

# UF/IFAS Extension

## The Journey to Sustainability Begins with Education







**Introduction to  
Organic Vegetable Gardening**

**Noontime Talks  
Phillippi Farmhouse Market**

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UF/IFAS Sarasota County Extension**

# OUTLINE

- **Overview of noontime talks on organic vegetable gardening**
- **Introduction and steps to organic vegetable gardening**
- **Agroecology and organic vegetable gardening**

# Topics of Noontime Talks for Organic Vegetable Gardening

- Introduction (Nov 23, 2011) ←
- Edible Flowers (Dec 7, 2011)
- Container Gardening (Dec 21, 2011)
- Worm Composting (Jan 4, 2012)
- Frost Protection (Jan 11, 2012)
- Composting – Part 1 (Jan 25, 2012)
- Transplants (Feb 11, 2012)



# Topics of Noontime Talks for Organic Vegetable Gardening

- Composting – Part 2 (Feb 22, 2012)
- Irrigation (March 14, 2012)
- Beneficial Insects (March 28, 2012)
- Companion Planting (April 11, 2012)
- Cover crops (April 22, 2012)

# Goals for Noontime Talks on Organic Vegetable Gardening

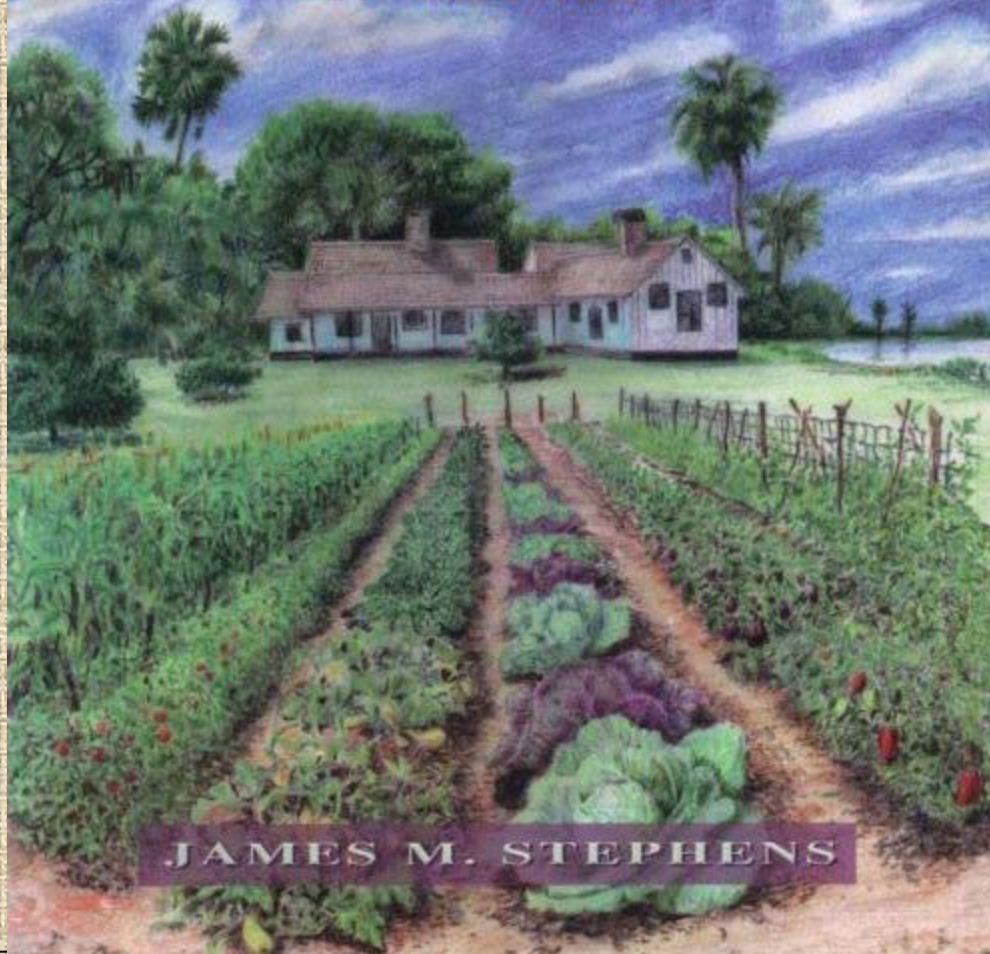
- Food for your freshest nutrition
- Food for expanding benefits of backyard vegetable gardening
- Food for thought
- Food for your soul

# Approach of Noontime Talks on Organic Vegetable Gardening

- Promote the practice of the guidelines in the reference “Vegetable Gardening in Florida” by James M. Stephens. 1999. Univ. of FL, IFAS
- Provide background information on the science and principles from agroecology for successful organic vegetable gardening
- Provide additional resources available for successful organic vegetable gardening



# VEGETABLE GARDENING IN FLORIDA



- Available from UF/IFAS bookstore, see <http://ifasbooks.ufl.edu/merchant2/>  
Also available from your favorite book vender.



# What is Agroecology?

- Recognition of the whole system nature of food production, i.e., the agroecosystem
- Understand indicators of agroecosystem sustainability
  - Energy flow
  - Cycles (e.g., nutrient, water, etc)
  - Population regulation mechanisms
  - Dynamic equilibrium
- Application and management
  - Identify and monitor the indicators in each system
  - Observe immediate and future impacts of your actions
  - Focus the search for alternatives or solutions to problems

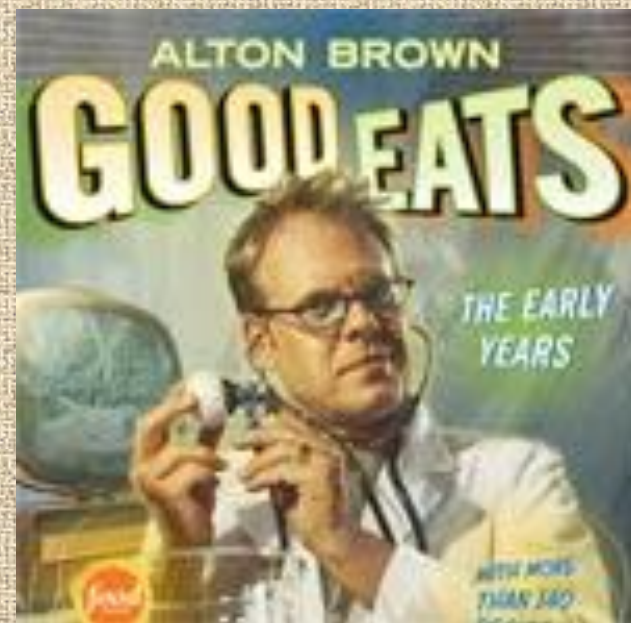
# Goals of Noontime Talks on Organic Vegetable Gardening

- They strives to provide something for everyone's different interests:
  - Food for your freshest nutrition
  - Food for expanding benefits of backyard vegetable gardening
  - Food for thought
  - Food for your soul



# In Other Words . . .

- Goal is to provide an enhanced level of understanding of the “why” and not only the “what” . . .
- Kind of like a version of the Alton Brown show but for organic vegetable gardening . . .



# What Is Organic Vegetable Gardening?





# Organic Vegetable Gardening

- It's a science and art
- Incorporates the entire landscape design and environment to improve and maximize the garden soil's health, structure, & texture
- Maximizes the production and health of developing plants without using synthetic commercial fertilizers, pesticides, or fungicides

David Knauft, Horticulture Department, Univ. of GA

[www.caes.uga.edu/extension/clarke/anr/documents/Organicgardening.pdf](http://www.caes.uga.edu/extension/clarke/anr/documents/Organicgardening.pdf)

# Organic Vegetable Gardening

- Differences to "conventional" gardening
  - mainly in the areas of fertilization and pest control
  - use natural and organic materials and methods
  - avoids using practices and synthetic chemicals that may be detrimental to his health or environment.

James Stephens, Horticultural Sciences Department, IFAS, Univ. of FL  
<http://edis.ifas.ufl.edu/VH019>



# Steps to Planning an Organic Vegetable Garden

- ✓ Design the garden size to meet your food needs (fresh, canning, selling, timing, etc)
- ✓ Select a location of good, well-drained soil with adequate water supply and sunlight
- ✓ Use planting guide for information
  - vegetables & cultivars suited to Florida gardens
  - planting distances and depths
  - planting dates by areas and hardiness
  - days to harvest and expected yields

# Steps to Planning an Organic Vegetable Garden

- ✓ Soil preparation with amendments
  - feed the soil, don't feed the plant
  - compost mixed into the soil at least 3 weeks prior to planting
  - liming and minerals additions according to soil tests
- ✓ Irrigate adequately
  - advisable to thoroughly wet the soil once a week compared to frequent light sprinklings



# Steps to Planning an Organic Vegetable Garden

## ✓ Weed control

- shallow cultivation and hoeing of small weeds are advised
- use mulch to suppress weeds

## ✓ Insect & disease control

- ✓ plant resistant & disease/pest-free varieties
- ✓ hand pick insects & use insectary plants
- ✓ water in morning so plants are not wet at night
- ✓ rotate garden areas
- ✓ use sprays and other preparations containing naturally occurring materials

# Is That All There Is To Organic Vegetable Gardening?

## Core Topic Areas for Successful Organic Vegetable Gardening:

- Soil Management
- Compost
- Crop Management
- Pest Management
- Water Management
- Agroecology



# Is That All There Is To Organic Vegetable Gardening?

“Thinking Like A Mountain”  
- Aldo Leopold

- *“Only the mountain has lived long enough to listen objectively to the howl of the wolf”*



# “Thinking Like A Mountain” - Aldo Leopold

- *From Sand County Almanac and Sketches Here and There (1949)*

- Quote from essay “Conservation from Round River”

- **Meaning = Wolf – Deer – Forest Dynamics & Inter-relationships**

- Teachings towards an environmental land ethic



- **Lessons in the value of biodiversity apply to organic vegetable gardening too !**



# History of Organic Gardening

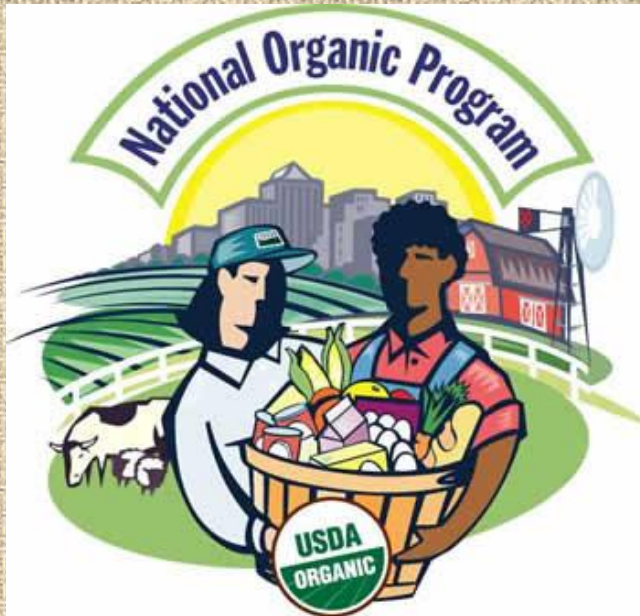
## ✓ Early

- can be dated back to thousands of years of traditional practices of growing foods

## ✓ Modern

- Reaction to advent of agrichemicals in farming
  - Fertilizers
  - Pesticides
- In 1950s, the organic movement in the US got a boost with J.I. Rodale's *Organic Gardening* magazine

# U. S. Organic Crop Production

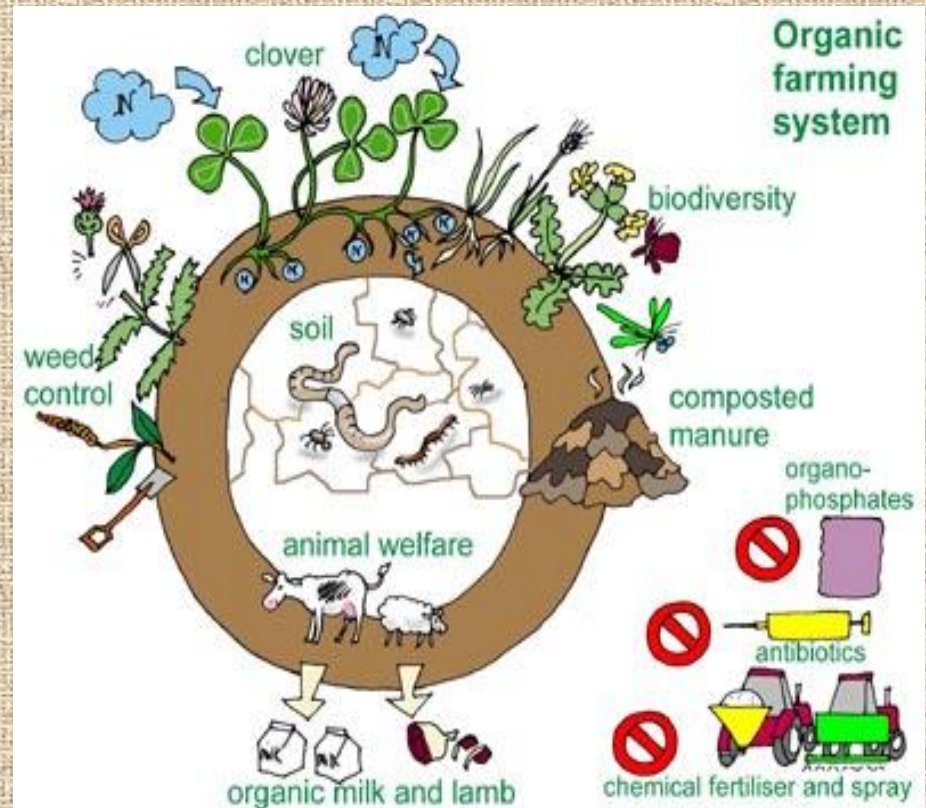


- **USDA/National Organic Program (USDA/NOP) was established as part of the Organic Foods Production Act (1990 Farm Bill).**
- **Provides information and resources useful for organic gardeners too**



# 1990 Farm Bill Definition

- **Organic agriculture is an ecological production management system**
- **that promotes and enhances biodiversity, biological cycles and soil biological activity.**



# 1990 Farm Bill Definition (cont.)

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- **Organic agriculture is based on minimal use of off-farm inputs and on management practices that restore, maintain and enhance ecological harmony;**
- **and methods to minimize residues from outside pollution from air, soil and water.**



# What is Agroecological Analysis?

- Recognition of the whole systems nature of food production, i.e., the agroecosystem
- Indicators of agroecosystem sustainability
  - Energy flow
  - Nutrient cycling
  - Population regulation mechanisms
  - Dynamic equilibrium
- Application and management
  - Identify the indicators in each system
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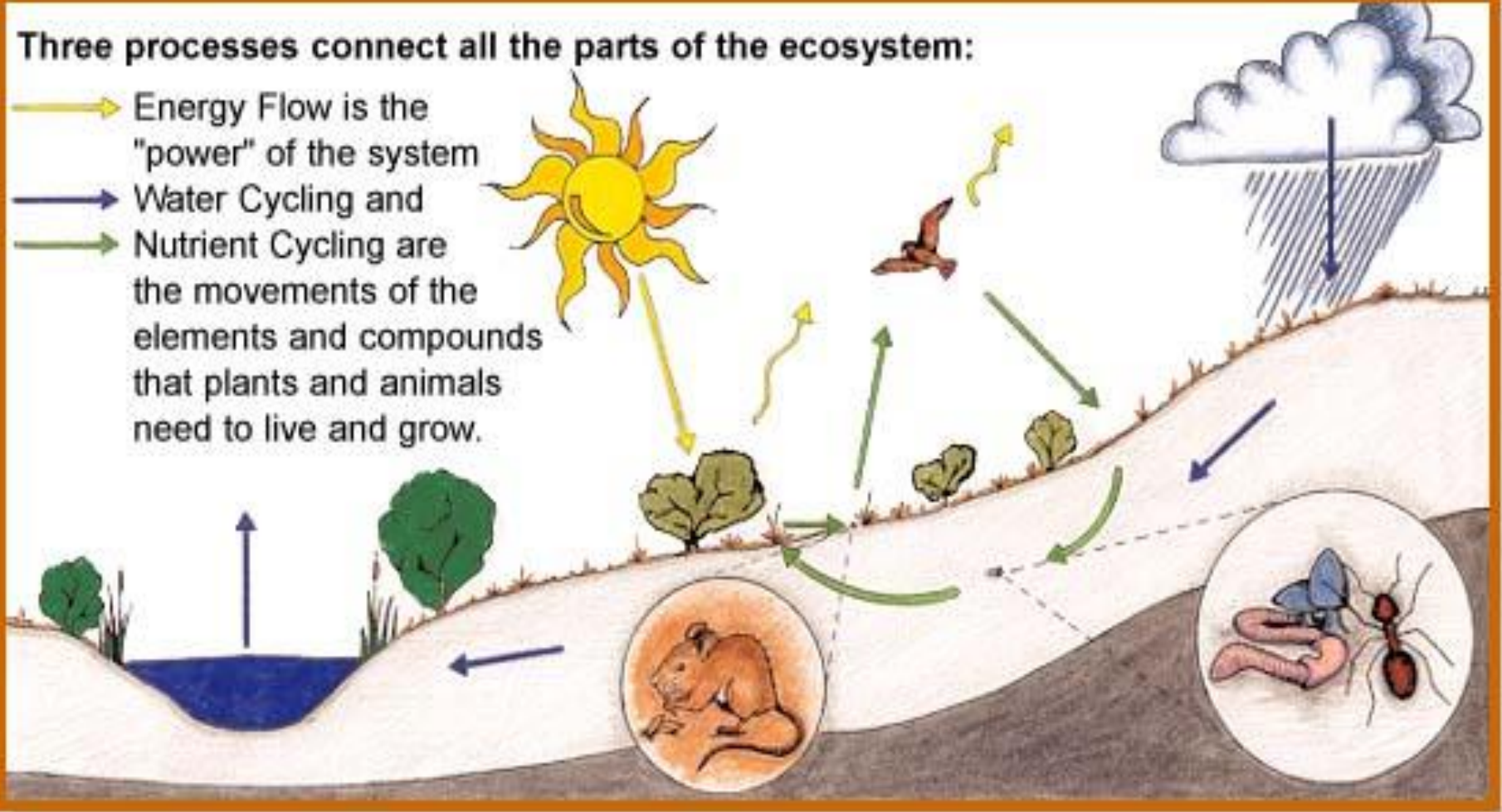
# Ecosystems and Plant Growth

## ECOSYSTEM PROCESSES

ILLUSTRATION: NICOLE BRAND

Three processes connect all the parts of the ecosystem:

- Energy Flow is the "power" of the system
- Water Cycling and Nutrient Cycling are the movements of the elements and compounds that plants and animals need to live and grow.



- Our model is the “ecosystem” w/ functional emergent properties & subsystems (e.g., nutrient cycling, etc)

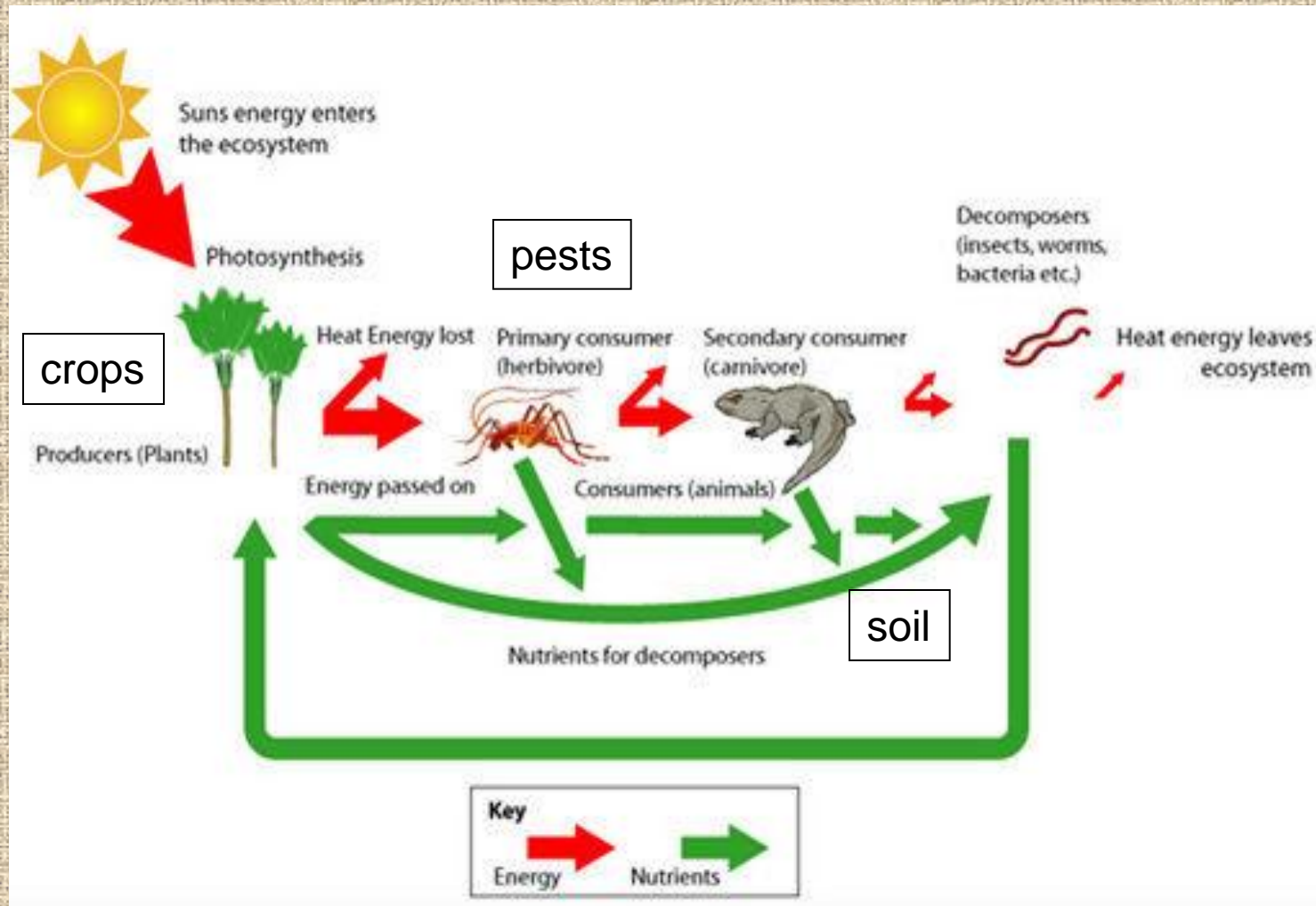


# Organic Vegetable Garden Ecosystem?





# Organic Vegetable Garden Ecology

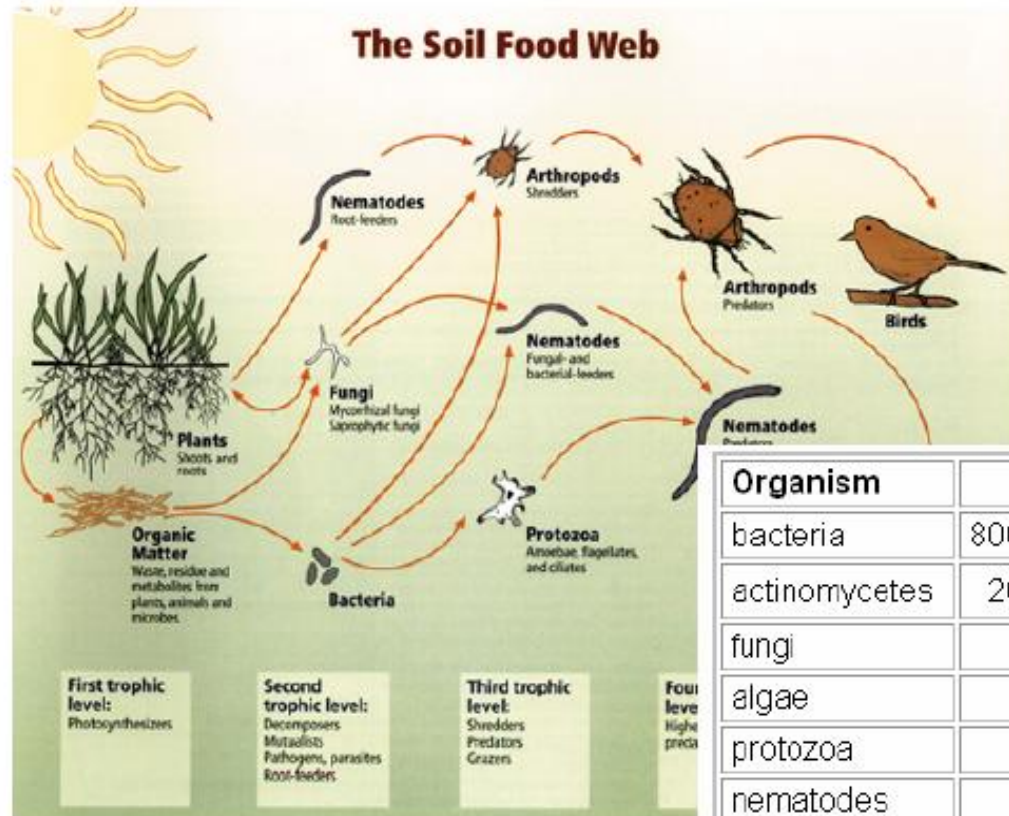


- Our model for organic gardening too is promote the “ecosystem” w/ functional subsystems from managed biodiversity



# Example: Organic Vegetable Garden and Soil Ecosystem

## Soil is Alive



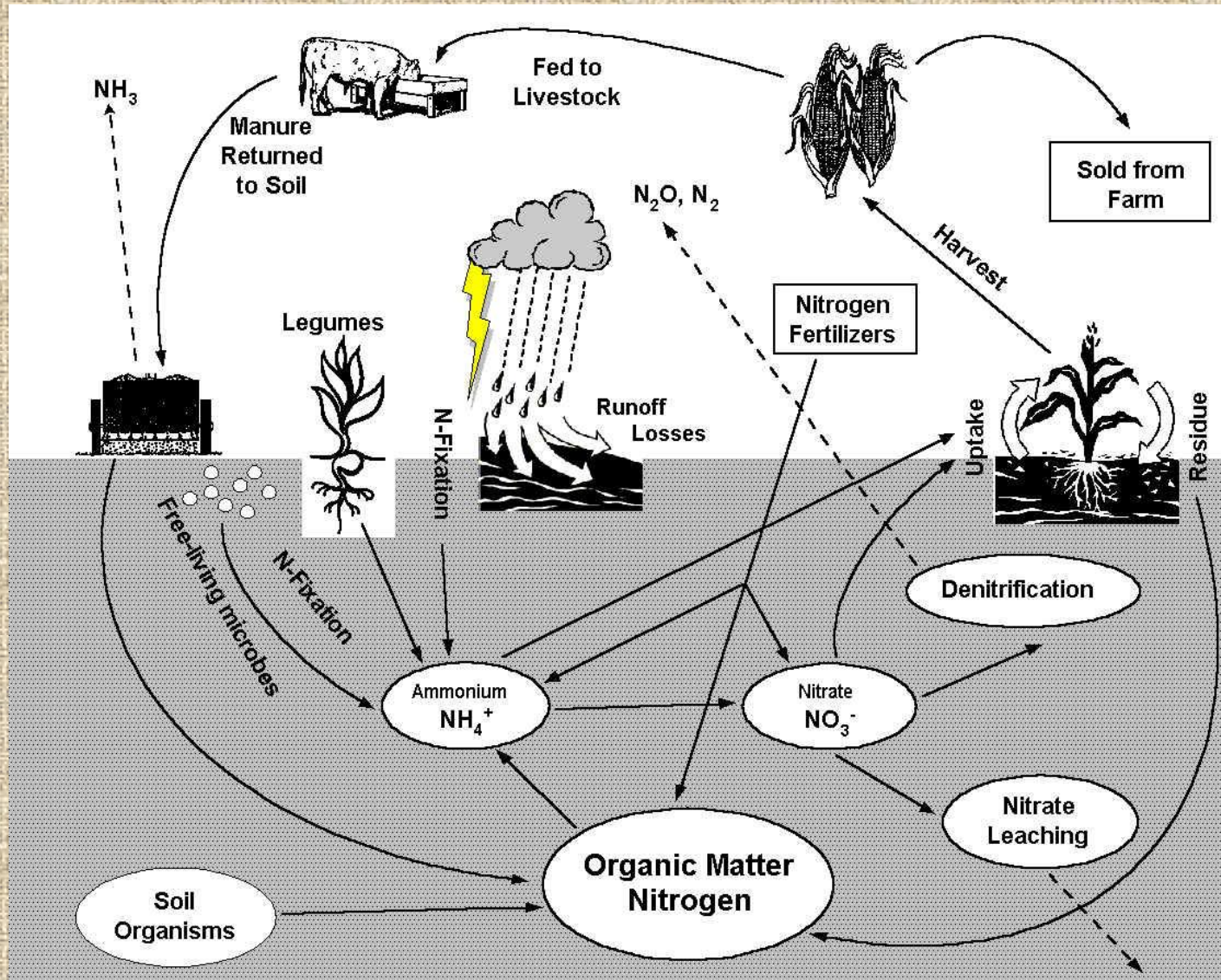
### Importance of Soil Biology

- diversity
- nutrient cycling
- pest/pathogen suppression
- symbioses

Organism	Number/acre	Lbs./acre
bacteria	800,000,000,000,000,000	2600
actinomycetes	20,000,000,000,000,000	1300
fungi	200,000,000,000,000	2600
algae	4,000,000,000	90
protozoa	2,000,000,000,000	90
nematodes	80,000,000	45
earthworms	40,000	445
insects & other arthropods	8,160,000	830

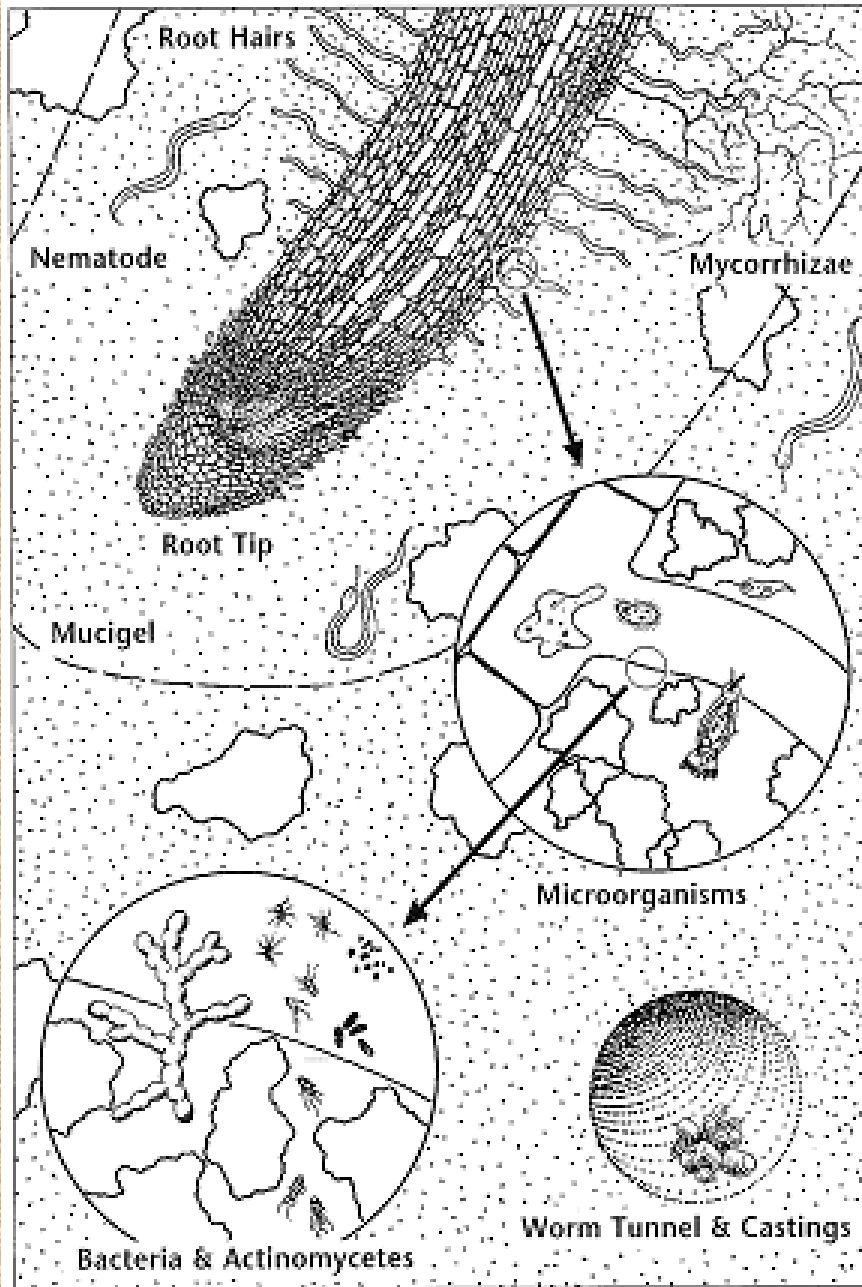
Source: Thompson and Troeh, 1978

# Example: Organic Vegetable Garden and Nutrient Cycling Subsystem



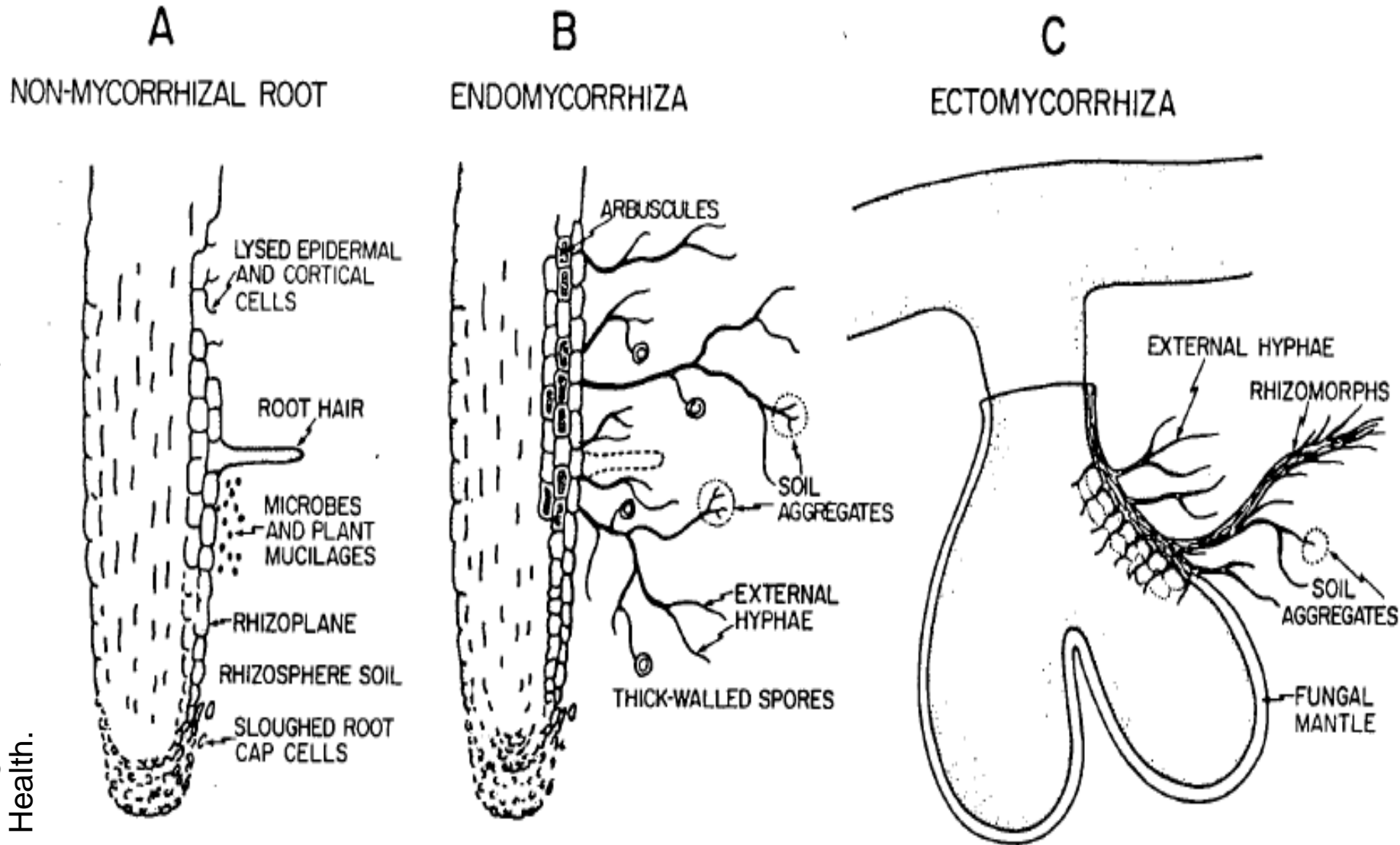


# Plant Root Ecosystem



# Root Mycorrhizal Mutualism

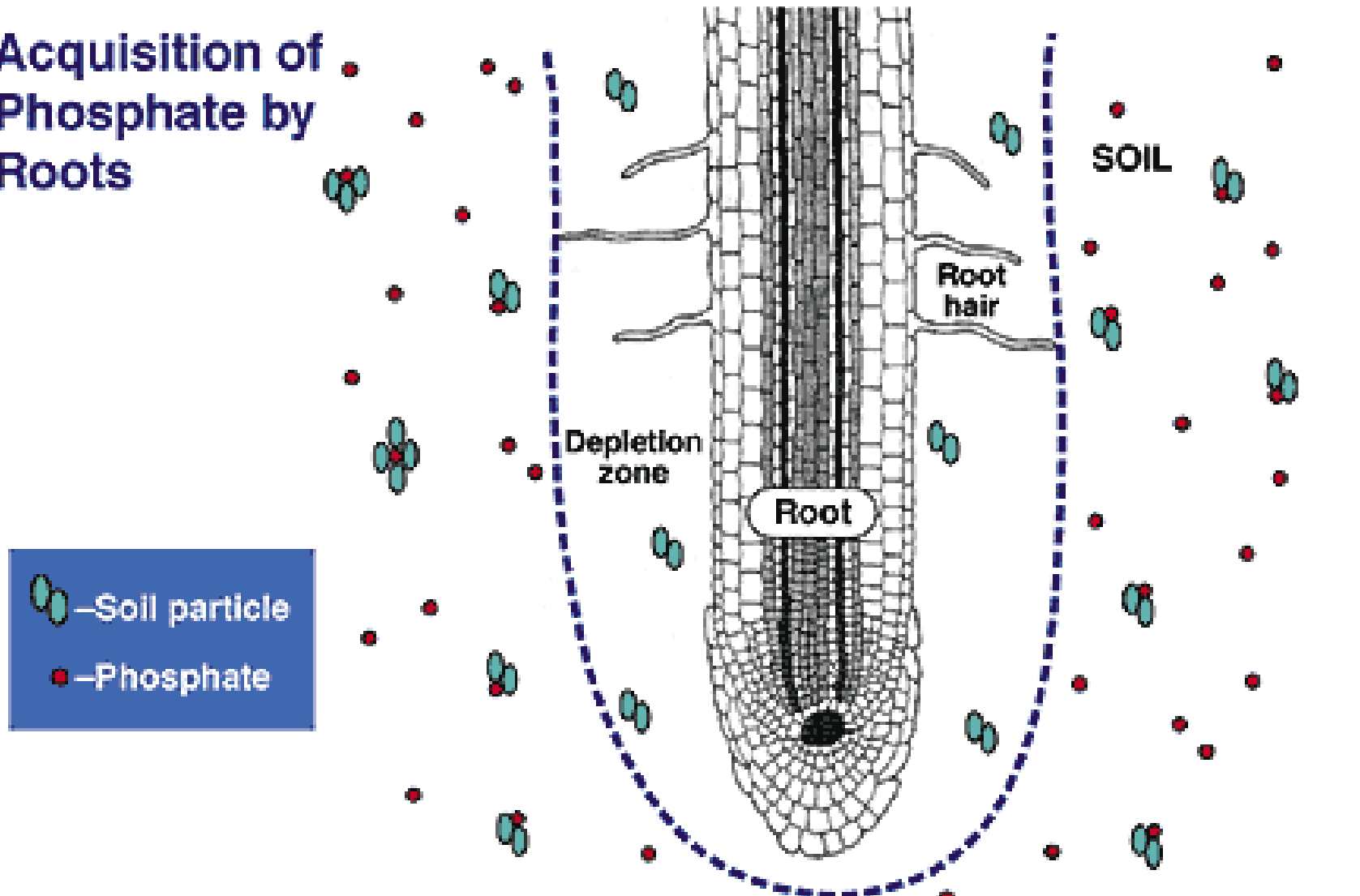
-Nutrient, Water, Physiology & Soil Benefits-





# Biotic Mutualism Example: Mycorrhizae

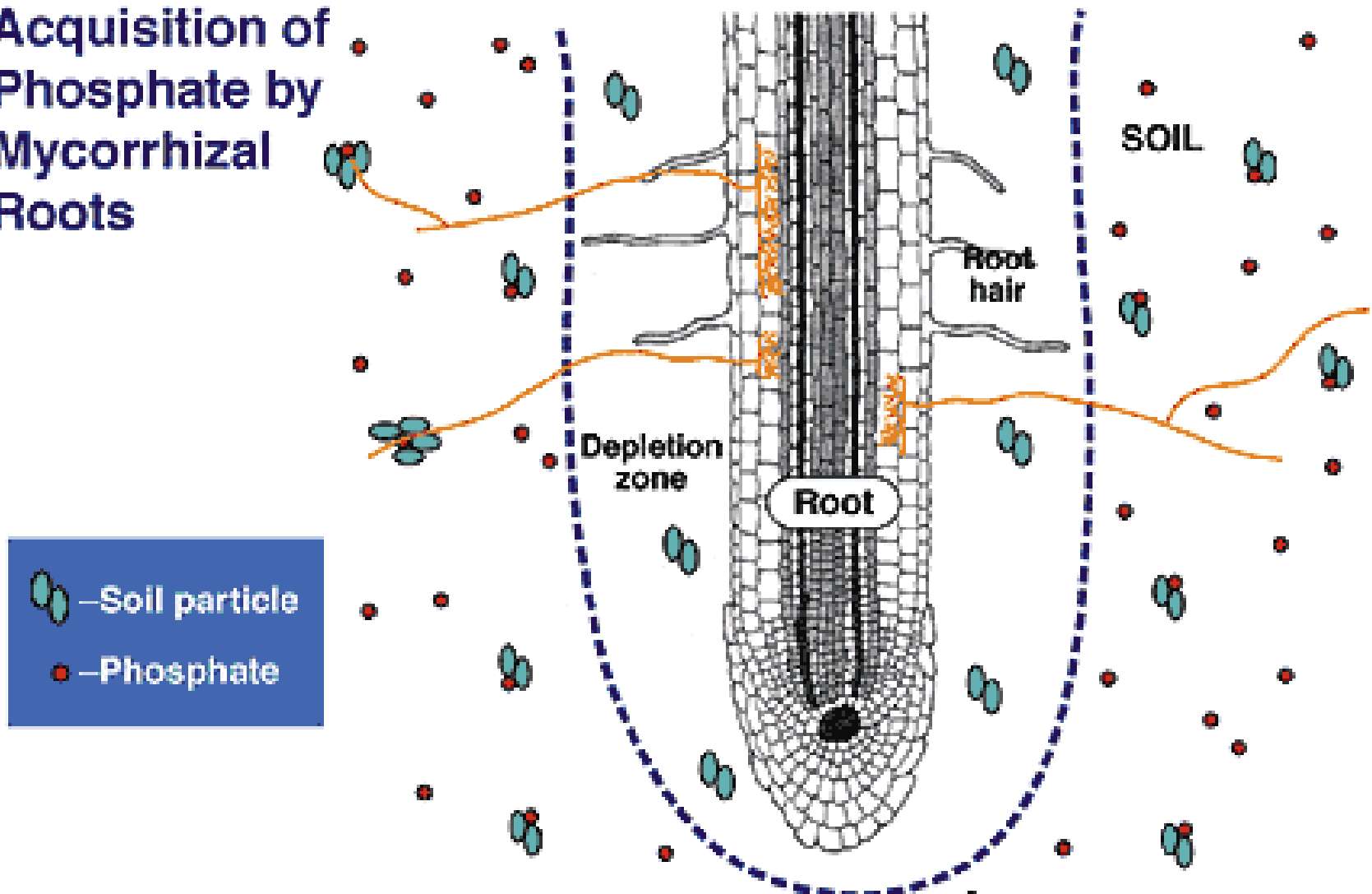
## Acquisition of Phosphate by Roots



Roots Without Mycorrhizae

# Biotic Mutualism Example: Mycorrhizae

## Acquisition of Phosphate by Mycorrhizal Roots

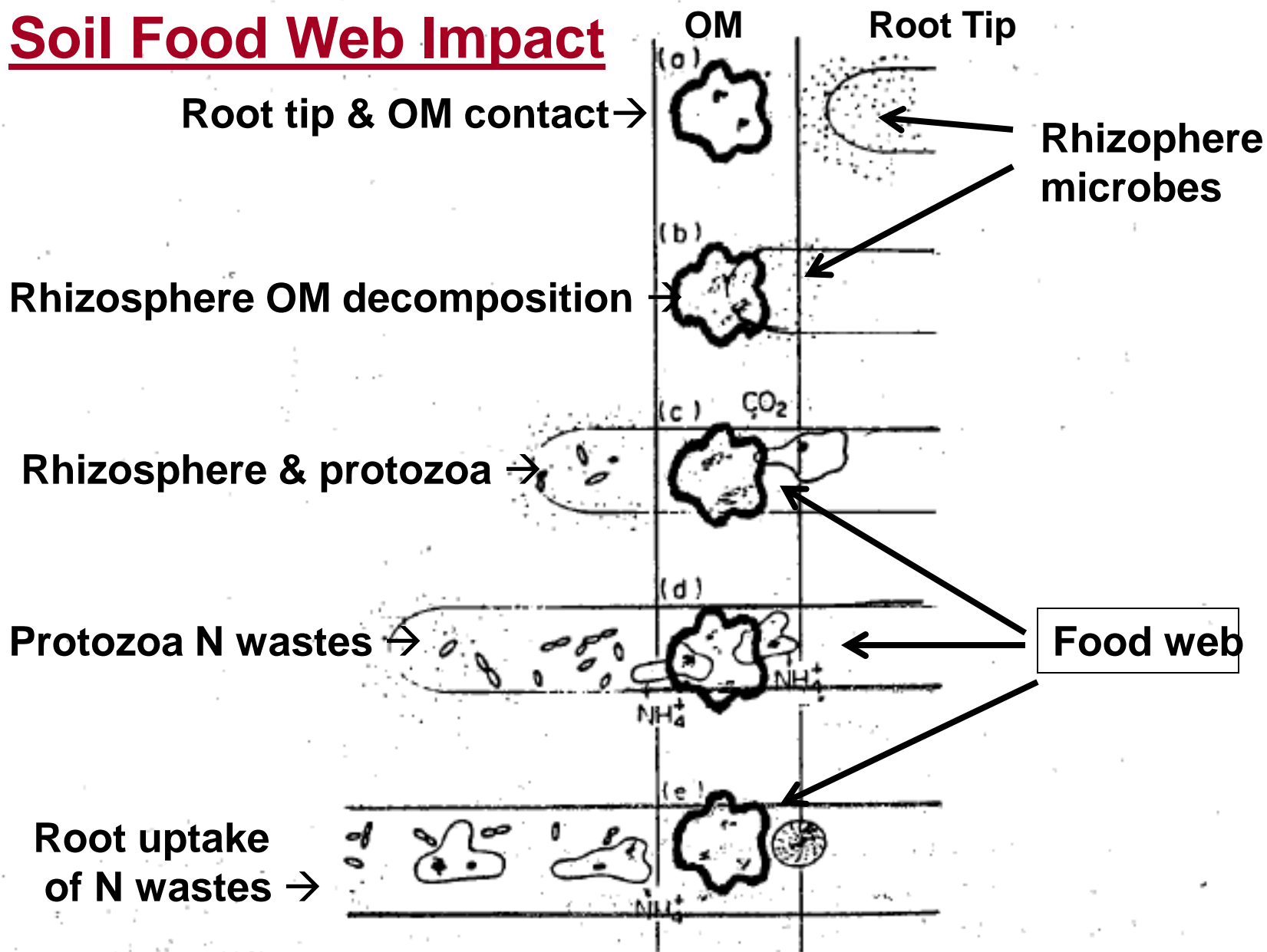


# Roots With Mycorrhizae

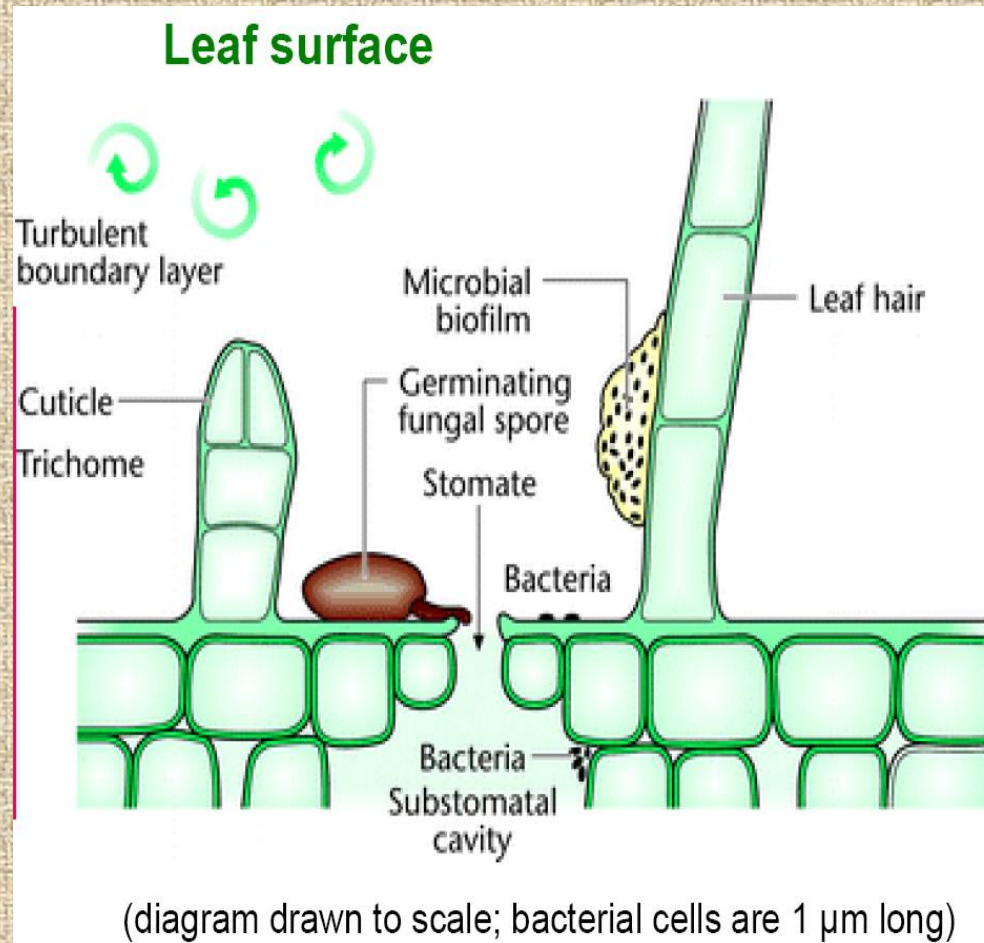


# Soil Life and Plant Nutrition: Rhizosphere

## Soil Food Web Impact



# Crop Leaf Subsystem (Phyllosphere)



- Crop systems have aboveground functional subsystems (e.g., root nutrient capture & leaf pathogen control) from biodiversity on leaf surfaces

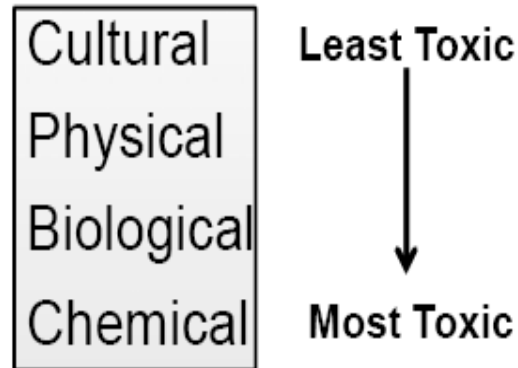


# Foliar Feeding and Organic Vegetable Gardening

- Don't use treated potable water (e.g., chlorinated)
- To be efficient and to avoid crop damage, use very dilute solutions of nutrient formulations
- Spray-solution pH should remain in the near-neutral range (5.5-8.5)
- Best effect is achieved when foliar sprays are finely atomized
- Absorption is increased when sprays also reach and coat the undersides of leaves
- Absorption is further enhanced when weather conditions are humid and moist
- Addition of a surfactant to the solution decreases surface tension on the leaf and may increase absorption.

# Organic Vegetable Gardening and Pest Management

Manage Using All Available Strategies

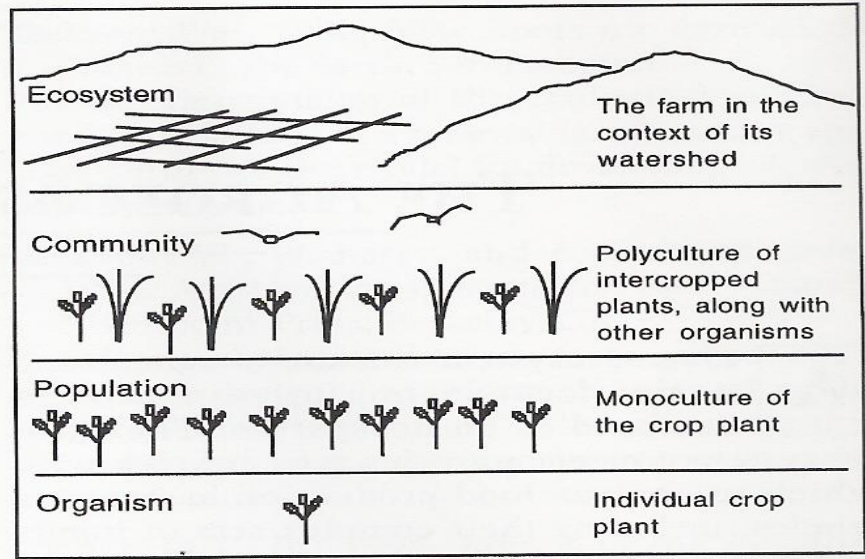


- Use a least hazardous approach, that will also enact effective control



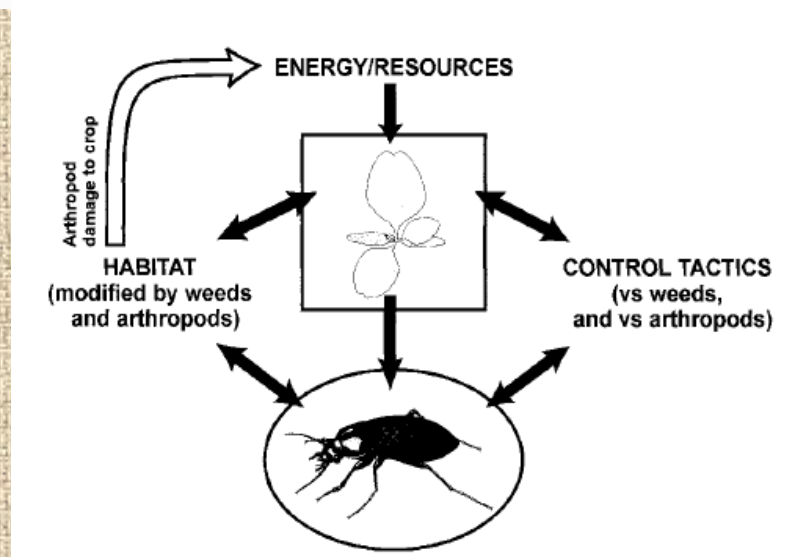
# Example: Organic Vegetable Gardening And “Pest Landscape Ecology”

**Hierarchical  
& Temporal  
Scales** (e.g.,  
Pest &  
Biocontrol  
Refugia)



**Integrative  
Approach**

(e.g., IPM & Multi-  
Trophic Effects)



Predator Insect	What to Plant (Insectary Plant)
Lacewings, aphidius, ladybugs	Achillea filipendulina
Hoverflies	Alyssum
Ground beetles	Amaranthus
Ichneumon wasp, ladybugs, lacewings	Anethum graveolens (dill)
Lacewings	Angelica gigas
Ladybugs, hoverflies	Convolvulus minor
Hoverflies, parasitic wasps, lacewings	Cosmos bipinnatus
Dicyphus	Digitalis
Lacewings, ladybugs, hoverflies	Daucus carota (Queen Anne's lace)
Damsel bugs, ladybugs, lacewings	Foeniculum vulgare (fennel)
Pirate bugs, beneficial mites	Helianthus annulus
Hoverflies	Iberis umbellata
Hoverflies, parasitic wasps	Limonium latifolium (Statice)
Aphidius, aphidoletes, hoverflies	Lupin
Parasitic wasps, tachinid flies	Melissa officinalis (lemon balm)
Parasitic wasps, hoverflies, tachinid flies	Petroselinum crispum (parsley)
Pirate bugs, beneficial mites	Shasta daisy
Pirate bugs, aphidius	Sunflowers
Ladybugs, lacewings	Tanacetum vulgare (tansy)
Dicyphus	Verbascum thaspus



# Example: Insectory Plant Management

- **Spring**



Mustards for  
Ladybugs &  
Syrphid fly adults

- **Summer**



Queen Anne's Lace for  
Scollid Wasps & ladybugs

- **Fall**



Fennel for  
Syrphid flies & small parasitic wasps

- **Winter**



Dandelion for  
Syrphid flies & small parasitic wasps

# Vegetable Crops & Pollinators

## Importance of Pollinators

- More than 75% of flowering plants depend on animal pollinators
- In U.S., over 100 crop plants depend on animal pollinators (value >\$15 Billion)
- Most natural ecosystems would collapse without animal pollinators
- Some plants are endangered because of diminished pollination



# Chemical Practice Examples

## BioRational Pesticides

- Microbial origin
- **Plant derived chemicals**
- New pesticides, such as particle film barriers, pheromones, and compounds such as Spinosad, that have low non-target impacts and degrade into non-toxic components.
- **Online resources:**
  - Biorationals: Ecological Pest Management Database ([http://attra.ncat.org/attra-pub/biorationals/biorationals\\_main\\_srch.php](http://attra.ncat.org/attra-pub/biorationals/biorationals_main_srch.php))
  - Resource Guide Organic Insect and Disease Management (<http://web.pppmb.cals.cornell.edu/resourceguide/>)

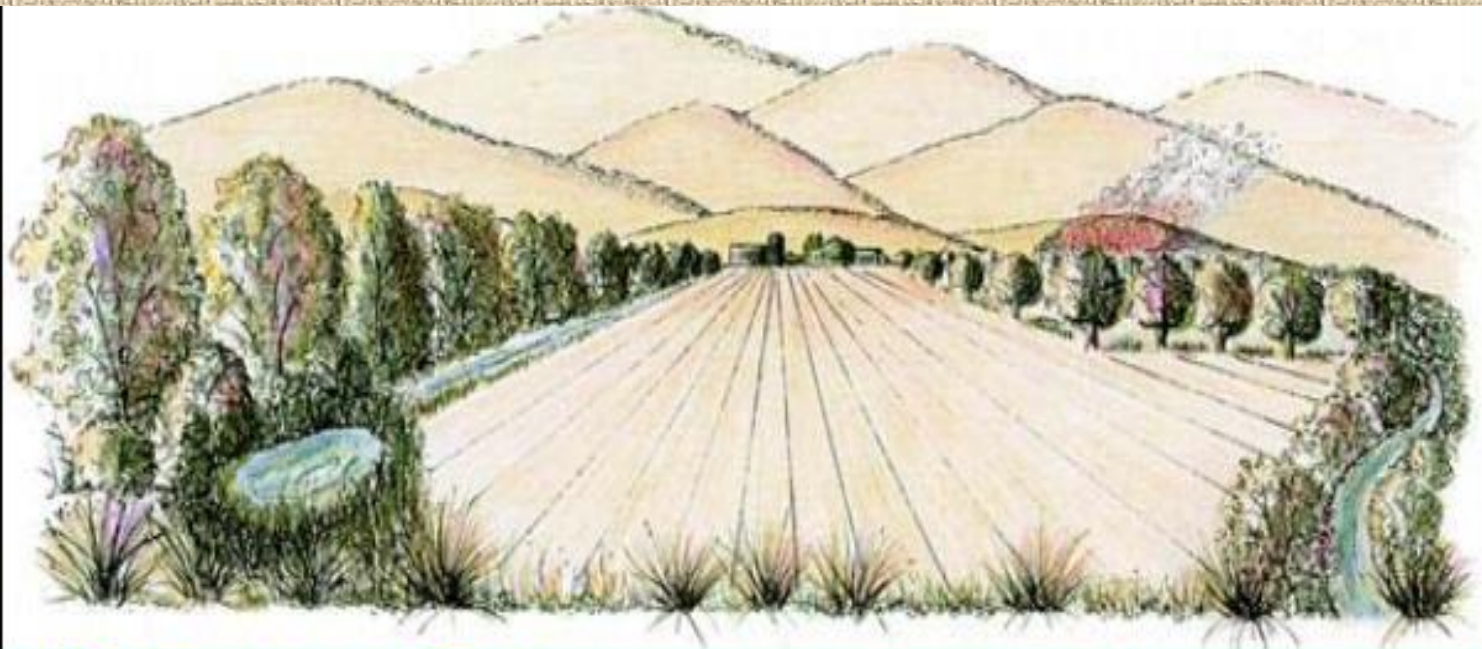
# Organic Vegetable Gardening Practices to Increase Biodiversity

## Planning a vegetable garden

- Intercropping
- Succession planting (double cropping)
- Relay planting
- Crop rotation
- Companion planting
- Row to row distance







**Farmscaping** is “the modification of agricultural settings, including management of cover crops, field margins, hedgerows, windbreaks, and specific vegetation growing along roadsides, catchments, watercourses, and adjoining wildlands.”(Bugg et al 1998).

# Agroecosystem “Health”

- **This concept is used to assess the sustainability of agroecosystems over time.**
- **It was developed to address the failures & side-effects of agroecosystems that have focused on the well-being of separate subsystems rather than on their aggregated whole.**
- **The concept is analogous to human health as an indicator of the functional integration of the complex of systems in a human body.**

E.O. Nielsen, (ed). 1994. Agroecosystem Health. Univ. of Guelph



# Expanding Gardening Benefits: Support 'Feeding the Hungry' Projects



Whether you are an individual, family or business, we invite you to join with GWA's Plant A Row for the Hungry campaign. . .

**COMMUNITIES  
HARVESTING  
HOPE..**



In 2004, the Plant A Row for the Hungry (PAR) program celebrated a decade of supporting gardeners committed to alleviating hunger in the U.S. and Canada. Numerous volunteers and sponsors have made our achievements possible.

PAR is endorsed by America's Second Harvest, Master Gardeners, American Community Gardening Association, American Nursery and Landscape Association, National Gardening Association, and by nurseries, seedsmen and garden suppliers across the United States and Canada.

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PAR is proving that each person can make a difference! We hope you will consider joining us today through financial support or volunteer participation.



Garden Writers Assn. Foundation  
10210 Leatherleaf Court  
Manassas, VA 20111  
T: 703.257.1032  
E: PAR@gardenwriters.org  
www.gardenwriters.org/par



Plant A Row For The Hungry

GARDEN WRITERS ASSOCIATION  
Toll Free: 877.492.2727 • PAR@gardenwriters.org

# Online Resources

- Stevens, J.M. 2009. Organic Vegetable Gardening. UF/IFAS EDIS Publication #CIR375 – see <http://edis.ifas.ufl.edu/vh019>
- Stevens, J.M. et.al. 2010. Florida Vegetable Gardening Guide. UF/IFAS EDIS Publication #SP103 - see <http://edis.ifas.ufl.edu/vh021>



# **“Food For The Soul”**

**'Quit thinking about decent land use as solely an economic problem, but examine each question in terms of what is ethically and aesthetically right, as well as what is economically expedient. A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise'**

**– Aldo Leopold**