Organic Gardening 101

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Main Concepts in Organic Growing

- Fertility Management (Soil Building)
- Weed Management
- Pest Management
- Disease Management
Intro - History

History of Non-organic practices

- Recent - Green Revolution
- Surpluses of War Industry (1940’s)
  - Pesticides from poison gases
  - Fertilizers from petroleum products
Intro - History

Prior to WW2 ALL practices were:

ORGANIC!

Source: spartacus.schoolnet.co.uk. Accessed 11/11/11
Intro - History

Organic growing popularized by

- Lady Eve Balfour (*The Living Soil*)
- J.I. Rodale (Rodale Institute Founder)
- Sir Albert Howard (India Composting)

Equilibrium of soil

• Slow release of nutrients to plants when needed

• Building + maintaining balanced, living ecosystems
Benefits

• Economical
• Composted food waste = free Herbivore animal manures*
• High in organic matter and nutrients + often free

*Restrictions Apply!

• Source: http://www.vegetablegardener.com (accessed 11/2/11)
Benefits

Nutrition

Evidence of higher nutritional value

Absence of insecticide and herbicide residues
Benefits-Landfill Reduction

Used with Permission:
† Seppo Leinonen, www.seppo.net
Benefits

Environmental

- Soil Building vs. soil erosion
- Protect water aquifers, etc.
- Protect wildlife
- Reduced petroleum dependence
Intro - Soil Testing

First Important Step

• Organic Matter
  o ~2 - 10%

• PH (6.0 - 7.0)
  o Important for Nutrient availability

Source: http://www.gobiodiversity.com
Intro - Soil Testing

How soil pH affects availability of plant nutrients

Source: http://heartland.ehclients.com
Intro - Soil Testing

• Resources
  • Cornell Cooperative Extension
  • pH, Recommendations
• Dairy One (Dairyone.com)
  • pH, Organic Matter, Macronutrients, Recommendations
• Alternative Independents
Soil Fertility

Main Principle:

Feeding the soil (slow) vs. Feeding the plant (fast)
Soil Fertility

Increasing organic matter:

- Increases beneficial macro & micro-organisms
- Increases nutrient retention

Source: [http://www.independentsoils.co.uk/arable/understanding-your-soil/](http://www.independentsoils.co.uk/arable/understanding-your-soil/)
Soil Fertility

Increasing organic matter:

• Increases water retention
• Reduces frequent irrigation
• Slows down erosion
• Binds nutrients for long-term use

Source: http://www.organicagriculture.co
Factors in Soil Fertility

Factors influencing soil fertility

- Infiltration of water
- Soil structure
- Exploitable depth
- Minerals
- Sufficient drainage
- Parent soil
- Ground water
- Active soil life
- Acidity (pH)
- Release of nutrients
- Water retention
- Content of organic matter

Source: http://www.organicagriculture.co
Soil Fertility

Organic Inputs
- Animal Manures *
- Compost **
- Organic Matter
- Formulated/pasteurized fertilizers
- Worm Castings, Emulsions, Meals
- Mineral Rocks
- Green Manures (Cover Crops)
Weed Management

Why not weeds?

• Compete for light, water, nutrients
• Increase pest/insect habitat
• Increase weed seed “bank”

Roundup, Preen, or any herbicides NOT allowed in organic growing

Options:
• Cultivation Practices
• Prevention
Weed Management

Cultivation practices

• Hoeing small weeds
  o white thread stage

• Hand weeding (between rows in a bed)

• Mulch to prevent light from reaching weed seeds

• Prevent weeds from going to seed (pull & compost!)
Pest Management

Insecticides work in two ways:

Axon poisons – affects the axon so that a message can’t be passed.

Synapse poisons – turns off the signal to release Acetylcholinesterase

Source http://chopwoodcarrywaterplantseeds.blogspot.com
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Pest Management

Pest Management

Not all insects are pests! Majority of insects play beneficial roles:

- **Pollinators**
  - come in all shapes and sizes...teensy flies....
- **Predators**
  - Parasitic wasps, Soldier Bugs, Lacewings
- **Food source for food web**
  - Birds, small mammals, etc.
- **Always try to I.D. insect before killing “it!”**
- **6/20**
Pest Management
The Good

Parasitic Wasp Eggs
Parasitic Wasp
Pest Management
The Good

Lacewing Larva preying on Aphid
Soldier Bug with Colorado Potato Beetle Larva
Pest Management
The Bad

Harmful insects:
• Destroy crops
• Diminish photosynthesis processes
• Suck sap
• Transmit disease

Large Milkweed Bug
Pest Management
The Ugly

Lady Beetle Larva

Lady Beetle
Familiarize yourself with beneficial and harmful insects in their various lifecycle stages

- **Egg**
  - Easiest control
- **Larval**
  - Active feeding
- **Adult**
  - Reproductive

*Knowledge is power! Work with nature!*

Pest Management

- Destroy the bad/Invite the good
- Companion plantings
- Rotate plantings
- Scouting
Pest Management

Destroy the Bad

• Handpick
• Squish or drown in soapy water
• High pressure water spray
• Insecticidal soap or soapy water
Pest Management

Invite the Good:

Plant an inviting habitat for beneficials with a variety of plants

- Bee Balm - Hoverfly, Predatory Wasp
- Parsley-Hoverfly, Tachinid Fly
- Sunflowers-Lacewings, Lady Beetle
- Buckwheat-Parasitic Wasps, Lady Beetle
Pest Management

Companion Plantings confuse or distract bad insects

- Beans with potatoes confuse bean beetles and potatoes beetles
- Marigolds or basil with tomatoes deter Tomato Horn Worm
Pest Management

Rotating Plantings:

- Deprive over-wintering larva of a food source for next year
- Deprive over-wintering adults of the perfect place to lay eggs
- Reduces stress on plants from soil-borne diseases or nutrient deficiency

Source: Center for Urban Agriculture
Pest Management

Rotate Crops

- Many pathogens infect all crops in the same family
- Some pathogens infect crops from several families
- Rotate between families at least every 2-3 years

Source: Center for Urban Agriculture
Disease Management

Options

• Cultural practices

• Diversity
  o Plant Families
  o Varieties

• Crop Rotation

• Disease resistant varieties

• Scouting
Disease Management

Cultural Practices

• Water in a.m.
• Water deeply
• Mulch to minimize splashing, drought stress
• Adequate Spacing = good air circulation
Disease Management

• Plant Diversity

• Mix it up!

Polyculture
NOT
Monoculture!

• Crop Rotation

• Make a plan
The End?

The Beginning!
Thank You!