Vegetable Gardening Class

Colorado State University Extension

COLORADO MASTER GARDENER℠

May 7, 2016

- What grows well here and how to do it.
- Maintenance of the Vegetable Garden
- Harvesting and Preservation

Types of Seed

- **Open pollinated (OP)**: a plant that is pollinated by wind, insects, birds or other natural methods.
  - Has the most genetic diversity.
  - Second generation seeds are "true to type"
- **Heirloom** : An open pollinated variety that has been around for at least 50 or more years

Types of Seed

- **Hybrid (F1)** : a plant that has been intentionally pollinated from two different parent plants to yield particular traits such as flower color, vigor or disease resistance.
  - Second generation seeds are not "true to type"
- **GMO:** Genetically Modified Organism. These plants are created using high tech methods such as gene splicing.

  Common crops: corn, soy, alphalfa, sugar beets
- **Pelletized:** a seed that has been encapsulated in a coating, usually clay to facilitate planting.
- **Seed Tapes:** seeds that are evenly spaced on biodegradable paper to aid in planting

Reading a seed package

- Year packaged for
- Seed planting and spacing depth
- Plant and row spacing
- Direct seed or transplant recommendations
- Days to germination
- Days to maturity
- When to plant
- Crop Type – Cool vs Warm Season

Factors determining what grows here

Days to Maturity = the number of days under optimal conditions that the crop requires to be harvested.

- Direct seeded crops are usually calculated after germination so be sure to include extra days into your planning!
- Vegetables that are normally transplanted are often calculated from the day of transplanting.
- **Select crop varieties with short days to maturity (50 or less days!).**

When is it time to plant?

An educated guess based on three factors:

- The soil is dry enough to be worked
  - Ball Test
- Soil Temperature
  - Measure soil at 8am (before soil warms in morning sun) with a soil thermometer inserted 4" deep.

When is it time to plant?

- **The last average frost date (LAFD)**
  - The date on which there is a 50% chance of a light freeze (29^0–32^0)
    - Information found online at National Climatic Data Center or Dave's Garden websites
  - June 25 for most of Grand County
  - July 13 is 10% chance of frost

Factors determining what grows here

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Length of growing season

- Based on the last and first average frost dates
  - 64 days for Fraser, Grand Lake, Tabernash and Winter Park (June 25–August 28)
  - 71 days for Granby and Hot Sulphur Springs
  - 82 days for Kremmling

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Direct seeding

Planting Steps for direct seeding

1. Prepare soil by incorporating soil amendments
2. Spacing is dependent on the layout design chosen
   - block, square foot or single row
3. Plant seeds at recommended depth for crop
   - General rule of thumb : plant seeds two times deeper than the size of the seed.
4. Gently cover the seeds up with soil.

Direct seeding

5. Lightly tamp the soil above the seeds - seeds need good soil contact for germination.
6. Mark the area with a label.
7. Water the soil with a light mist or gentle rain nozzle.
8. Make sure the soil stays evenly moist at all times.
9. After the plants have their second set of leaves called "true leaves" (the first leaves are cotyledons), THIN to recommended spacing.

Purchasing plants

Thoroughly inspect plants for purchase:

- Roots should be white and not circling the pot.
- Healthy leaves – green, no yellowing or signs of disease.
- No signs of insects – be sure to check stems and undersides of leaves
- Will need to be hardened off (acclimated to the outdoor environment) if coming directly from an indoor environment or greenhouse

Transplanting

1. Make sure the transplant has been properly hardened off and the plant is well watered.
2. Try to transplant on a cloudy, windless mild day to lessen transplant shock. Late afternoon is also a good time to transplant.
3. Dig a hole as deep as the transplant's soil line and twice as wide in previously prepared garden soil.
4. Gently remove the container of the transplant.
5. Check the condition of the root ball. If there are roots that circle the pot, gently break them up with your hands, trowel or pruners. Try to minimize damage to the overall root ball.

Transplanting

6. Place the plant into the hole. Be sure that the top of the soil line of the transplant matches the depth of the planting hole.
7. Gently fill soil around the base of the plant & carefully tamp soil.
8. Water the transplanted plant to minimize air and soil voids.
9. Check and water accordingly the new transplant the first week or two as the plant becomes established.

Crop Type:

Cool Season Crops:

- A cool season crop is defined as a vegetable that grows best with temperatures of 60 to 80 degrees.
- Cool-season crops can tolerate light to moderate frosts.
- Are intolerant of high summer temperatures.

Warm Season Crops

- A warm season crop is defined as a vegetable that will grow with temperatures above 55 degrees.
- They prefer daytime temperatures between 70-95 degrees.
- Warm season crops can NOT tolerate frost.
- They are also sensitive to cool winds.

Warm Season Crops

Tender Vegetables

- Require daytime temperatures above 55^0
- Can NOT tolerate frost. Will need protection.
- Can be transplanted after the last average spring frost date.
- Consider the length of the growing season and days to maturity when selecting these crops.

Examples:

Beans
Celery
Cucumbers
Summer Squash –
Zucchini and Yellow

What vegetables can I grow?

Very Tender Vegetables

- A warm season crops that requires daytime temperatures above 60 degrees and prefer temps that are between 70 and 95.
- These vegetables can NOT tolerate frost or cool winds.
- Can be transplanted after the last average spring frost date.
- Consider the length of the growing season and days to maturity when selecting these crops.
- Examples: Eggplant, Peppers, Melons, TOMATOES

Cool Season Crops

Hardy Vegetables

- Can grow with temperatures as low as 40 degrees
- Can survive a hard frost (25 to 28 degrees).
- Can be planted as early as 2-4 weeks before the last average spring frost date.

Examples: Onions
Radish
Lettuce
Spinach
Peas
Turnips
Cole Crops – Broccoli, Cabbage, Kohlrabi, Kale, Brussels Sprouts

Cool Season Crops

Semi-Hardy Vegetables

- Can grow with minimum daytime temperatures between 40-50 degrees.
- Can tolerate light frost (29 to 32 degrees).
- Can be planted after the last average spring frost date or up to 2 weeks prior.

Examples:

Beets
Carrots
Cauliflower
Parsley
Parsnips
Potatoes
Swiss Chard
Pac & Bok Choi

What vegetables can I grow?

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Perennial Vegetables

Asparagus

- Requires extra soil preparations – 4 inches of organic material incorporated to a depth of 12 inches.
- Also needs a minimum of 3 years growth before harvesting!

Horse radish

- Easy to grow, but can become invasive.

Rhubarb

- Easy to grow, takes a few seasons before it is ready to harvest

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What herbs can I grow?

Perennial Herbs

Chives
Garlic
French Tarragon
Mint
Parsley
Sage
Winter Savory
Thyme

What herbs can I grow?

Annual Herbs

Basil (frost tender)
Cilantro / Coriander
Dill
Fennel
Greek Oregano
Summer Savory
Rosemary

What vegetables can I grow?

Lettuce and Greens (Hardy)

- Direct seed 2 – 4 weeks before LAFD and soil temperatures are above 35^0
- Can also be transplanted 3-4 weeks before LAFD
- 30 – 60 days to harvest
  - Can harvest as "baby lettuce" or full sized heads by either cutting the plant to 3" or picking individual leaves & it will grow back.
- Will turn bitter and bolt (flower) when temperatures are hot.

What vegetables can I grow?

Spinach (Hardy)

- Direct seed 4-6 weeks before LAFD and soil temperatures are above 40^0
- 30-45 days to harvest
  - Can harvest as "baby spinach" or full sized by either cutting the leaves to the base or picking individual leaves & it may grow back.
- Will turn bitter and bolt (flower) when temperatures are hot.
- Can also be planted in fall for a spring crop

What vegetables can I grow?

Radish (Hardy)

- Direct seed 2-4 weeks before LAFD and when soil temperature is above 40^0
- Very fast growing, 25-30 days to harvest
- Harvest before it becomes too spicy and woody
- Flea beetles can be a problem but doesn't effect roots. Can be a beneficial as a trap crop

What vegetables can I grow?

Peas (Hardy)

- Direct seed 4-6 weeks before LAFD and soil temperature is above 40^0
- 60 days to harvest
- Use of inoculant improves yields
  - Legumes can make soil nitrogen available
- Presoaking seeds can aid germination
- Shelling, Snow and edible pod (Sugar Snap) varieties available
- Most varieties need trellising

What vegetables can I grow?

Cole (Brassica) Crops –

Broccoli & Brussels Sprouts (Hardy)

- Transplant 2 – 4 weeks before LAFD and soil temperature are above 40^0
- 100 days to harvest for Brussels Sprouts
  - Aphids are a problem
- 60 days to harvest after planting for Broccoli
  - Choose broccoli varieties with good side shoot production
    - Cabbage loopers can be a problem, cover with floating row cover / insect barrier

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What vegetables can I grow?

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Cole (Brassica) Crops –

Kohlrabi and Cabbage (Hardy)

- Transplant 2 – 4 weeks before LAFD & soil temperatures are above 40^0
- 35 days to harvest after transplanting for Kohlrabi
- 60 days to harvest if Kohlrabi is direct seeded (4-6 weeks)
- 70 days to harvest for transplanted Cabbage

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What vegetables can I grow?

Cole (Brassica) Crops –

Kale(Hardy)

- Direct seed 2-4 weeks before LAFD & soil temperatures are above 40^0
- Can also be transplanted 4 weeks before LAFD
- 30 days to harvest baby leaf or 50 days to mature
- Leaves may turn tough and bitter when it's hot
- Light frost improves the flavor

What vegetables can I grow?

Cole (Brassica) Crops –

Cauliflower, Bok/Pak Choi (Semi – Hardy)

- Transplant 2 weeks before LAFD & soil temperatures are above 40^0
- 65 days to harvest for Cauliflower
- 45 days to harvest for Bok/Pak Choi from transplant
- Bok/Pak Choi can be direct seeded 2 – 4 weeks before LAFD

What vegetables can I grow?

Swiss Chard (Semi – Hardy)

- Direct seed 2-3 weeks before LAFD & soil temperature is above 40^0
- Can also be transplanted 2 weeks before LAFD
- Presoaking the seeds aid germination
- 30 days to harvest baby leaf or 60 days to mature
- Some heat tolerance
- Flea Beetles can be a problem

What vegetables can I grow?

Carrot

- Direct seed 2 weeks before LAFD & soil temperatures is above 40^0
- 60- 70 days to harvest (early varieties)
  - Choose varieties with short days to maturity
- Has special needs to produce a successful crop-
  - Soil must be loose, free of soil clumps & rocks
  - Seeds have trouble breaking through soil crusts

What vegetables can I grow?

Potatoes (Semi – Hardy)

- Plant 2 weeks before LAFD
- Use certified "seed", early season varieties

To plant:

- Cut potato into at least 2" pieces containing 1or more "eyes"
- Allow to scab over if time allows
- Dig a trench 6"-12" deep
- Plant potato in bottom of trench & cover with 2" – 4" of soil

What vegetables can I grow?

Potatoes

- As potato grows, fill in trench gradually leaving 4-6" of the plant exposed
- When the trench is filled, "hill" (mound) soil around the base of the potato plant
- Can harvest "new" potatoes 8 weeks after planting
- Harvest main crop of potatoes 2 weeks after the plant dies back to allow the skin to toughen up.

What vegetables can I grow?

Other crops that grow here:

- Beets
- Turnips
- Parsnips
- Onions
  - 'Sets' of long day varieties
  - Scallions

Tomatoes

- Are NOT frost tolerant
- Requires daytime temperatures at least 60^0
  - Plant growth will be stunted with temperatures below 55^0 for a week
  - Pollen will not develop at night time temperatures below 55^0
- Must be protected –

  Greenhouse, hoop house, frost cover or plastic over tomato cage, wall of water

  Or brought indoors when temperatures are cool

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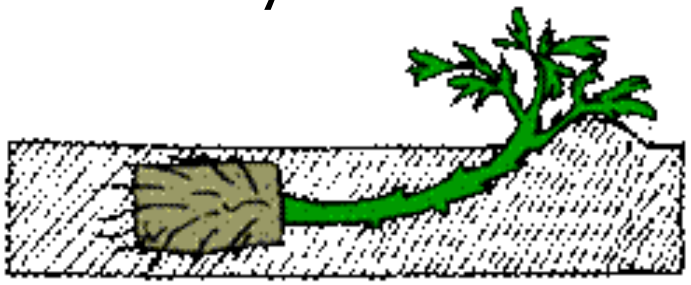
Tomatoes

- Choose varieties with shortest days to maturity
- Avoid water on the leaves
- Can develop roots along the stems –
  - Remove lower leaves
  - Plant deeply, just leaving the top leaves exposed
  - Plant horizontally



Questions?

10 Minute Break

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Maintenance of the Vegetable Garden

WATERING THE VEGETABLE GARDEN

An adequate supply of water during the growing season is directly related to produce quality and yields.

Watering Guidelines

- Timing and amount of water needed depends upon:
  - Type of vegetable crop grown
  - Stage of crop development
  - Weather

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WATERING THE VEGETABLE GARDEN

Watering Guidelines

- Check soil moisture regularly with a soil moisture meter.
- Keep soil consistently moist during seed germination.
- Water transplants immediately after planting.

WATERING THE VEGETABLE GARDEN

- Seedlings need more water at shallower depth.
- Larger plants consume more water than seedlings.
- Mature plants need less frequent deeper watering.
- Clay soils hold more water.
- Hot, windy weather increase water demand significantly.
- Over/under watering makes plants vulnerable to insects and disease.
- Moist soil helps protect plants from frost damage

WEEDING THE VEGETABLE GARDEN

In the vegetable garden a WEED is any plant that you did not intentionally sow. Weeds are inevitable.

Problems Caused by Weeds

- Compete with desirable plants for water, nutrients, space and light.
- May act as host or shelter for insects and/or diseases.
- A seed bank will develop if weeds are allowed to drop seeds. Weed seeds can remain viable for years.
- Capable of quick reproduction.

WEEDING THE VEGETABLE GARDEN

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Control Methods

- Pre-sprout weeds in the spring. Moisten soil and cover with clear plastic or cover beds with plastic in the fall.
- Minimize disturbance to the soil once the seed bed is prepared.
- Plant certified weed free seed
- Space plants to shade soil. One benefit of block planting.
- Use mulch where appropriate.
- Be able to differentiate between a vegetable seedling and a weed.

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WEEDING THE VEGETABLE GARDEN

Control Methods

- Hand pull weeds or use small hand tools in the raised bed.
- Weed when the soil is moist.
- Weed early and often. Weeds are easier to remove when small.
- Remove weeds before they produce seeds.
- Cultivate shallowly so as not to bring up more weed seeds.
- Eliminate weeds growing in the vicinity of the garden.
- Do not use herbicides in the vegetable garden.

MANAGING INSECTS IN THE VEGETABLE GARDEN

- Most insects observed in the landscape are causing no harm.
- Learn which insects are beneficial or detrimental in the garden.

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Diagnosing An Insect Problem

- Check plants regularly. Early detection means easier control.
- Identify the plant affected. Pests are usually crop-specific.
- Identify the signs and symptoms - type and extent of damage to leaves, stems, flowers, fruit or roots. Use a hand lens.
- Identify the insect using these signs and symptoms. Easiest if insect is present.
- Evaluate if management efforts are warranted. Determine how much damage is acceptable to you.
- Evaluate management options effective for this insect.

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Management Options

- Plant resistant varieties and pest-free materials.
- Apply proper water and nutrients.
- Space plants appropriately.
- Diversify plantings. Interplant unrelated plants.
- Remove weeds and other hiding places.
- Remove infested plants

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Management Options

- Use row covers, traps or barriers, such as plant collars.
- Hose insects off the plants.
- Hand pick insects off plants, drown in soapy water.
- Protect and encourage beneficial insects, birds and bats.
- Plant host plants for beneficial insects.
- Import and release beneficial insects.

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Management Options

- **Use chemicals as a last resort.** Avoid unwarranted use.
- Research and use the appropriate product for the identified insect.
  - Can kill beneficial insects.
- Use a product labeled for edible crops.
- Read the label. Apply correctly and carefully.
- Always spot treat.
- Avoid blanket spraying.

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MANAGING DISEASES IN THE VEGETABLE GARDEN

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A PLANT DISEASE is an abnormal growth and/or dysfunction of a plant.

Diseases are the result of some disturbance in the normal life process of a plant.

Biotic diseases are caused by living organisms such as fungi, bacteria and viruses. In Colorado's dry climate, fungi are most common causes of plant disease. Powdery mildew most common

Abiotic diseases are caused by non-living environmental conditions, such as too much or too little water, weather, temperatures and salts.

Diagnosing and controlling plant diseases are generally the same process as for insects

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Open Forum Questions

Questions?

For more information:

Websites: www.ext.colostate.edu
www.cmg.colostate.edu
www.grandcommunitygardens.org

For Further Questions contact the Grand County CSU Extension Office
970-724-3436

Questions will be answered or referred to Master Gardener in your Community.