

The background of the slide features a large, faint watermark of the Rutgers University seal. The seal is circular and contains the text "RUTGERS UNIVERSITY" around the perimeter and "1823" at the bottom. The seal is centered and occupies most of the slide's background.

RUTGERS

New Jersey Agricultural
Experiment Station

Pollinators: Not Just Honeybees

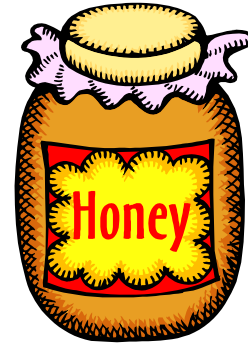
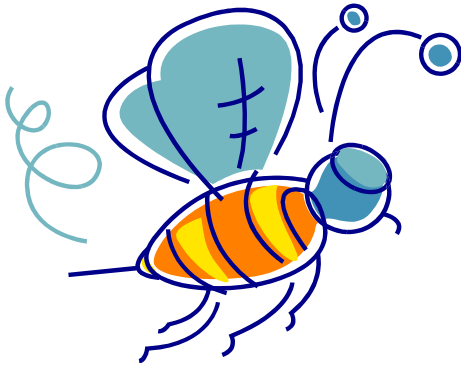
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Jan Zientek

Rutgers Cooperative Extension of Essex County



Bees + Flowers = Honey



FILLING LUNCH

WITH POLLINATORS

WITHOUT POLLINATORS



*Insect visitation produces robust apples and the tomatoes in your pizza sauce.
Alfalfa leafcutter bees and alkali bees help pollinate the alfalfa necessary
for dairy cows to produce cheese and butter.
Even the chocolate chips in your cookie rely on pollination by tiny flies.*

<https://diadasia.wordpress.com/category/bombus/>

COLORFUL DINNER

WITH POLLINATORS

WITHOUT POLLINATORS



Bumblebees increase tomato and pepper yields, especially in greenhouses. Squash bees pollinate zucchini, squash, and cucumbers, and avocados rely on honey bees. Mustard greens are grown from seed produced by insect pollination as well.

- 75% of plants are pollinated by animals
 - Honey bees
 - Native bees
 - Wasps
 - Moths
 - Flies
 - Bats
 - Birds
 - Beetles



www.usalovelist.com

- 1/3 of our food depends on bees' interaction with plants
- Many plants cannot reproduce without the help of pollinators

Science



&



Art

- Applied bee biology
- Anticipation not merely reaction
- Colony population management



- **A beekeeper's job is to do the least amount of damage to the bees.**
- **There are 2 things that kill bees:**
 - **Bears**
 - **Varroa mites**



Honey Bees: *Apis mellifera* L.



www.seedquest.com

- Types of Honey Bees:
 - Italian
 - Carnolian
 - Russian
 - Caucasion
 - Minnesota Hygenics
 - SMRs (*Apis Mellifera Hybrid*) – SMR (Suppression of Mite Reproduction)
 - Buckfast (from Buckfast Abbey)

Most pollination is - and will continue to be - done by the European honey bee.

This leaves us reliant on a single pollinator, one that is experiencing many problems.



Colony Collapse Disorder

- Disease/pathogen?
 - Israeli Acute Paralysis Virus?
 - New strain of *Nosema*?
- Pests?
- Poor diet?
- Insecticides?
- Stress?



Pollinators in Peril?



Why should I care?

Fewer Pollinators



Less pollination of flowers



- **REDUCED** production of fruits and vegetables
- **FAILURE** of native plant communities and habitat restoration projects
- **LIMITED** survival of endangered plants and animals.



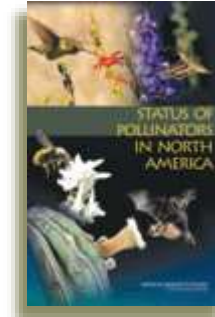


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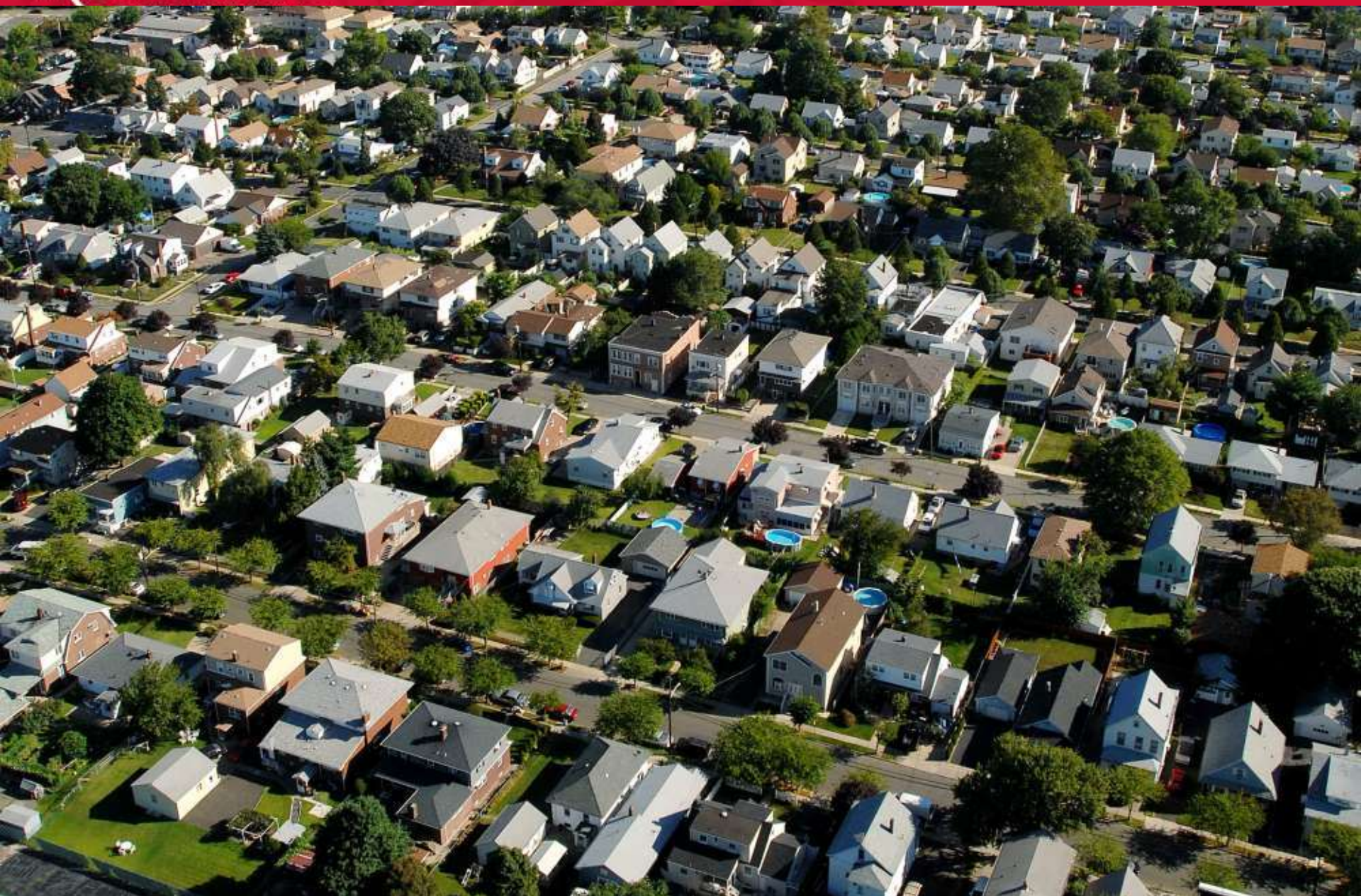
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- Habitat loss due to land use change
- Parasites, disease
- Pesticides, herbicides
- Nonnative pollinators
- Monocultures
- GM crops
- Climate change
- Protected lands limited



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Research demonstrates contribution of native bees to crop pollination:

- 51 species recorded visiting tomato, sunflower, or watermelon in California
- More than 80 bee species recorded visiting berry crops in Massachusetts, Maine, and Nova Scotia

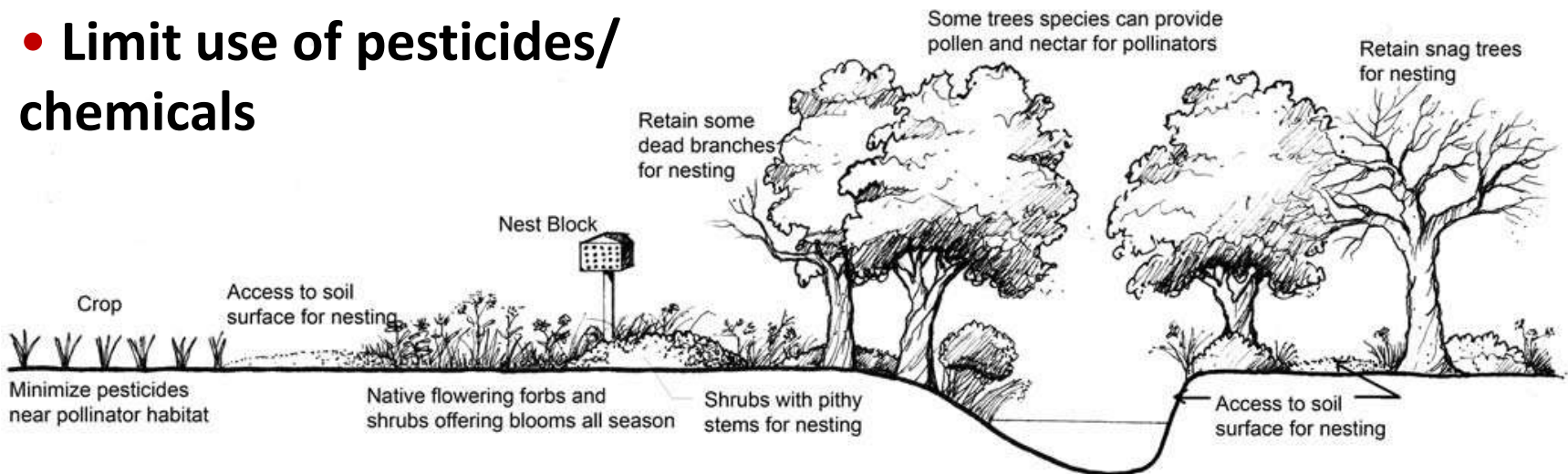
Example: sunflower pollination

When native bees were present, the seed set in hybrid sunflower fields more than doubled.

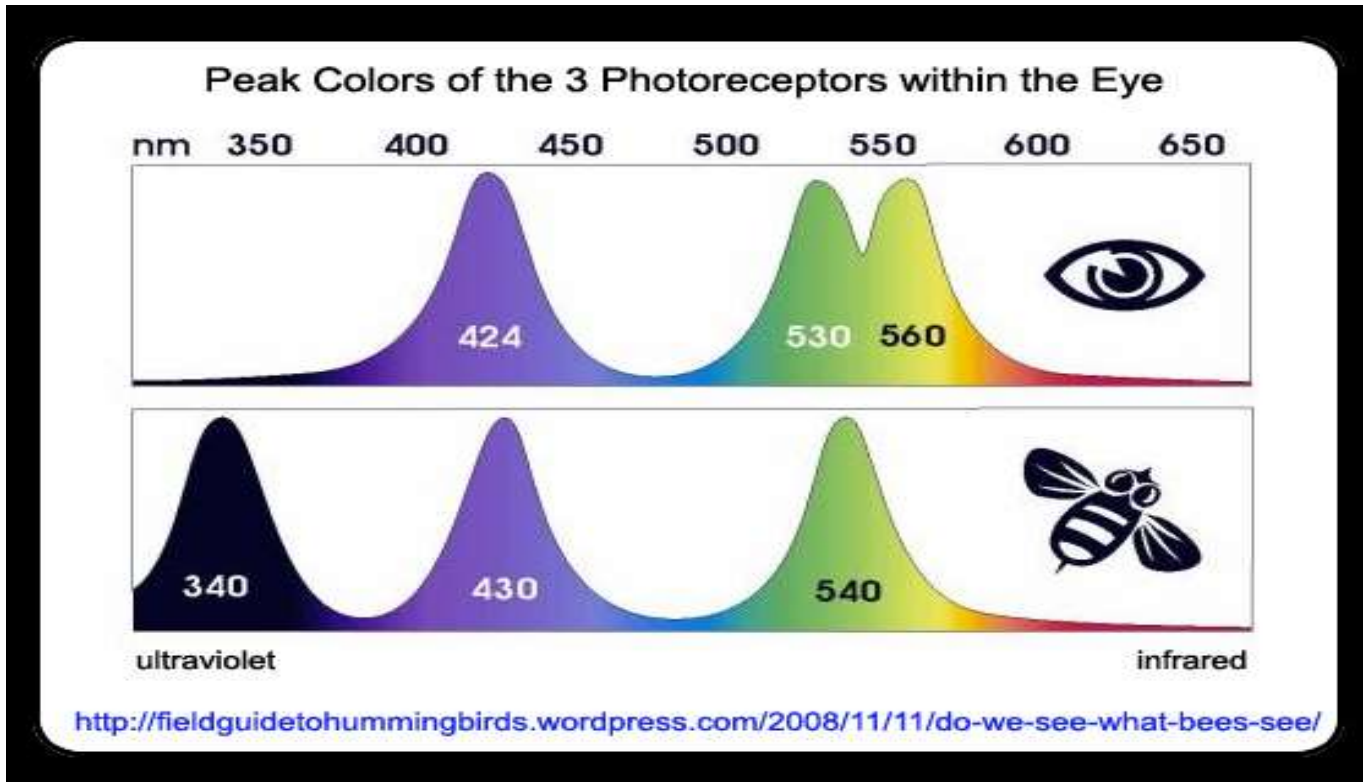


Creating habitat for pollinators

- Plant native species that have varying bloom periods.
- Provide access to water and nesting sites.
- Control or remove Invasive species
- Limit use of pesticides/chemicals



- We see in Red, Blue, Yellow
- Bees see UV, Blue, Green (think color blind)
- Bees do not see Red



UV Images of Flowers



- Nectar is a sweet liquid made in special glands called nectaries that are found on flowering plants
- Nectaries are most often found by the base of a flower's petals
- Nectar is the reward given to insects and small animals
- Nectar is the base ingredient of honey



- A well run ecological garden attracts birds and beneficial insects that help control pests
- Avoid insecticides, they are non selective
- Fungicides are also dangerous
- BT-bacillus thuringiensis
- Neonicotinoids
 - An insecticidal coating on seeds to prevent insect damage
 - Strongly suspected of being systemic (it stays inside the plant cells, in the blooms)



- Bees need water
 - Hydration-digestion, metabolism, brood, queen
 - Temperature and humidity regulation
- Bees can drown
- Floating landing platform needed
 - Stick, log, piece of wood, water plants, cork
- Ponds
- Streams
- Puddles
- Dew
- Garden Water Features (fountains)
- Can add hive water bottle
- Pools are not good



Native Early Spring Bloomers

- Native Perennials
 - Columbine*
 - Crocus-Prairie
 - Violets
 - Bluebells *
 - Virginia waterleaf *
 - Wild geranium *
 - Wild Indigo
- Weeds
 - Dandelions



www.flowerinfo.com



www.kew.org

Native Early Spring Bloomers

- Many of these are good for birds too
- Trees and shrubs
 - Fruit trees-apple, peach, cherry, crabapple
 - Dogwood – trees and shrubs
 - Chokecherry
 - Lilac
 - Red Bud
 - Rose
 - Serviceberry
 - Strawberry
 - Viburnum
 - Willow
 - Wild Plum
 - Black locust
 - Raspberry



www.youtube.com



www.coloradotrees.org

Native Summer Bloomers

- Native Perennials
 - Beebalm
 - Black-eyed Susan
 - Blazing Star
 - Clover
 - Compass plant
 - Cup Plant
 - Mint
 - Phlox
 - Purple Cone flower
 - Spiderwort
 - Coreopsis (tickseed)
 - Yarrow

- Native 'Weeds'
 - Butterfly Weed
 - Milkweed



www.altnature.com



www.grownative.org

- Squash plants
- Pumpkins
- Pepper
- Beans
- Tomatoes
- Eggplant
- Potatoes
- Basil
- Cosmos
- Lavender
- Rosemary
- Marigolds
- Zinnia



www.edenbrothers.com



www.victorslavender.com

- Native Perennials
 - Aster
 - Goldenrod
 - Sunflowers
- ‘Weeds’
 - Joe-pye weed
 - Ironweed



www.edenbrothers.com



www.beesource.com

Bombus



Xylocopa virginica



Bumble Bee Carpenter Bee

Andrena, Colletes...



www.securitypest.com

Halictidae

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www.cirrusimage.com



Megachile



Peponapis pruinosa



Osmia



Colletes



Steps You Can Take:

- Decrease use of pesticides
- Plant native varieties
- Create habitat in your yard, community, or town



Steps You Can Take:

- Call professionals to remove swarms
 - Contact your local animal control department or NJ Beekeeper Association to remove and take away.
 - Do not kill
- Avoid Chemical Treatments
 - Impairs foraging for food



www.hardyhoney.com

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