Ecology for Garden Design

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This presentation was originally created for use in the fall of 2013 for the Cornell Garden-Based Learning Regional Training for Cornell Cooperative Extension educators and Master Gardener Volunteers. This training kicked off our CCE 2014 Growing Season Educational Campaign: Designing for Garden Ecosystems.

Garden design is critical for setting the stage for garden success and environmental stewardship. In this training we consider a polycultures approach to garden design. The concept embraces growing multiple crops in the same space, in imitation of the diversity of natural ecosystems.

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Ecology Defined

• Oikos = home

• Study of the relationship between organisms and their environment

• Study of the relationship between organisms, their environment, *and each other*
Paradise Lot
Two Plant Geeks, One-Tenth of an Acre
and
The Making of an Edible Garden Oasis in the City

Eric Toensmeier
With Contributions from Jonathan Bates
Nature is a web

Abiotic Factors → Producers

Producers → Consumers

Producers → Decomposers

Consumers → Producers

Decomposers → Producers
Abiotic Factors

• *Non – living* elements of the ecosystem

• *Precipitation, Landform, Sun, Soil, Geology, Climate, Microclimate, Wind, Water, etc*

• “Limiting Factor”
  – An environmental variable that limits or slows the growth of an organism/system:
  – *Sets limits to what we can do!*
gardening.cornell.edu/sectors

- Sun
- Shade
- Wind
- Water
- Noise
- Visual
- Wildlife
- Pollution
- Traffic
Microclimate
Understand limits of site climate & microclimate

“limiting factors”

Abiotic Factors

Producers

Consumers

Decomposers
Producers = plants

Only organisms that can Photosynthesize sunlight
Producers = plants

Only organisms that can Photosynthesize sunlight

“Catch & Store Energy”
Plants transform sun energy to wood, seeds, fruits, roots, & shoots
Trees and plants respire water, modify temperature & humidity.
Biomass production – the root of ecosystem wealth
The forest as our model

The Seven Layers of a Forest Garden

1. Canopy (Large Fruit & Nut Trees)
2. Low Tree Layer (Dwarf Fruit Trees)
3. Shrub Layer (Currants & Berries)
4. Herbaceous Layer
5. Rhizosphere (Root Crops)
6. Soil Surface (Ground Cover Crops)
7. Vertical Layer (Climbers, Vines)
Polyculture!
“We don’t plant plants, we plant ecosystems”
Basic Ecology

Abiotic Factors

“limiting factors”

Understand limits of site climate & microclimate

Producers

“catch & store energy”

“We don’t plant Plants, we plant Ecosystems!”

Consumers

Decomposers
Consumers = Animals

- Move *fertility*, seed, pollen, materials
Pollination
Not just honey bees

Green Sweat Bee

Bumble Bee

Leaf Cutter Bee

© Heather Holm
Attracting Native Pollinators
Protecting North America's Bees and Butterflies

Ensure pollination in your garden, orchard, or farm
Identify the flower-visiting insects of your region
Provide host plants and nesting sites for bees and butterflies
Create a landscape that is beautiful, diverse, and pollinator-friendly

Foreword by Dr. Marla Spivak
Domestic animals cycle fertility
Importing fertility from offsite
“Importing” fertility

Winter food sources, diverse plantings & edges, nesting habitats

- Bluebirds
- Chickadee
- Nut Hatches
- Sparrows
- Swallows
- Woodpeckers
Edge, Structure, Texture is Key