# Planting a Fall Vegetable Garden

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NC State University
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COOPERATIVE EXTENSION
Empowering People · Providing Solutions

# Planting a Fall Vegetable Garden

**Fall crops**

- Planting seasons
- Seed or transplants?
- Container gardens
- Successive plantings

**Getting the most the garden**

- Soil preparation
- Fertilizing
- Watering
- Managing pests

# Planting Seasons

## Vegetables

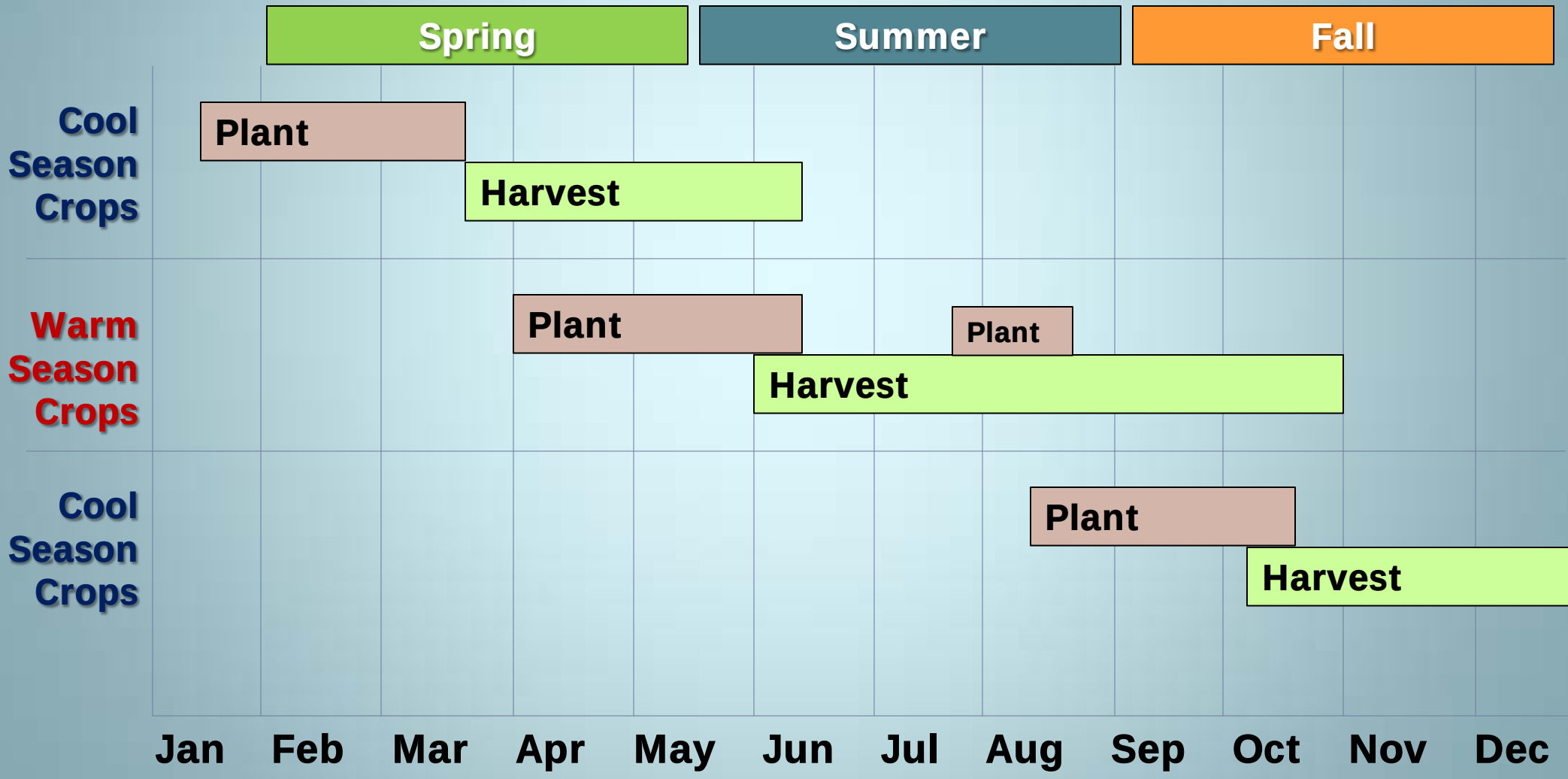
- **Cool season** – fall and spring crops, some live through winter
- **Warm season** – summer crops, do not tolerate frost

## Culinary Herbs

- **Cool season** - parsley, cilantro, dill
- **Warm season** - Basil
- **Perennial -** chives, oregano, thyme, rosemary

Not the same as the produce aisle!

# Planting Seasons



# Starting Vegetables

## Transplants

- Small/young plants
- **Easy** – higher rate of success!
- Good when only need a few plants
- For crops planted as individual plants (cabbage, broccoli, kale)
- Buy in late Aug – Sept.
- Grow your own – start in early August

# Starting Vegetables

## Seed

- Greater variety
- **Sow directly into garden**
  - Some must be seeded – root crops
  - Salad greens patches
  - To grow transplants
- **Sow in containers**
  - To grow transplants
  - To grow in containers
- Most vegetable seed store for years – plastic bag in refrigerator


# How Vegetables are Typically Planted

## Seed Sown Direct

- Radish
- Rutabaga
- Turnips, Mustard
- Carrots
- Beets
- Onions

## As Transplants

- Broccoli, Cauliflower
- Cabbage, Collards
- Kale
- Garlic – cloves

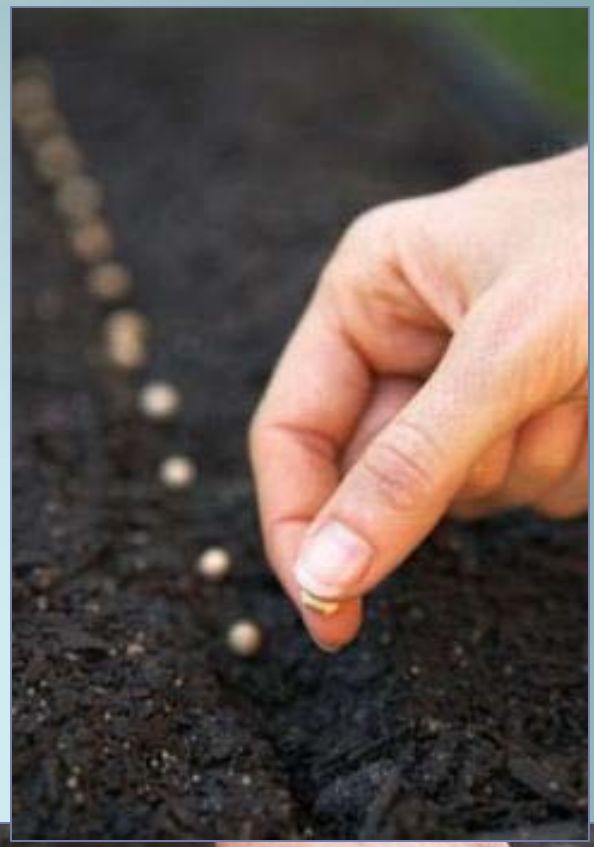
**Both ways:**
lettuce , spinach, Swiss chard
parsley, dill, cilantro

# Sowing Direct

- **Well prepared soil**
- **Keep moist!**

**Options:**

- Sow in place where will grow, thin after seedlings emerge
- Sow and then transplant to permanent location



**Sow carefully or thin to correct spacing**

# Sowing in Containers

**Potting soil**

**Liquid fertilizer**

**Options:**

- Sow in **pot/cell** (peat pot, 4 or 6 pack) then transplant to garden
- **Sow in flat**, transplant to pot/cell to grow on
- **Sow in container** in which they will grow (lettuce, spinach)
- **Outside!**

# Containers

- Most cool season vegetables grow well in containers!
- Larger plants need larger containers!
- For best results use **potting soil** (not garden soil) and **slow release fertilizers**
- Water frequently

# Best Vegetables and Herbs for Containers

## Cool Season

- Lettuce, Spinach
- Cabbage
- Broccoli
- Parsley, Cilantro
- Radish
- Swiss Chard

## Warm Season

- Basil
- Tomatoes
- Squash
- Cucumbers
- Peppers
- Eggplant

**Perennial Herbs**: Chives, Oregano, Thyme, Rosemary, Sage

# Successive Crops

- Sow or plant new crop every 2-3 weeks to extend harvest time
  - Necessary for 1-time harvest crops (eg. cabbage)
  - Not needed for crops with long harvest season (kale, collards)

# Warm Season Crops for Fall

- **Must mature quickly** – less than 60 days
- **Insect and disease pressure will be high**
- Yields reduce as temperatures cool off (mid October)
- Killed by frost

It's not too late to start basil from seed or cuttings. Containers can be brought indoors in winter.

# Cucumbers, Summer Squash & Zucchini

- Harvest in 40-50 days
- **Very easy to grow from seed**
- Sow 2-3 seeds per hill or start in peat pots/4” pots
- Plant 18” apart for squash
- 3’ apart for cucumbers

# Squash Bugs

- Feed on plant – cause wilting
- Look for eggs and adults under leaf and squish
- Spray: Permethrin, Pyrethrin (organic), Neem – nymphs only


# Squash Vine Borer

- Attack squash and zucchini in May/June and August
- **Spray** Pyrethrin or, Neem every 3-5 days, or Permethrin every 7-14 days, August – mid Sept.
- Or cover with light weight row cover until begin blooming

# Downy Mildew

## Cucumbers

- Effects pickling cucumbers more severely
- Late crops often wiped out – very prevalent by mid summer
- Difficult to control
- Spray: copper and chlorothalonil (Daconil)

# Cool Season Vegetables

**Tolerate frost:**

- **Hardy**: tolerate heavy frost (below 28 degrees), can produce through winter
  - Cabbage, kale, collards, carrots
- **Half-hardy**: tolerate light frost (26-28 degrees), usually productive through December – extend season with cold frames or row covers

# Extend Winter Harvest

Cold Frames

Reemay Frost Protection Cloth

# Root Crops

- **Carrots, beets, kohlrabi, rutabaga, radish, turnips**
- **Do not transplant** – almost always sown in place in the garden
- Need sandy, loose, well drained soil for good root development
- Harvest once, must succession sow

Root crops can be grown in containers – carrots need deep pots!

# Radish

- Mature in 25 – 30 days, sow every 7-10 days, Sept. 1 through Oct. 15
- Hot temps, water stress can cause strong flavor and woody texture
- Harvest when 1” in diameter
- **Daikon:** long white radish, takes longer to mature

# Carrots

- Mature in 60-90 days, can leave fall crops in ground through winter
- Sow in place, **slow to germinate**
- Sow August for fall crops
- Sow shallow, keep moist
- Pelleted seed are easier
- Shorter varieties easier

# Beets and Turnips

- Mature in 40-50 days, sow mid Aug. through mid Oct.
- Harvest when size of tennis ball
- **Can also harvest greens** – over harvest of greens reduces root size

# Rutabaga and Kohlrabi

- **Rutabaga**: Mature in 90 days, sow in early to late August
  - Harvest when size of a softball
  - Similar to turnip
- **Kohlrabi**: Mature in 45 days, sow mid August through mid Oct.
  - Edible part is swollen stem above soil level

# Onions and Their Relatives

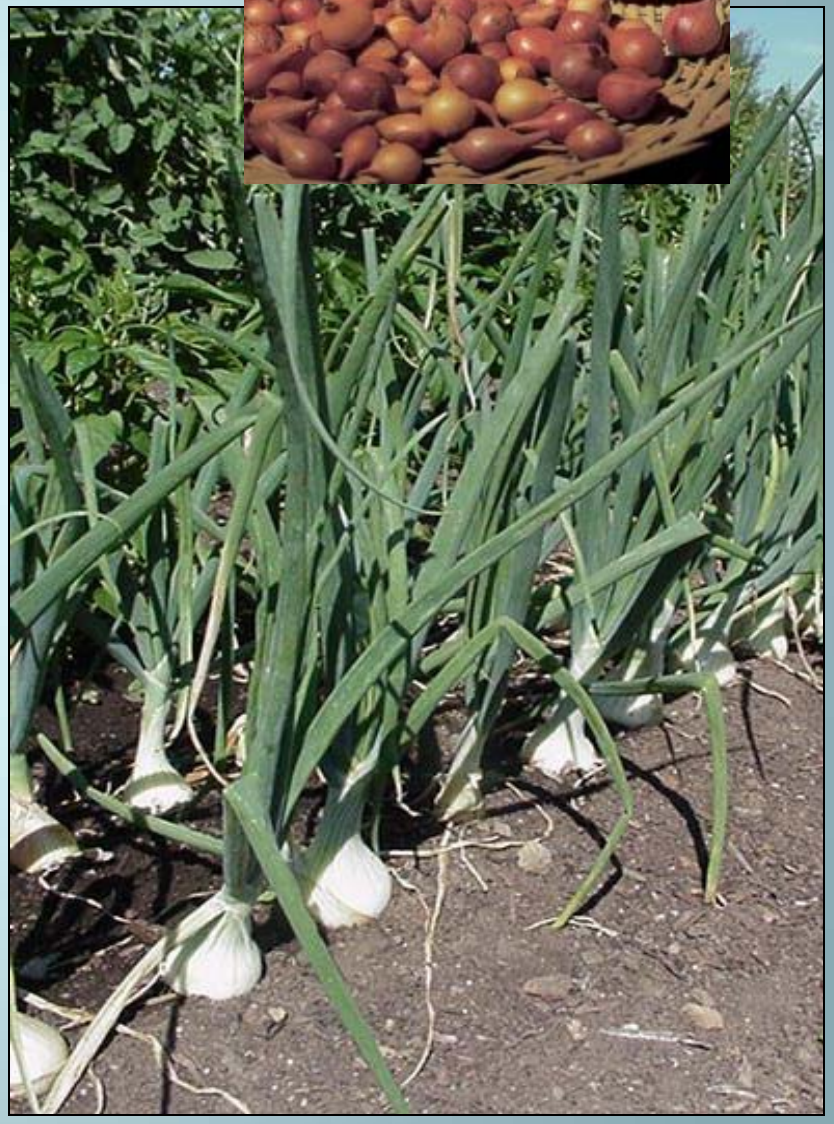
- **Onions, Garlic, Leeks**
- Do best in our area when fall planted!
- Harvested in spring
- **Heavy feeders** – like lots of organic matter and consistent moisture and nutrients
- Need good drainage

Green onions/scallions are very easy to grow – sow August – Sept. Ready to harvest in 50-60 days.

# Onions

- Sow direct in October to harvest in April-May
- Short Day varieties: ‘Grano’, ‘Granex’, ‘Texas Super Sweet’
- Seed usually more successful and cost less than sets
- Thin in Jan to 4” apart for larger bulbs
- Need lots of Nitrogen in spring, but **no sulfur**

Onion Sets



# Garlic

- Plant in Sept/Oct to harvest in late spring
- **Grown from cloves**
- **Soft Neck** varieties grow best in the south – have stronger flavor
- **Elephant garlic** also does well – very large with mild flavor

# Leeks

- Sow August
- **Plant in a shallow trench**
- **Fill soil in around as leeks grow** up to produce long white shanks
- Stays in ground all winter, harvest late winter-spring

# Leafy Greens

- **Lettuce, mustard and turnip greens, chard, spinach**
- Most are quick growing, ready to harvest in 30 to 40 days
- Can be sown direct in wide or single rows
- Lettuce, spinach and chard often available as transplants
- **Multiple harvest**, except head lettuce

Lettuce grown in 18” wide rows

# Mustard and Turnip Greens

- Mature in 35-50 days, sow direct in wide rows Aug – mid Oct.
- Sow new patch every couple of weeks for extended harvest
- Can be grown mixed together or separate
- Some turnip varieties only produce greens – no roots

Mustard leaves have curly edges

Turnip greens are slightly prickly

# Leaf Lettuce

- Mature in 30-50 days, plant late Aug. – mid Sept.
- Do not form dense heads
- **Easiest** lettuce– transplants and seed available
- Many color variations, leaf shapes
- Can plant as single plants or in patches
- Make **successive sowings** every 2 weeks for extended harvest

# Head Lettuce

- **Romaine/Cos** and **Butterhead/Bibb** do well
- **Romaine** mature in 50-60 days, sow late August and Feb
- **Bibb** types mature in 40-50 days, sow late August and Feb-March
- **Iceberg** is finicky in our area

# Other Salad Greens

## Arugula / Roquette

- Matures in 50 days, sow direct in garden late Aug – late Sept
- Pungent, spicy taste

## Mesclun Mixes

- Seed mixes of several types of salad greens, may include lettuce
- Grow in patches like leaf lettuce

# Spinach

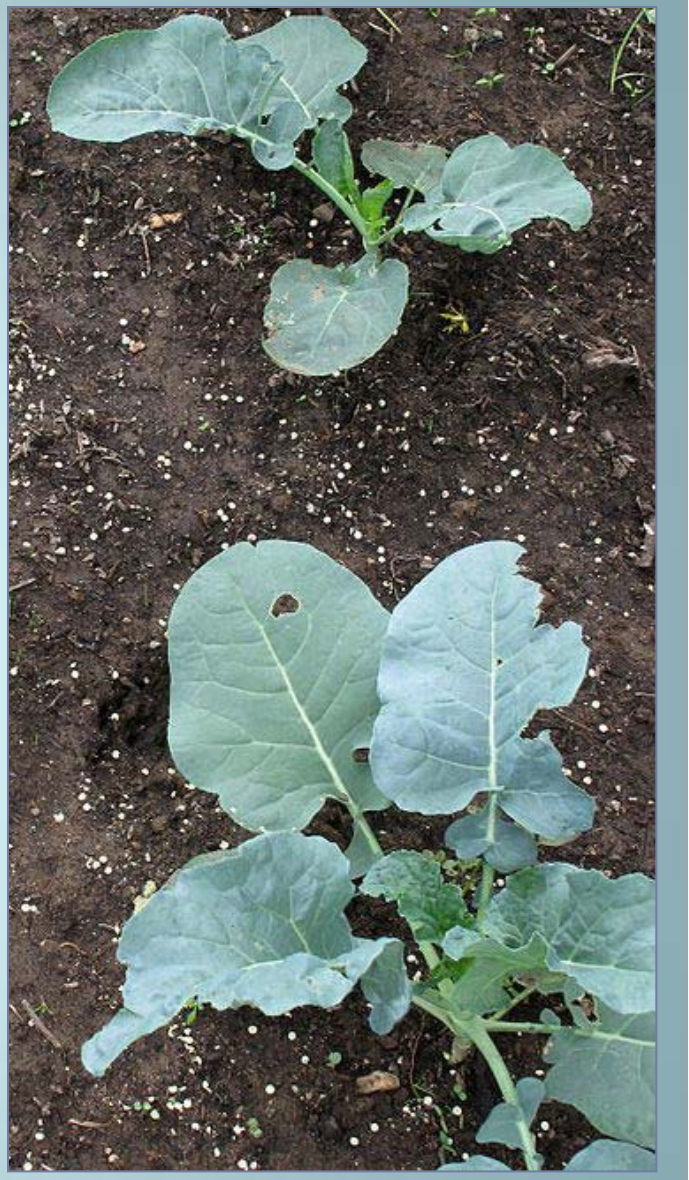
- Matures 30-40 days, sow mid Sept through mid Oct.
- **Need fresh seed**
- Grow in rows or 12” wide beds – sow new rows every couple of weeks
- Root rot and wilt can cause problems

# Swiss Chard

- Mature in 30 days, but can stay in garden all winter
- Sow seed in August or plant transplants in Oct.
- Harvest by picking leaves
- Varieties with colorful mid ribs available

# Crucifers/Cole Crops

- **Broccoli, Cauliflower, Cabbage, Collards, Kale, Brussel Sprouts**
- Slower growing, productive over longer time – many are **winter hardy**
- Can be grown from seed sown in early-mid August
- Or set out as transplants in September
- Large plants, space individual plants 18” to 2’ apart



Give cole crops plenty of space!

# Broccoli and Cauliflower

- Mature in 50-70 days
- Start seed early August, set out transplants mid August – mid September
- **Half hardy** – harvest through Dec.
- **Broccoli** - After harvest main head, **side shoots** will develop
  - Sprouting types/Calabrese – lots of side shoots!
- **Cauliflower** – pull up after harvest, no side shoots
  - **Cauliflower more difficult than broccoli**

# Cabbage

- Mature in 65-90 days
- Sow early Aug. or set out transplants late Aug. – early Sept.
- Consistent moisture and nutrients results in high quality heads
- Most varieties very hardy, can stay in garden through winter
- Pointed/Spring cabbage faster to mature but does not store as well

# Napa/Chinese Cabbage
# Bok Choy/Pac Choi

- Mature in 40-60 days
- Sow early Aug. or set out transplants in late Aug. – early Sept.
- **Less hardy** - harvest before hard frost (28 degrees)
- **Flea beetles** love them! Cover with row cover or spray pyrethrin/permethrin

# Collards and Kale

- Mature in 55-75 days, sow early Aug. or set out transplants early Sept. – early Oct.
- Plant in rows as single plants
- Very cold hardy will produce through winter
- Crop leaves from bottom up
- **Cabbage-Collards** lighter green, more tender leaf

# Kale!

Red Russian

Toscana

Winterbor

# Brussels Sprout

- Mature in 85-110 days, sow seed in early-mid Aug., plant homegrown or purchased transplants in early – mid Sept.
- Harvest in spring
- Very cold hardy

Brussels Sprout plant in fall

# Crucifer Pests: Caterpillars

- Be on the lookout!
- All become moths – can cover with row cover
- **Organic Insecticides**
  - **B.t.** (*Bacillus thuringiensis*)
  - **Spinosad**
  - **Neem** and **Pyrethrin**
- **Synthetic Insecticides**:
  - Sevin (carbaryl)
    malathion, permethrin

# Aphids

- Small soft bodied insects that feed on plant sap
- Populations build up very quickly
- Cause distorted leaves
- Have many natural enemies!
- Control: **Organic -** Horticultural oil, Insecticidal soap, Neem, Pyrethrin
- **Conventional:** malathion, Permethrin

Parasitized Aphids

Turnip Aphids

# Cool Season Annual Herbs

- Sow direct or in containers Aug.-Sept.
- Do not transplant easily
- **Parsley**
  - Hardier – will live through winter
  - Soak seed in water 6-8 hrs.
  - Flat leaf (Italian) and curly leaf types
- **Cilantro** – seed called coriander
- **Dill**

# Caterpillars

- Black swallowtail larva feed on all members of parsley/carrot family
- Handpick – grow perennial fennel as ‘nursery’ crop
- Spray with B.t, spinosad, etc.

# Mediterranean Herbs

**Rosemary and Bay (shrubs)**

**Sage, Oregano and Marjoram**

**Thyme and Lemon Thyme**

- All are perennial
- Require full sun, excellent drainage
- Drought tolerant
- Irrigation and fertilizer lead to disease problems and reduce flavor
- Bay needs sheltered spot

# Other Perennial Herbs

## Chives

*Allium schoenoprasum*

Extremely easy from seed or division. Long lived, self seed. Sun well drained soil, drought tolerant.

## Garlic Chives

*Allium tuberosum*

Taller than chives, same requirements. Self seeds prolifically.

# Mints

All spread extremely vigorously!!

## Spearmint

*Mentha spicata*

Sun to part shade,
moist to average soil.

## Peppermint

*Mentha piperita*

Grow in containers
above ground.

## Pineapple Mint

*Mentha suavolens*
'Variegata'

## Apple Mint

*Mentha suavolens*

# Fennel

- Perennial parsley relative
- Anise flavor
- Sun – light shade, moist to dry soils
- 3’-5’ tall, yellow flowers in summer – attracts beneficials
- **Florence Fennel** is related – forms bulb – sow direct July-August

# Getting the Most from Your Garden

- Preparing the soil
- Soil testing
- Fertilizing
- Watering
- Managing pests
- Cover crops

# Location, Location, Location

- All vegetables need **at least 6 hours of sun** a day!
- All vegetables need **well drained soil**!
- Grow best at **pH 6.0-6.5**

# Raised Beds:

A great way to grow vegetables and herbs!

- Want **at least 8” deep**
- **4’ wide** or less
- **Length** – depends on material used and space available
- Fill with **mix** of soil and compost

# Raised Beds

Trex – recycled plastic $$

Treated or untreated boards

Concrete blocks

# Improve Your Soil with Compost

- **Incorporate into soil each season**!
  - 2”-3” layer, mix in 6”-8” deep
- Improves sandy and clay soils
- Peat moss not as good as **compost**

# Grow Your Own Compost
## Cover Crops and Green Manures

Plant in empty areas, let grow for a season then till into the soil

- **Winter Hardy:**
- **Legumes** – add N to soil: hairy vetch, crimson clover, Austrian winter pea
- **Grains**: oats, wheat, rye
- **Mustard & Rapeseed** – reduce RKN when tilled in
- **Buckwheat** – **not hardy but very quick** – incorporate in 30 days!

**Crimson Clover –** till in before seed set!

# Soil pH

- Changes in pH affect **nutrient availability**
- **6.2 – 6.5** ideal for most vegetables
- Soil testing is the most accurate way to determine pH!
- **Lime** raises, **sulfur** lowers
- **Both high and low pH levels are common in SE NC**

Hydrangeas flower pink in basic soils

And blue in acid soils

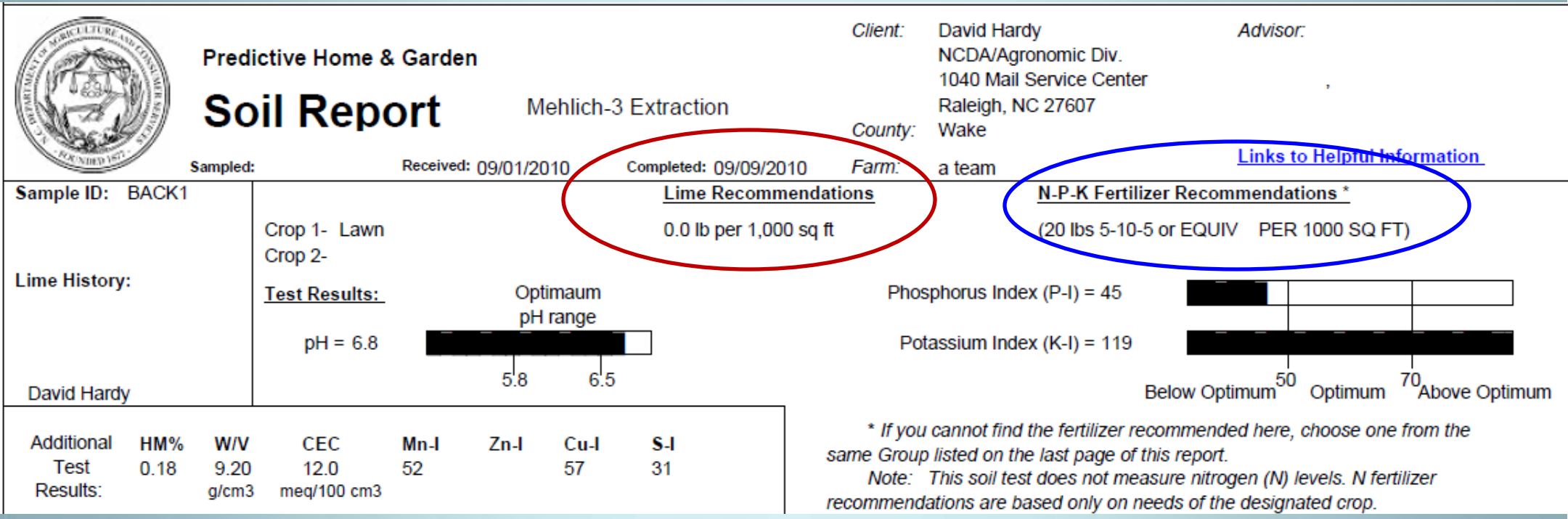
# Soil Testing

- **FREE!**
- Drop off samples at any Extension Office or Pender Pines Nursery
- Sample veg. gardens each year, **any time** of the year, every second year
- Take **4-5 samples** from garden and mix together to fill one box
- **Results posted online** in 3-12 weeks

# Soil Test Results

- Will tell you the **pH** of your soil
  - **If you need to add lime**, and how much
- What **nutrients** are needed and how much of each to add
- **Does not determine:**
  - If diseases or chemicals are present in the soil
  - Drainage problems
  - If organic matter needs to be added

# Soil Test Report: New Format!



Predictive Home & Garden

**Soil Report**

Mehlich-3 Extraction

*Client:* David Hardy
NCDA/Agronomic Div.
1040 Mail Service Center
Raleigh, NC 27607

*Advisor:*

*County:* Wake

*Farm:* a team

Links to Helpful Information

Sampled: Received: 09/01/2010 Completed: 09/09/2010

**Sample ID:** BACK1

**Lime History:**

David Hardy

**Lime Recommendations**

0.0 lb per 1,000 sq ft

**N-P-K Fertilizer Recommendations ***

(20 lbs 5-10-5 or EQUIV PER 1000 SQ FT)

Crop 1- Lawn
Crop 2-

**Test Results:**

pH = 6.8

Optimaum pH range

5.8 6.5

Phosphorus Index (P-I) = 45

Potassium Index (K-I) = 119

Below Optimum 50 Optimum 70 Above Optimum

| Additional Test Results: | HM% | W/V | CEC | Mn-I | Zn-I | Cu-I | S-I |
|---|---|---|---|---|---|---|---|
| | 0.18 | 9.20 g/cm3 | 12.0 meq/100 cm3 | 52 | | 57 | 31 |

** If you cannot find the fertilizer recommended here, choose one from the same Group listed on the last page of this report.*

*Note: This soil test does not measure nitrogen (N) levels. N fertilizer recommendations are based only on needs of the designated crop.*

Reports from 2009 – present available online in new format:

**http://www.ncagr.gov/agronomi/pals/**

# Fertilizer

**N - P - K**

- Apply based on soil test results
- **Nitrogen, Phosporous, Postassium** (N-P-K)
  - **N** = green leafy growth. Fall crops need lots!
  - **P** = roots, flowers, seeds. Important for root crops
  - **K** = makes plants hardier, flavor
  - Can be supplied by natural or synthetic fertilizers
- **Compost** – improves soil, slowly provides some nutrients but usually not enough


# Fertilizers

## Liquid Fertilizers

- ‘Fast Food’ for plants
- Eg. Miracle Grow, compost tea

## Granular Fertilizer

- Dissolve when watered
- Pre-plant and Side-dress
- Eg. 10-10-10


## Slow Release Fertilizer

- Release nutrients over time
- **Recommended for sandy soils!**
- Organic fertilizers
- Time release fertilizers, eg. Osmocote

# Water

- **How often depends on weather and soil**
  - Sandy soils = more often
- Most vegetables require **1” water per week**
  - 3, 1/3” applications in sand
- **Herbs more drought tolerant**
- Avoid wetting leaves

Leaf spot diseases are worse during wet weather or with overhead irrigation.

# Better Ways to Water

Temporary Soaker Hoses

Permanent Drip Lines

# Mulching Vegetable Gardens

- **Reduces weeds and some diseases Conserves water**
- Any biodegradable material, 2”
  - Grass clippings (aged): **No Herbicides!**
  - Newspaper
  - Straw or leaves
- **Till in at end of season**

# Managing Insects and Diseases

- **If you plant it, they will come!!!**
- **Scout** regularly to find problems before they become widespread
- Use **multiple methods** (IPM) to control


# Good Practices to Avoid Pests

- **Start with a good site**
  - Sun and well drained soil
- **Clean up crop debris**
- **Support healthy growth!** Prepare soil, fertilize, water
- **Space plants properly** and **avoid wetting leaves**
- **Rotate Crops** – don't plant related crops in same place year after year

Cabbage, collards, kale, Brussels sprouts, broccoli, cauliflower, turnips, and mustard are all in the same family!

# Handpicking

- **Inspect** plants for egg clusters and insect pests
- Squash or drop them in sudsy water
- Remove diseased leaves early

# Exclusion

Floating row covers can keep flying adult insects from laying eggs on vegetables – e.g. Cabbage whites

# Protect and Encourage Beneficials

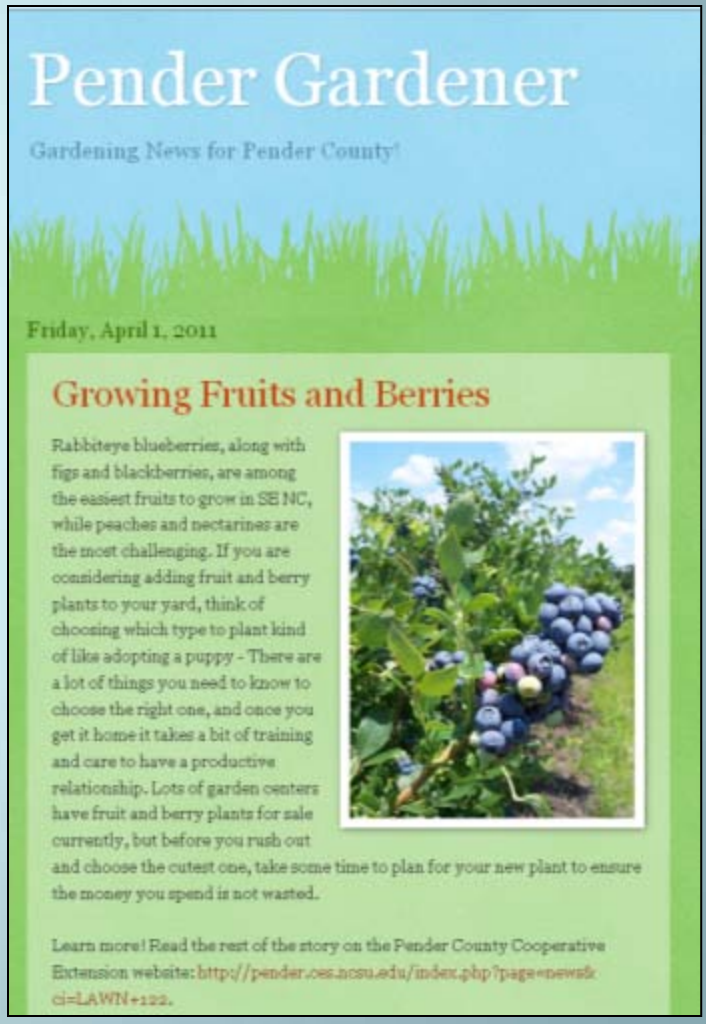
- **Plant flowers** to attract pollinators and beneficial insects
- **Best flowers for beneficials:**
  - Herbs: fennel, dill, cilantro, basil, lemon balm
  - Flowers: purple coneflower, black eyed Susans, Salvias, Asclepias, Zinnia, Yarrow
  - Cover Crops: buckwheat, hairy vetch
- **Minimize use of pesticides**, especially insecticides

**Fennel Flower** - Plants with lots of small flowers attract more beneficials

# Sign Up for Food Gardener Emails

- **When to plant, pest alerts, upcoming classes and more!**
  - **To subscribe**: send an email to **mj2@lists.ncsu.edu**
  - Leave the subject line blank
  - In the body of the message put: **subscribe foodgardener**

- Also posted on the **Pender Gardener Blog**: http://pendergardener.blogspot.com



Pender Gardener

Gardening News for Pender County

Friday, April 1, 2011

Growing Fruits and Berries

Rabbiteye blueberries, along with figs and blackberries, are among the easiest fruits to grow in SE NC, while peaches and nectarines are the most challenging. If you are considering adding fruit and berry plants to your yard, think of choosing which type to plant kind of like adopting a puppy - There are a lot of things you need to know to choose the right one, and once you get it home it takes a bit of training and care to have a productive relationship. Lots of garden centers have fruit and berry plants for sale currently, but before you rush out and choose the cutest one, take some time to plan for your new plant to ensure the money you spend is not wasted.

Learn more! Read the rest of the story on the Pender County Cooperative Extension website: http://pender.ces.ncsu.edu/index.php?page=news&ci=LAWN+122.

# Become a Master Gardener!

- Volunteer program – MG's help with educational outreach
- Training begins late Jan., runs through late March
- Classes meet twice week, at Poplar Grove and Extension office
- Fee: $75-$100
- Volunteer 40 hours within 1 year of completing training

# Pender County Cooperative Extension

801 S. Walker St., Burgaw

259-1235

Visit http://pender.ces.ncsu.edu to submit questions to our 'Ask an Expert' widget

**Pender Gardener Blog:**

http://pendergardener.blogspot.com

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