (red pigment in tomatoes)
  - Trellis or stake tomato plants to increase garden space and produce better crops.
  - Harvest when fruit is fully developed
- Challenges – diseases, insects

Potato

- Tuber characteristics
  - Harvest season – early, midseason, late
  - Flesh color

- Intended use
  - Baking
  - Boiling
  - General purpose
  - Storage

Potato

- Culture
  - Cool season crop
  - Plant from tubers or parts of tubers
  - Plant mid-March through April
  - Excessive nitrogen delays tuber formation
  - Can dig for new potatoes when flowers form
  - Allow vines to die back before digging for storage
- Challenges – Colorado potato beetle
**Sweet Corn**
- Types of sweet corn
  - s series cultivars (standard)
  - se series cultivars (sugar enhanced)
  - sh2 series cultivars (super sweet)
  - Yellow, bicolor, and white

**Dried Corn**
- Popcorn
- Ornamental corn

**Sweet Corn**
- Culture
  - Warm season crop
  - Usually direct seeded
  - Plant enough to allow for pollination
  - Optimum temperature: 56-86°F
  - Needs plenty of nitrogen
  - Moisture is critical during silking & ear dev.
  - Preferred pH: 6.0-6.5
  - Harvest when kernels are developed but before starchy taste (sweet corn) or after the ears have dried (dry corn)
- Challenges – corn earworm

**Sweet Potato**
- Culture
  - Warm-season crop; very cold-sensitive
  - Plant slips – shoots that grow from the root
  - Optimum temperature: 70-85
  - Optimum pH: 5.8-6.0
  - Grow in raised beds to avoid poor yields
  - Harvest before frost, or cut off frosted vines

**Okra**
- Culture
  - Warm season crop
  - Harvest pods when small

**Herbs**
- Mint family (Lamiaceae)
  - Spearmint, peppermint, other mints
  - Basil
  - Rosemary
  - Lavender
  - Thyme
  - Sage
  - Marjoram, oregano
**Herbs**

- Carrot family (Apiaceae)
  - Parsley
  - Dill
  - Anise
  - Caraway
  - Cilantro

**Time for a Break!**

**The Winter Vegetable Garden**

Patrick Byers
Regional Horticulture Specialist
University of Missouri Extension

**Outline**

- Introduction
- Extending the season with garden structures
- Cool season vegetables

**Introduction**

- Keys to success
  - Select your site very carefully
  - Select the most cold tolerant crops
  - Cover your crops

- Winter vegetable gardening has been successful in Maine and France at 44th parallel
- Missouri is located on the 38th parallel, and gets as much winter sun as Spain, southern Italy, Greece, or Turkey
Introduction

- Choosing a site
  - South facing sites are preferred
  - A slope to the south is good
  - Prevent wind chill if possible, especially from the north
    - Hedges, windbreaks
    - Fences or walls
  - Avoid low lying areas where cold air sinks
  - Locate near a heat sink source – patio, stone wall, brick wall
  - Shady summer sites may have enough sun during the winter – fallen leaves, different sun angle

- Hedges, windbreaks
- Fences or walls

Introduction

- Grow winter crops to harvestable size by mid/late fall
- Plant more than you think you need
- Crops grow very little in the winter months December-January
- February – crops will start to grow again
- Crops may be held at harvestable size for many months with protection

Plant Covers

- Plant covers work by:
  - Trapping the sun’s heat during the day
  - Trapping heat in the ground at night
  - Additional heat sinks (walls, insulation) provide additional heat
- Minimal water needs during the winter
- Minimal pest pressure during the winter

What temperatures can I expect in my protective structures?

<table>
<thead>
<tr>
<th>Outside</th>
<th>Cold Frame</th>
<th>Tunnel</th>
<th>Double Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>-10</td>
<td>4</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>0</td>
<td>14</td>
<td>11</td>
<td>25</td>
</tr>
<tr>
<td>18</td>
<td>28</td>
<td>24</td>
<td>36</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sunny day</th>
<th>Outside</th>
<th>Cold Frame</th>
<th>Tunnel</th>
<th>Double Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
<td>60</td>
<td>42</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>75</td>
<td>60</td>
<td>85</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cloudy day</th>
<th>Outside</th>
<th>Cold Frame</th>
<th>Tunnel</th>
<th>Double Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>45</td>
<td>45</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

High Tunnels

- High tunnels are larger version of low tunnels made with a poly-cover
- Require a rigid frame
- With a greater ground cover and volume of air keep in more heat
- Able to get into on very cold days if a door is built
- Harvest during the day when temperatures are not freezing
Plant Covers

- **High tunnels**
  - Use poly cover
  - Rigid frame
  - Keeps in more heat
  - Can enter on cold days
  - Harvest during the day when temps are above freezing

- **Cold frames, hotbeds**
  - Location is important
  - Frame will stay closed most of the time
  - Harvest during the day when temps are above freezing

- **Low tunnels**
  - Use poly covers or row covers (consider 2 layers)
  - Harvest during the day when temps are above freezing

Low Tunnel Construction
(For a 2' wide by 18' long planting bed)

- Cut ten, 3 ft. long pieces of 1/2 in. pvc water pipe into 8 ft. long pieces and slide them over the rows to make the boxes.
- Connect the boxes at the top with stretchy chicken wire and along each side with some nylon tape.
- Cut and drape a piece of 22 ft. long x 10 ft. wide row cover over the frame, and secure it to the ground with rock pins, bricks or boards.

The Low Tunnel in Fall - Winter

- Plant your fall crop in the open or under shade cloth
- Once temperatures drop below ideal, install the low tunnel
- Keep the low tunnel installed till maturity
- 2-3 degrees of frost protection, depending on thickness
- May need to vent on warmer days

Good for any fall crop that need more time to mature or to keep summer crops producing longer
Plant Covers

- Passive solar greenhouse

http://bradford.cafnr.org/search/passive+solar+greenhouse

Plant Covers

- Row covers
  - Single or double layers of polypropylene

Germination/Growing Temperatures

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Parsnip</td>
<td>35°F</td>
<td>50-70°F</td>
<td>40-75°F</td>
<td>60-65°F</td>
<td>5°F</td>
</tr>
<tr>
<td>Arugula</td>
<td>35°F</td>
<td>45-70°F</td>
<td>40-75°F</td>
<td>60-70°F</td>
<td>5°F</td>
</tr>
<tr>
<td>Spinach</td>
<td>35°F</td>
<td>45-75°F</td>
<td>40-75°F</td>
<td>60-65°F</td>
<td>5°F</td>
</tr>
<tr>
<td>Cabbage</td>
<td>40°F</td>
<td>45-90°F</td>
<td>40-75°F</td>
<td>60-65°F</td>
<td>22-24°F</td>
</tr>
<tr>
<td>Beet/Chard</td>
<td>40°F</td>
<td>50-80°F</td>
<td>40-75°F</td>
<td>60-65°F</td>
<td>15-25°F</td>
</tr>
<tr>
<td>Lettuce</td>
<td>35°F</td>
<td>40-80°F</td>
<td>45-75°F</td>
<td>60-65°F</td>
<td>10-25°F</td>
</tr>
<tr>
<td>Pea</td>
<td>40°F</td>
<td>50-75°F</td>
<td>40-75°F</td>
<td>60-65°F</td>
<td>18-25°F</td>
</tr>
<tr>
<td>Cucumber</td>
<td>60°F</td>
<td>50-90°F</td>
<td>60-90°F</td>
<td>65-75°F</td>
<td>30°F</td>
</tr>
<tr>
<td>Eggplant</td>
<td>32°F</td>
<td>70-90°F</td>
<td>65-95°F</td>
<td>70-95°F</td>
<td>30°F</td>
</tr>
<tr>
<td>Tomato</td>
<td>50°F</td>
<td>60-85°F</td>
<td>65-85°F</td>
<td>70-75°F</td>
<td>30°F</td>
</tr>
</tbody>
</table>

Cool Season Vegetables

- Characteristics of cool season vegetables
  - Optimum germination and growth occurs during cool temperatures
  - Ability to tolerate light frosts, or even hard freezes with protection
  - Poor growth during periods of hot temperatures
  - Some crops require cool weather to establish, but are generally not planted for fall/winter gardens
    - Onions and potatoes

Cool Season Vegetables

- Cool season vegetables
  - Root crops - Radishes, turnip, rutabaga, carrots
  - Garden or English peas
  - Lettuce, spinach, chard
  - Cole crops

Root Cole Crops

- Radish
- Turnip
- Rutabaga
Root Crops
- Carrot
- Parsnip
- Salsify
- Beet

Greens
- Lettuce (many types)
  - Leaf lettuce
  - Head lettuce
- Specialty greens

Very Hardy Greens
- Arugula (Radicchio, Italian Chicory)
- Green Chives (Italian Dandelion)
- Claytonia (Miners Lettuce)
- Endive (Frisée)
- Dandelion
- Escarole (Batavian Endive, Batavia, Scarola)

Greens
- Chard
- Spinach

Kale
- Lacinato kale
- Russian kale
- Siberian kale
- Curly kale
**Its All About Scheduling**

<table>
<thead>
<tr>
<th>Vegetable</th>
<th>Planting Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>kohlrabi – winter</td>
<td>1-Jul</td>
</tr>
<tr>
<td>kale – winter</td>
<td>5-Jul</td>
</tr>
<tr>
<td>carrots – winter</td>
<td>15-Jul</td>
</tr>
<tr>
<td>kale – winter</td>
<td>20-Jul</td>
</tr>
<tr>
<td>chard – winter</td>
<td>1-Aug</td>
</tr>
<tr>
<td>lettuce – winter</td>
<td>1-Aug</td>
</tr>
<tr>
<td>lettuce – winter</td>
<td>20-Aug</td>
</tr>
<tr>
<td>pak choi</td>
<td>20-Aug</td>
</tr>
<tr>
<td>beets – winter</td>
<td>1-Sep</td>
</tr>
<tr>
<td>spinach</td>
<td>1-Sep</td>
</tr>
</tbody>
</table>

**Managing Row Covers in Winter**

- Have hoops in place in October
- Cover plants with row cover when temperatures drop below freezing
  - One layer for temperatures between 20 – 30°F
  - Two layers for temperatures below 20°F
  - Remove row covers when temperatures are above 30°F

**Storing Fresh Vegetables**

- Important considerations
  - Temperature
  - Relative humidity
- Cool and humid – root crops, potato
- Cool and dry – onion, dried vegetables
- Warm and humid – sweet potato
- Warm and dry – winter squash, garlic, pumpkin
Putting Vegetables By

- Freezing
  - Quick and easy
  - Preserves flavor and nutrition
  - Blanching may be needed
  - Expensive
  - What happens if you lose power?

- Canning
  - Great for long term storage
  - Must be done properly to ensure safety
  - Changes to flavor and some loss of nutrients/vitamins

- Drying
  - Dehydrator (or other energy source)
  - Finished product does not take up much space
- Pickling, fermenting

References

MU Guides on vegetable gardening
- G6203, Vegetable Planting Calendar
- G6203, Disease Prevention in Home Vegetable Gardens
- G6203, Common Diseases in the Home Garden
- G6204, Managing Nematodes in Gardens
- G6226, Vegetable Harvest and Storage
- G6400, Frequently Asked Vegetable Questions
- G6461, Growing Home Garden Tomatoes
- G6470, Growing Herbs at Home
- G6965, Building and Using Hotbeds and Cold Frames
- G6985, Raised Bed Gardening
- M563, Managing Insect Pests in the Home Vegetable Garden
- PS9, Common Vegetable Insects

MU Guides on vegetable preservation
- GH1454, Quality for Keeps: Preserve Your Garden Delights — How to Can Fresh Fruits
- GH1455, Quality for Keeps: Fruitable Canning
- GH1456, Quality for Keeps: Tantalizing Tomatoes — How to Can Fresh Tomato Preserves
- GH1457, Quality for Keeps: Pickling Basics — In a Pickle
- GH1459, Quality for Keeps: Pick a Pickled Product
- GH1501, Quality for Keeps: Freezing Basics
- GH1502, Quality for Keeps: Freezing Fruits
- GH1503, Quality for Keeps: Freezing Vegetables
- GH1507, Quality for Keeps: Freezing Unusual Fruits and Vegetables
- GH1512, Quality for Keeps: Drying Foods
- GH1553, Quality for Keeps: How to Dry Foods at Home
- GH1564, Quality for Keeps: How to Use Dried Foods
- MP562, Home Storage of Fruits and Vegetables in Root Cellars
- MP590, Complete Guide to Home Canning
Any Questions?

[Image of assorted vegetables]