# Reframing & Deepening Into Guilds & Polycultures

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# Purposes:

- Update.
- Frame/reframe key concepts.
- Deepen conversation & inquiry.

# Premises:

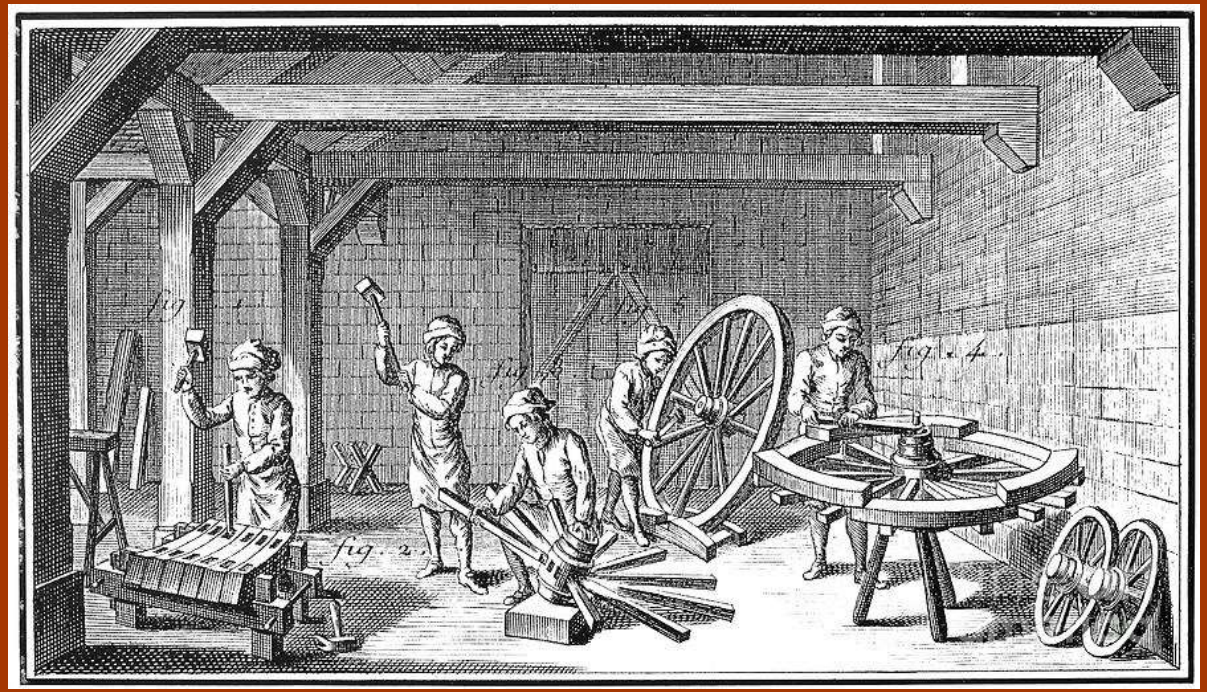
- Functional social structures kindle ecosystem health.
- Guilds and polycultures central to ecosystem social structure.
- Poor framing limits design potential.

# Goal:

*Clear, operational framing of guilds and polycultures maximizes our ability to observe, analyze, design & inhabit functional edible ecosystems.*

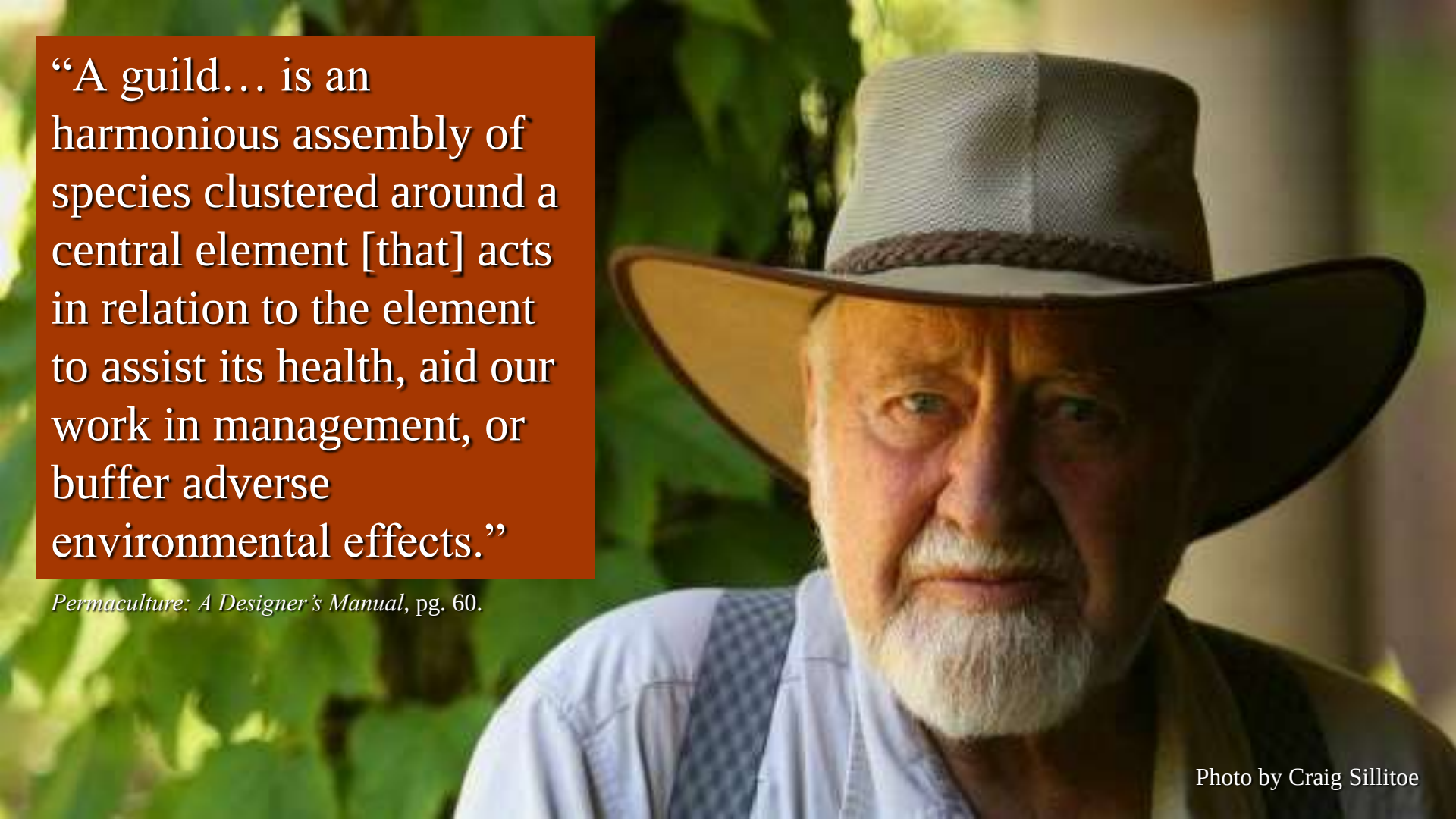
***Monoculture*:**
**one species in a patch.**

***Polyculture*:**
**two or more species in a patch.**



"Guild: an association of persons of the same trade or pursuits, formed to protect mutual interests and maintain standards." *American Heritage Dictionary*

*Many different*
*definitions of “guild”*
*exist in the ecological literature.*



“A guild… is an harmonious assembly of species clustered around a central element [that] acts in relation to the element to assist its health, aid our work in management, or buffer adverse environmental effects.”

*Permaculture: A Designer’s Manual*, pg. 60.

Photo by Craig Sillitoe

"A guild is…a group of species that exploit the same class of environmental resources in a similar way."

Ecologist R.B. Root, 1967

Guild: A group of similar species. J.P. Kimmins, *Forest Ecology*

“Everything should be as simple as possible, but no simpler.”

Einstein

# Three Kinds of Guilds:

1. Community Function Guild

2. Resource Partitioning Guild

1. Mutual Support Guild

# Community Niche = Community Function

- Butcher, baker, candlestick maker…
- Nut tree, canopy herbivore, canopy predator…

Photo: Eric Toensmeier

Producers

Decomposers

# Initial Community Niches/Functions…

Photos: Eric Toensmeier

Crops

Ground Covers

Soil Improvers…

# …Initial Community Niches/Functions

| Latin Name | Common Name |
|---|---|
| *Chrysogonum virginianum* | green and gold |
| *Viburnum trilobum* | highbush cranberry |
| *Tiarella cordifolia* | foamflower |
| *Levisticum officinale* | lovage |
| *Sambucus canadensis* | elderberry |
| *Myrrhis odorata* | sweet cicely |
| *Coreopsis* spp. | tickseed |
| *Solidago odora* | sweet goldenrod |
| *Sium sisarum* | skirret |
| *Aster novae-angliae* | New England aster |

Nectary Plants

# 1. Community Function Guild

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A group of species in the same community niche, therefore serving the same community function.

# 1. Community Function Guild

## Tree Fruit Guild

### Stone Fruit Guild

Photo: Eric Toensmeier

# One Community Niche, Many Possible Species Niches

# One Species, Many CF Guilds

Summer Insectivores

Winter Omnivores

Lower Canopy Gleaners

Black-capped Chickadee

Year-round Residents

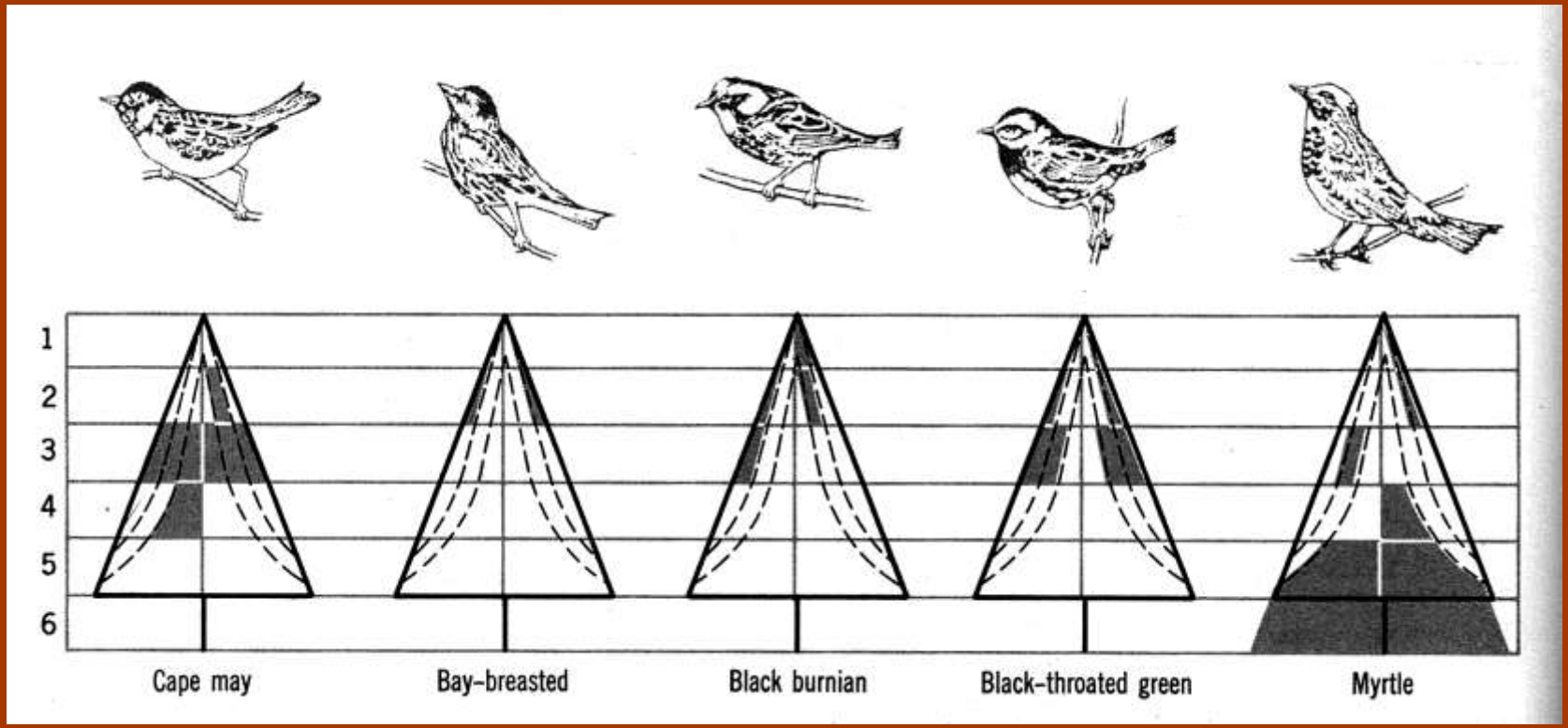
Cavity & Crevice Nesters

# Three Kinds of Guilds:

1. Community Function Guild:
   - ✓ *Shared function AKA shared community niche.*
   - ➔ ⬆☐ *Redundancy of function,* ⬆ *stability & resilience.*

2. Resource Partitioning Guild

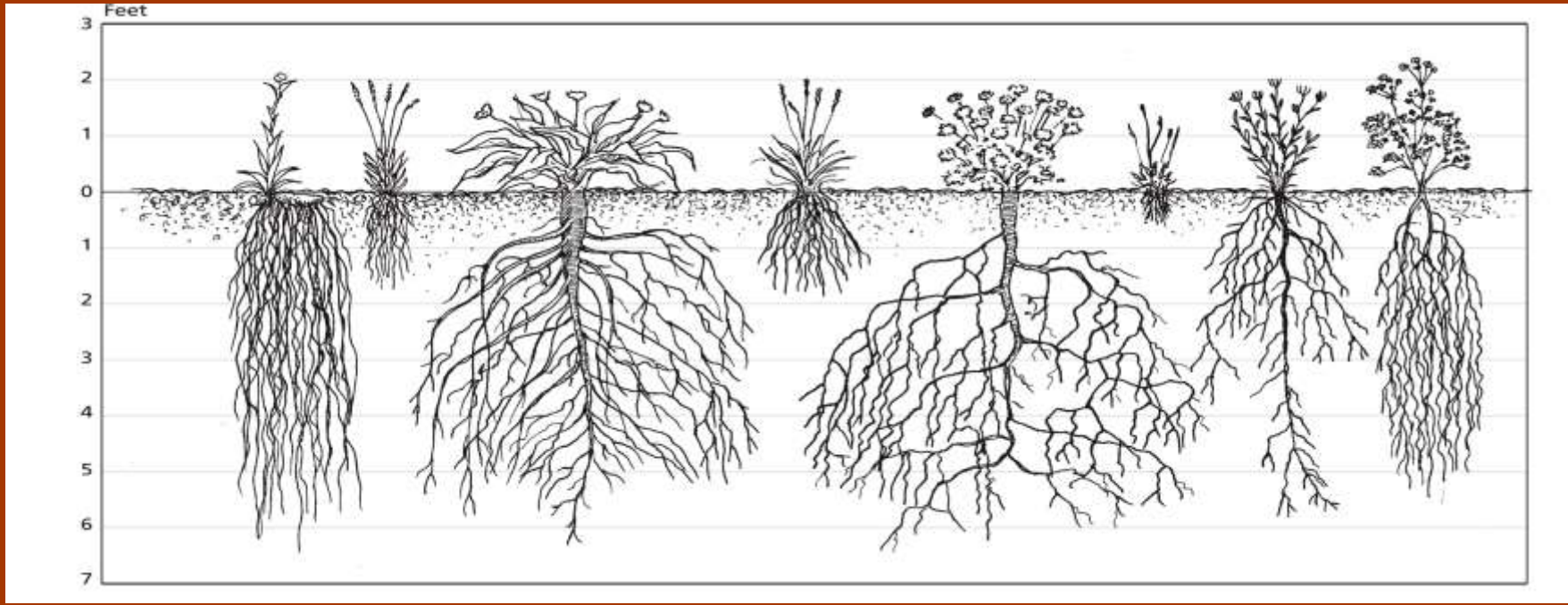
1. Mutual Support Guild




Warbler feeding niches; adapted from MacArthur, 1958 for *Ecology*, by Paul Colinvaux

# 2. Resource Partitioning Guild

A group of species that partition
a shared resource to avoid competition.



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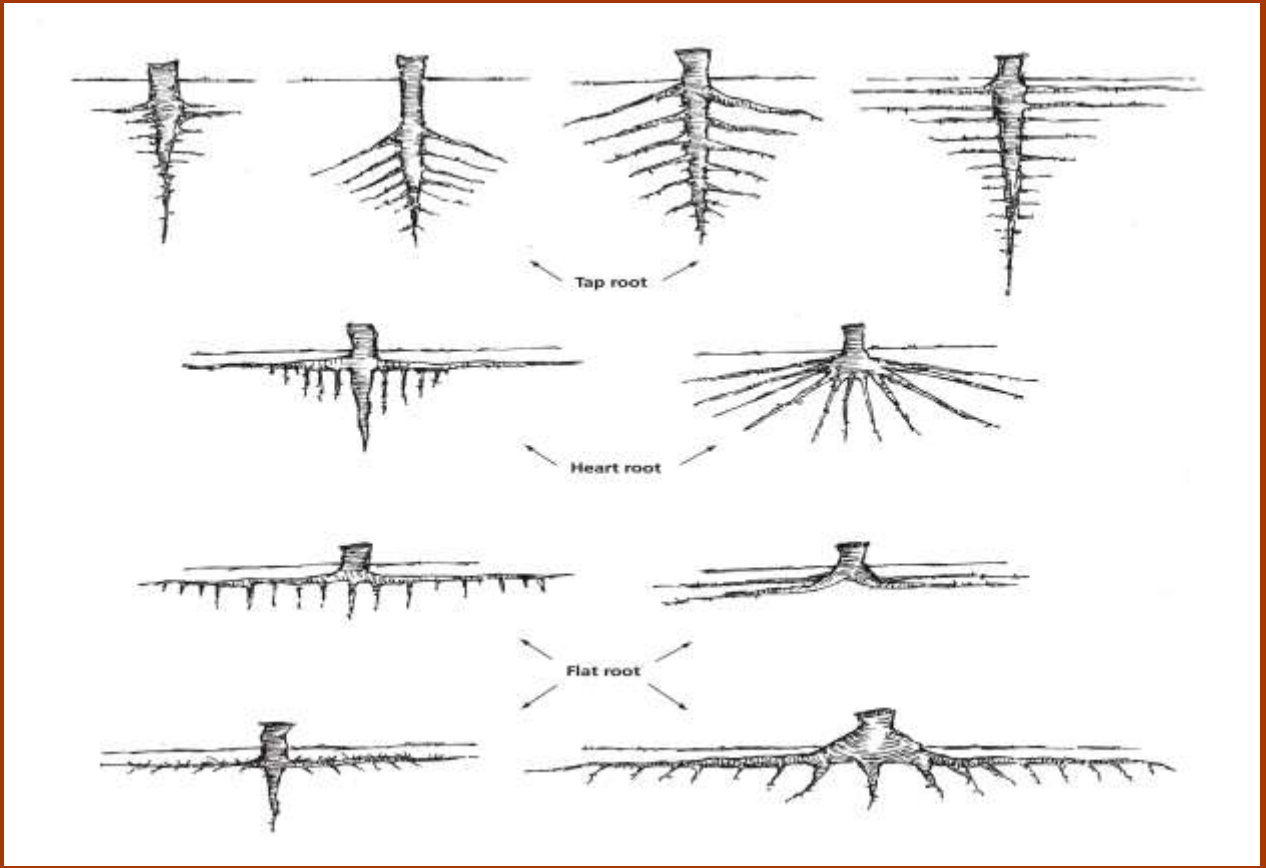

# 2. Resource Partitioning Guild

**Am. Chestnut**

***Castanea dentata***

- *Taprooted*
- *Fruits in full sun*

**Juneberries**

***Amelanchier* spp.**

- *Flat rooted*
- *Fruits in shade*

Photo: Eric Toensmeier

# 2. Resource Partitioning Guild

| Latin Name | Common Name | A | M | J | J | A | S | O |
|---|---|---|---|---|---|---|---|---|
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| *Tiarella cordifolia* | foamflower | | • | • | | | | |
| *Levisticum officinale* | lovage | | • | • | • | | | |
| *Sambucus canadensis* | elderberry | | | • | • | | | |
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| *Coreopsis* spp. | tickseed | | | • | • | • | • | |
| *Solidago odora* | sweet goldenrod | | | | • | • | • | • |
| *Sium sisarum* | skirret | | | | | • | • | |
| *Aster novae-angliae* | New England aster | | | | | | • | • |

What is the partitioned resource?

# Three Kinds of Guilds:

1. Community Function Guild

2. Resource Partitioning Guild:
   - ✓ *Partitioning a shared resource avoids competition.*
   - ➔*Increases diversity & productivity; reduces stress.*

1. Mutual Support Guild

# 3. Mutual Support Guild

# Three Kinds of Guilds:

1. Community Function Guild:

2. Resource Partitioning Guild:

1. Mutual Support Guild:
   - ✓ *Yields of one element meet needs of another.*
   - ➔*Increases stability & health; reduces stress, work, waste.*

# 3. Mutual Support Guild

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This guild can function with the grapes
and raspberries as much as four miles apart!



# *Not all guilds are polycultures.*


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# *Not all guilds are polycultures.*

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Nectary CF guild: not necessarily a polyculture.
Pollinator partitioning guild: not necessarily a polyculture.

**SPACE**
**defines *polycultures*:**
**who grows in the same patch?**

***RELATIONSHIPS***
**between species define *guilds*.**

# Interspecies Relationships Define Guilds

1. Community Function Guild:
   - ✓ *Shared function / community niche.*

2. Resource Partitioning Guild:
   - ✓ *Partitioning avoids competition.*

1. Mutual Support Guild:
   - ✓ *Yields meet needs.*

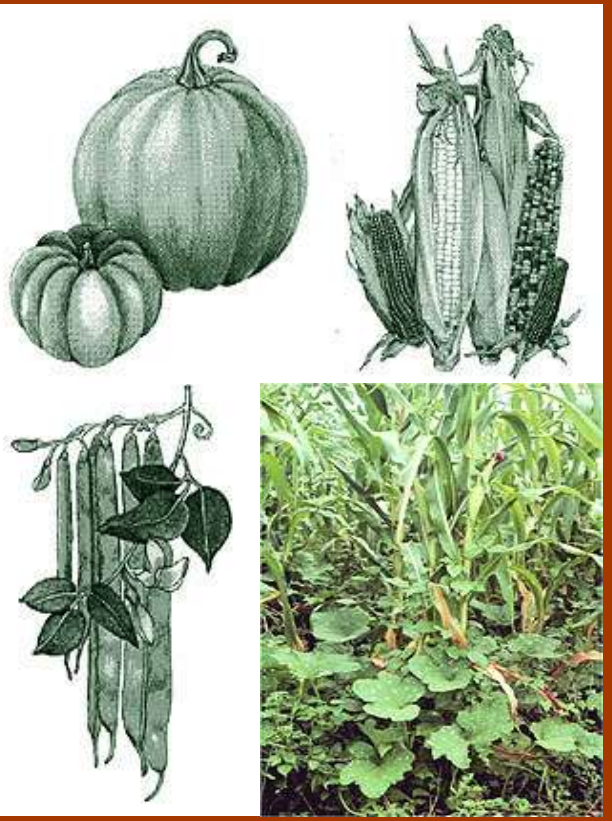
*Not all guilds are polycultures.*

*To be effective,*
*a polyculture*
*must contain multiple guilds.*

# 1 Polyculture, 3 Species, 13+ Guilds

The Three Sisters: dry corn, dry beans, winter squash (et al!)

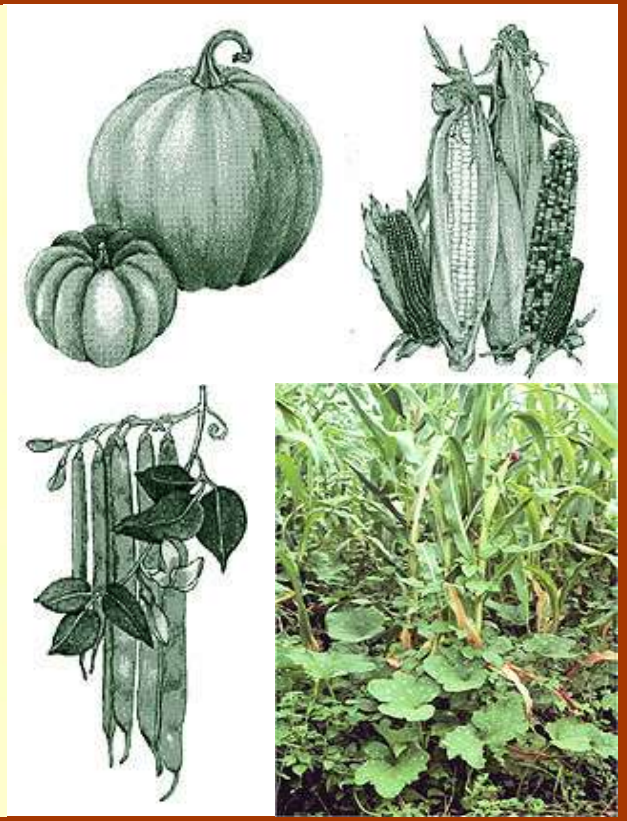
Three Sisters: corn, squash and beans.



# Effective Polycultures Overyield

Cornell: 3 sisters 17% more calories/acre vs. monocrops.

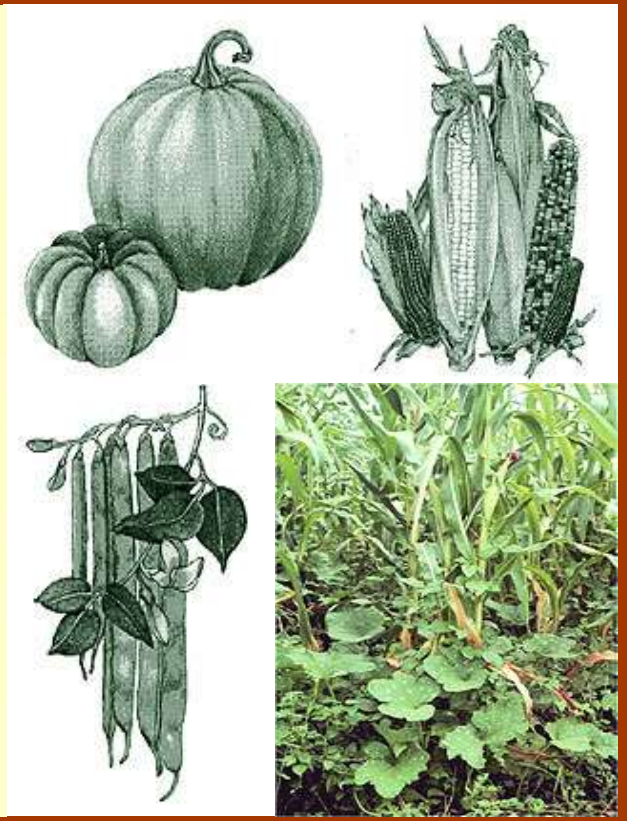
Three Sisters: corn, squash and beans.



# Effective Polycultures Lower Stress

More resources available; more stable & resilient.

Three Sisters: corn, squash and beans.



# A Perennial Three Sisters?


Photo: Eric Toensmeier


Photo: Oikos Tree Crops


Photo: Oikos Tree Crops

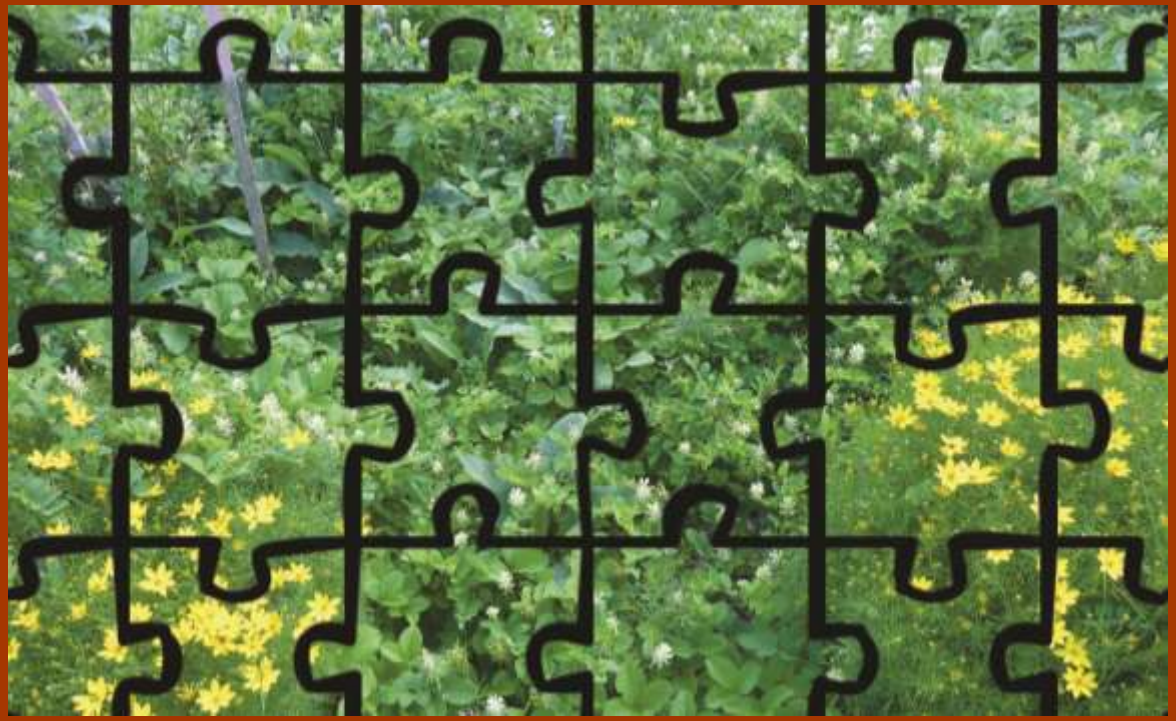
**Jerusalem Artichoke**
*Helianthus tuberosus*

**Groundnut**
*Apios americana*

**Crosnes**
*Stachys affinis*


Photo: Eric Toensmeier

# Directed CoEvolution: Breeding for Polycultures



**The ultimate goal of farming**
**is not the growing of crops,**
**but the cultivation**
**and perfection**
**of human beings.**

**--Masanobu Fukuoka**
***The One-Straw Revolution***

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Robert Hart in his forest garden, 1997.