



HONEY BEE NECTAR & POLLEN SOURCES

ANNE ARUNDEL BEEKEEPERS ASSOCIATION

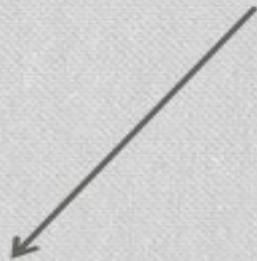


PLANTS AND BEES EVOLVED TOGETHER



POLLINATION

Ways of Pollination



Wind Pollination



Insect Pollination



POLLINATION

Cross-pollination

pollen
grains

1. Pollen from stamens sticks to a bee as it visits a flower to collect food.



2. The bee travels to another plant of the same type.

3. Pollen on the bee sticks to a pistil of a flower on the other plant.



MONOECIOUS PLANTS



Male and Female flowers are on the same plant

DIOECIOUS PLANTS



Male and Female flowers are on different plants

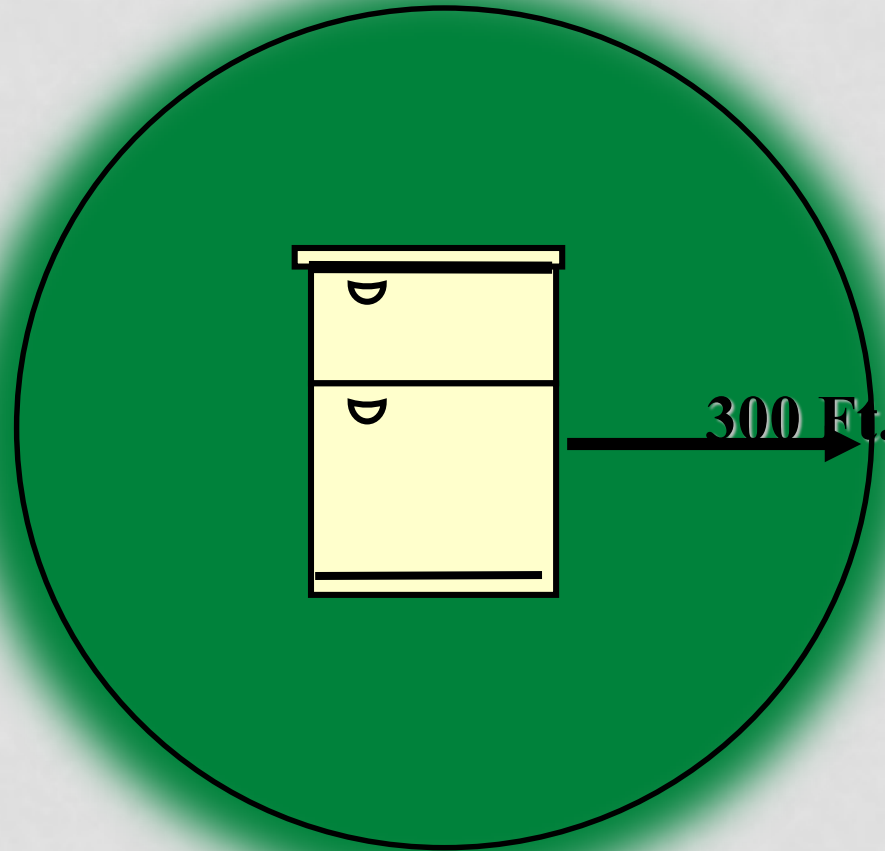
EVERY THIRD BITE



POOR POLLINATION

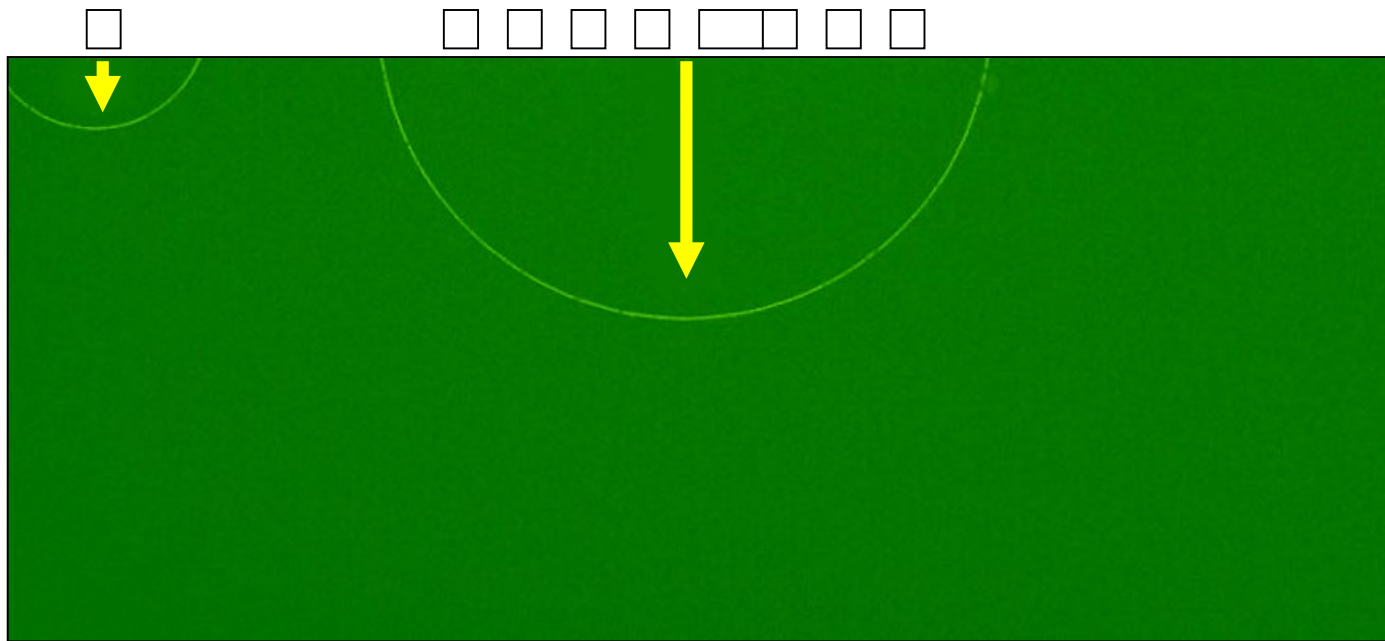


FORAGING ENERGETICS



FORAGING ENERGETICS

Competition Increases Coverage



POLLEN



A healthy brood frame with a ring of pollen stored on the periphery. B. Oliver

NECTAR

- **Converted by bees to honey**
- **Is stored in frames**



HONEY BEE POLLINATION

Crop	Dependence on insect pollinators	Proportion that are honey bees
Alfalfa, hay, seed	100%	60%
Apples	100%	90%
Almonds	100%	100%
Citrus	20-80%	10-90%
Cotton	20%	80%
Soybeans	10%	50%
Onions	10%	90%
Broccoli	100%	90%
Carrots	100%	90%
Sunflowers	100%	90%
Other fruits, nuts	10-90%	10-90%
Other vegetables	70-100%	10-90%
Other field crops	10-100%	20-90%



ADVANTAGES – HONEYBEES

- Honey bees are “Generalists”
- Honey bees exhibit “Flower constancy”



OTHER POLLINATORS

Besides honey bees, what other bees are important crop pollinators in the mid-Atlantic region?

bumble bees
Bombus spp.



squash bees
Peponapis pruinosa
Xenoglossastrenua



mason bees, *Osmia* spp.



mining bees
Andrena spp.



halictid (sweat) bees
(various genera)

Osmia photos by T'ai Roulston, http://people.virginia.edu/~thr8z/Bee_Diversity/Blandy_Bee_Diversity.php

ADVANTAGES – NATIVE BEES

- **Forage in windy weather**
- **Work exterior of trees**
- **“Scopa” – for efficient pollination**
- **Forage earlier in day**



HONEYBEE FORAGE THROUGH THE SEASON



Skunk Cabbage – early pollen source

SPRING TREES



Red Maple and Redbud (Cercis spp.)
Early nectar & pollen source

SPRING BLOOMING



Crocus chrysanthus

Bulb

Blooms in March

Pollen ***

Nectar **

DANDELIONS



Dandelion – bees eat this early Spring nectar & pollen (is not stored)

HENBIT (LAMIUM)



Red pollen

BLACK LOCUST TREES

Pollen ***
Nectar *****



TULIP POPLAR TREES

Pollen ***
Nectar *****



DUTCH CLOVER



SPRING BLOOMING



**Spiderwort
(*Tradescantia virginiana*)**

Perennial

Blooms in May

Pollen ***

Nectar ***

SPRING BLOOMING



**Buckwheat
(Fagopyrum
sagittatum)**

Annual

Blooms in June

Pollen **

Nectar ***

SUMMER BLOOMING



Salvia (Salvia x superba)

Summer blooming

Perennial

Pollen **

Nectar ***

SUMMER BLOOMING



**Lima Bean
(Phaseolus lunatus)**

Blooms in July

Annual Climbing Vegetable

Pollen *

Nectar ***

SUMMER BLOOMING



**Mountain Mint
(*Pycnanthemum
tenuifolium*)**

Blooms in July

Perennial Herb

Pollen **

Nectar ***

SUMMER BLOOMING



**Sunflower
(*Helianthus annuus*)**

Blooms in August

Annual

Pollen ****

Nectar ***

FALL BLOOMING



**Salvia ('Indigo Spires')
(Sage)**

Blooms in September

Perennial

Pollen **

Nectar ***

FALL BLOOMING



Sedum 'Autumn Joy'

Stonecrop

Blooms in September

Perennial

Pollen ***

Nectar ***

FALL BLOOMING



**Goldenrod
(*Solidago rugosa*)**

Blooms in October

Perennial

Pollen ***

Nectar ****

FALL BLOOMING



**Chrysanthemum
(Chrysanthemum
pacificum)**

**Blooms in
November**

Perennial

Pollen ***

Nectar ***

COVER CROPS FOR BEES



Crimson Clover

Summer or Winter N source



Yellow Sweet Clover

Biennial



Alfalfa

Perennial forage crop

MANY OTHERS

- **Blackberries**
- **Basswood trees (cities)**
- **Cucs, squash melons (on shore)**
- **Sumac**
- **Butterfly Bush**
- **Thistle (native)**
- **Joe Pye weed**

WHAT DO BEES NEED?

- **Pollen and Nectar rich flowers**
- **Large Swaths of same flowers**
- **Succession of bloom time from March to October**
- **Forage in between the main fruit or vegetable crop**

FLOWERS FOR HONEYBEES

- **12-20 Flowering species in a garden**
- **3-4 Plant species that bloom at a given time**
- **Combination of annuals & perennials**
- **Variety of flower colors & shapes
(whites/blues/yellows)**

FLOWERS FOR HONEYBEES

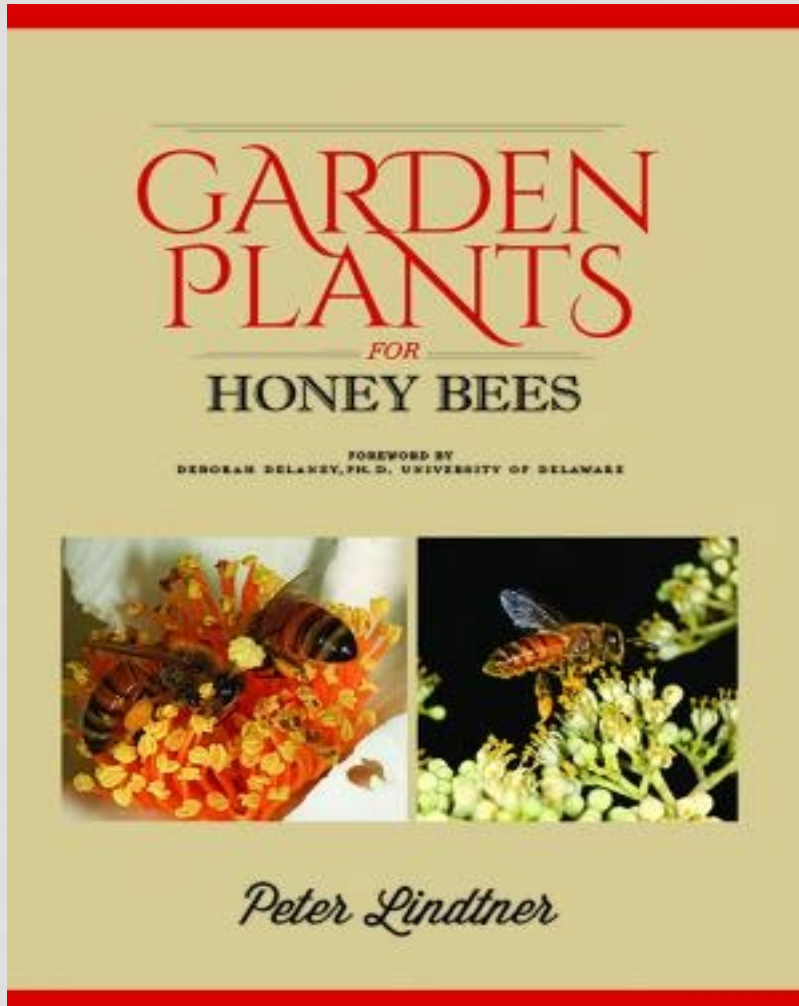
- **Plantings in strips or field margins**
- **Native plants – larval host plants for some species (Butterflies and Native bees)**



FLOWERS FOR HONEYBEES



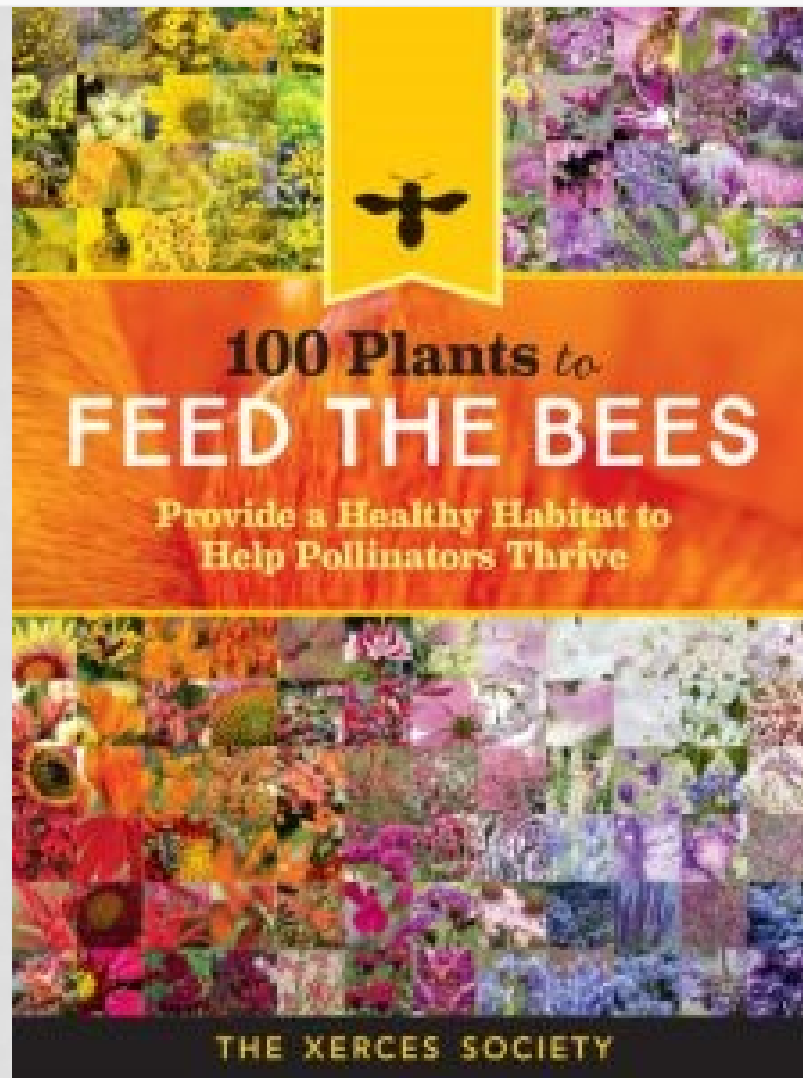
BOOKS



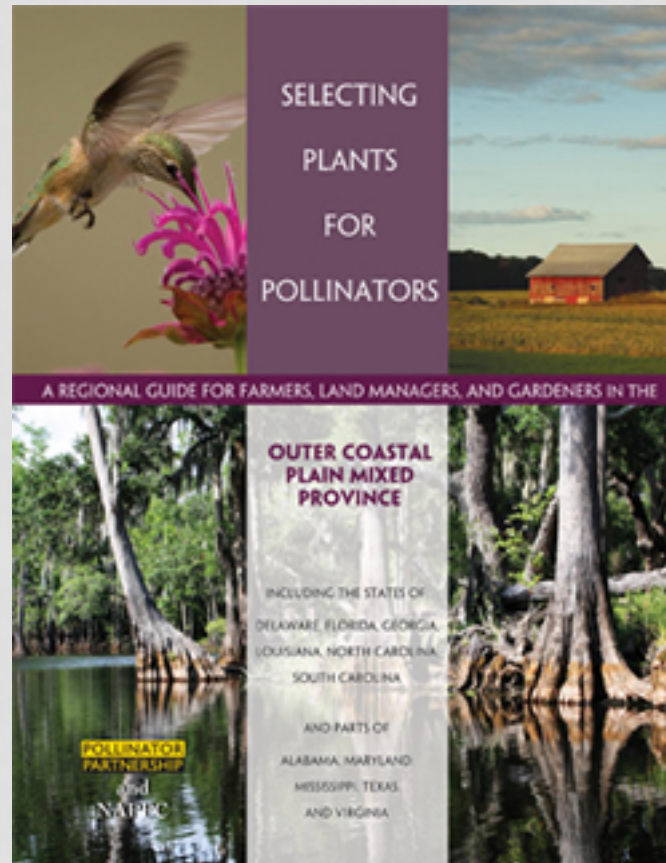
*** Least Resourceful**

******* Most Resourceful**

BOOKS



POLLINATOR PARTNERSHIP



QUESTIONS?

