Course overview

Objectives:
- Build on MGV General Training with in-depth study of cultivation of vegetables in the personal garden
- Reinforce current knowledge of experienced vegetable gardeners
- MGVs will be able to better assist public with vegetable gardening questions
- Community partners will increase knowledge of research-based vegetable gardening practices & increase awareness of UW-Extension resources

Course schedule

Session #1: Introduction and overview
Session #2 & #3: Crop by crop examination
Session #4: Pests and pest management
Insects, diseases, weeds and wildlife

Course materials

- Community Partners
  - “Growing Your Own Vegetables”
  - Summaries of entomology, plant pathology, weeds.
- MG Program Manual
  - Unit 9A: “Vegetables for the Home Garden”
  - Unit 2C: “Organic Gardening”
  - Unit 5: “Entomology” (p. 25 vegetable insect pests)
  - Unit 6: “Plant Pathology”
  - Unit 7: “Weeds & Pest Management”
  - Others: Soils, Composting, etc.

Course materials

- UW-Extension Publications
  - Vegetables section from Handbook for WI Gardeners
  - Plus:
    - “Weed Seedlings for the NC States” (NCR607)
    - “Home Grown Tomatoes: (A1691)
    - “Tomato Physiological Disorders” (A3798)
    - “Tomato Post-Harvest Disorders” (A3799)
    - “Spring/Summer/Fall Vegetables” (new series)

- WI Garden Factsheets (XHT series)
  - “Using Manure in the Garden” (XHT 1143)
  - “Using Produce from Flooded Gardens” (XHT1187)
  - “Extending the Season” (XHT1158)
  - Plus:
    - List of XHT Factsheets on vegetable pests
Course materials

- Articles from WI MG Program Website: (http://wimastergardener.org)
  - “Floating Row Covers”
  - “Heirloom Vegetables”
  - “Refresh Your Vegetable Garden for a Fall Crop”
- Articles from WIMGA Newsletters:
  - “Saving Garden Seeds”

Vegetable gardening references

- “Vegetable Gardening in the Midwest”
  – by Voight and Vandermark (IL Cooperative Extension)
- “The Midwest Fruit & Vegetable Book”
  – by Jim Fizzell (former IL Extension agent in Chgo.)
- “Homegrown Harvest”
  – American Horticultural Society (new Nov. 2010)

Enough about class…

……what about YOU!

Why grow your own?

- Food safety (pesticide free)
- Enjoy gardening
- Satisfying
- Cheaper
- To share with others
- To sell
- Get varieties you can’t buy elsewhere
- Teach children or grandchildren

Why grow your own?

[Image of Barack Obama and Michelle Obama eating carrots]
What about organic gardening?

A definition

- “A sustainable system, based on nature, where plant health is maximized through cultural practices and building the soil; pests are managed by a variety of means, including organic pesticides when needed; and without the addition of synthetic fertilizers.”

In other words...

- Working with nature
- Improving the soil
- Maximizing plant health
- Applying intelligent pest management

Organic gardening concepts about:

- Soils
- Plants
- Fertilizers
- Pest management
  - Pesticides
- Other products

What is a vegetable?

A plant product eaten with the main course of a meal.

What is a vegetable?

A slightly older definition:

“In the physiological sense, a fruit is borne subsequent to inflorescence and upon the flower stem, and is the result of sexual growth, as exemplified in the case of an Apple, Tomato, Egg-Plant, Melon and Pea or Bean...”
What is a vegetable?

“A culinary Vegetable, on the other hand, is a portion of the plant developed under or above ground, independent of sexual results, and generally requires cooking to prepare it for food.”

Testimonial From 1884 Landreths’ Companion for the Garden and Farm

What plant parts are vegetables?

- Leaves
- Stems
- Roots
- Reproductive parts: flowers, fruits, seeds

Is a tomato a fruit or a vegetable?

Yes!

Pollination

1. These methods of pollen transfer:
   - Self-pollination: pollen from same plant to different flower
   - Cross-pollination: pollen from different plant

- Self-pollination
  - Tomatoes, peppers, eggplants
  - Cucumbers, squashes, melons

- Cross - required or helpful
  - Same variety but different plant required (corn)
  - Same or different varieties
    - If different then resulting seed will produce plants different from parents
    - Specific different variety required (pollinizer)
How?

- By wind
- By insects and others

Wind pollination

- Corn in blocks (different plants needed)
- Tomatoes, peppers, eggplants

Pollinators

Effects on pollinators

- Temperature,
  - wind,
  - rain,
  - time of day,
  - pesticides

Effects on pollination

- Whether male or female flowers are produced
  - Especially vine crops
  - Influenced by daylength
  - Temperature
  - Plant maturity
  - Crowding
  - Stress

Physical requirements of vegetables

- Sunlight
- Temperature (thermo classes)
  - Soil
- Daylength (onions)
Planning the garden

Site requirements

• Light
• Soil
• Access
• Air drainage
• Proximity to trees & shrubs
  – root competition
  – Black walnut roots

Preparing the site

• Kill or remove the “sod”

Preparing raised beds

• Double digging
Deciding what to grow

- **Purpose**
  - Food for family
  - Food to donate
  - Supplement purchased produce
  - Unusual varieties
  - Health
  - Teaching

Choosing varieties

- **Flavor, use, appearance**
- **Mature size**
- **Days to harvest**
- **Disease resistance**
- **Growth characteristics**
  - Determinate/indeterminate
  - Vine or bush type

Choosing varieties

- All-America Selections (AAS)
- Heirlooms
- Seed saving
- Availability
  - Starting from seed
  - Purchasing

Planning the garden

- **Garden layout**
  - Crop groups/families
  - Rotation

Crop rotation

- **Moving groups of crops** to different locations in the garden every year on a 3 – 4 year cycle.
  - Largely for pest management
Crop Groups

Leafy greens
Root crops
Cole crops
Legumes
Vine crops
Solanaceous crops
Perennial crops
Misc.

Leafy Greens

Swiss chard
Spinach
Head lettuce
Mesclun
Leaf lettuce

Root Crops

Cole Crops

Legumes

Vine Crops
**Solanaceous Crops**

**Perennial Crops**

**Misc.**

**Layout**

1) Perennial crops
2) Rotation of annual crops

- Consider:
  - Exposure
  - Back of garden is north
  - Tall crops to the back
  - Row orientation – north to south
  - Space needed and spacing of plants

**When to plant what**

- **Timing is everything!**
  - Frost free dates
  - Thermo classification
    - 5 Groups A - E
  - Direct seeding or Transplants
When to plant what

• Thermo classification
  5 Groups A - E

• Direct seeding or Transplants
  – Seed starting
  – Season extenders
    • Cold frame/ hot bed

Sequential planting

• Planting small amounts of the same crop every week or two to spread out the harvest.

• Planting a different second crop in an area vacated by an early, fast growing crop that has been harvested and removed.

Interplanting

• Planting small, fast to mature crops between transplants of another longer season crop that gradually increases in size. The faster crop will be finished before the longer one gets large enough to need the space.

Late Planting

• Planting (again) in mid-season those early season crops that prefer cool temperatures when they are mature and producing in the fall.

Season extenders

• Cold frames and hot beds
• Floating row covers
• Plastic films
• Soil mounds
• Individual plant covers — Cloches
  — Walls ‘o water
Cold frames & Hot beds

Floating Row Covers

Plastic films

Soil mounds (raised beds)
Individual plant covers

Production & management

Culture of vegetable crops
- Planting
- Watering
- Mulching
- Harvest
- Storing
- Pest management

Organic gardening concepts
- Soils
- Plants
- Fertilizers
- Gardening products
- Pest management & pesticides

Organic Gardening: Soil management
- 2 main concepts:
  - Build the soil
  - Compost wastes
Organic matter added to the soil helps bacteria change ammonium in the soil into nitrates which can be used directly by plants.

**Organic Gardening: Plants**
- Select varieties adapted to your area
- Choose disease resistant varieties
- Provide good cultural care

**Organic gardening: Fertilizers**
- Nutrients plants need most from fertilizers:
  - **N-P-K**
    - (Nitrogen-Phosphorus-Potassium)

**Nitrogen**
- water soluble/leaches
- Vegetative, green leafy growth

**Phosphorus**
- held on soil particles; SEW soils P-rich
- Ban only for lawns
- Root development
  - Starter fertilizers for transplants
  - Flower development
• **Potassium (K)**
  - held on soil particles; SEW soils K-rich
  - Disease resistance
  - Winter hardiness

• **Plant available forms**
  - N as nitrates and ammonium
  - P2O5
  - K2O

• **Organic fertilizers**
  - From “organisms”
    - Manures
    - plant wastes (compost)
    - fish emulsion

*Never use fresh manure on vegetables (unless you’re sure you are doing it safely!)*

• **Inorganic fertilizers**
  - Mined or synthesized (environmental issues)
  - Immediately available to plants
  - Often “salts”
  - Can leach into surface water and groundwater (also environmental issues)

• **Plants don’t care but the soil does!**
  Adds organic matter and benefits soil microrganisms

**Organic gardening: Product selection**

• **Sustainability & environmental impacts**
  - Renewable
  - Recyclable
  - Environmental impacts of production
  - Environmental impacts of using
  - Human impacts of production and sale
  - Carbon footprint
For example: Coir

- Peat moss substitute
  - Peat is not renewable; coir is
  - Coir is the fibers from the outside of coconut shells
  - By-product of the coconut industry
  - More absorbent than peat
  - Wets faster
  - Compresses into smaller volume

Organic gardening: pest management

- Integrated Pest Management
  - Organic pesticides

Will be discussed in Session #4

Production & management

Culture of vegetable crops

- Planting
- Watering
- Mulching
- Harvest
- Post harvest care/ storing
- Pest management

Planting

- Seeds
  - Follow seed packet directions
  - Thinning later is critical
- Transplants
  - Final spacing
  - Same depth or a little deeper
  - Tomatoes a lot deeper
**Watering**

- Avoid overhead watering
- If overhead watering, then water early in the day
Mulching

• Organic mulches

 mulches

Mulching

• Inorganic mulches

Harvesting

• At proper stage of maturity
• Early in the day while cool
• After foliage has dried
• Remove any unnecessary plant parts (carrot tops)
• Brush off dirt
• Wash (except lettuce)
• Keep cool to stop respiration

Storing

• Immediate post-harvest care - either:
  a) Cure in a warm, dry place to "seal"
     • Onions, potatoes, winter squash

Storing

• Or put directly into storage conditions
  a) Cold (33 degrees) with high humidity (90 – 95%)
     • Most vegetables
        • Ventilated plastic bags
  b) Cool (40 – 60) with high humidity (90 – 95%)
     • Sweet peppers, potatoes, sweet potatoes, tomatoes
        • Ventilated plastic bags (potatoes in sand!)
  c) Cold with low humidity (65 – 70%)
     • Dry beans, onions, hot peppers, winter squash
Next 2 Weeks

- Vegetable crops
  - By rotational group
  - By time of planting

- Bring:
  - Unit 5: pp. 18 – 45
  - "Grow Your Own Vegetables" pp. 18 – 45

QUESTIONS?