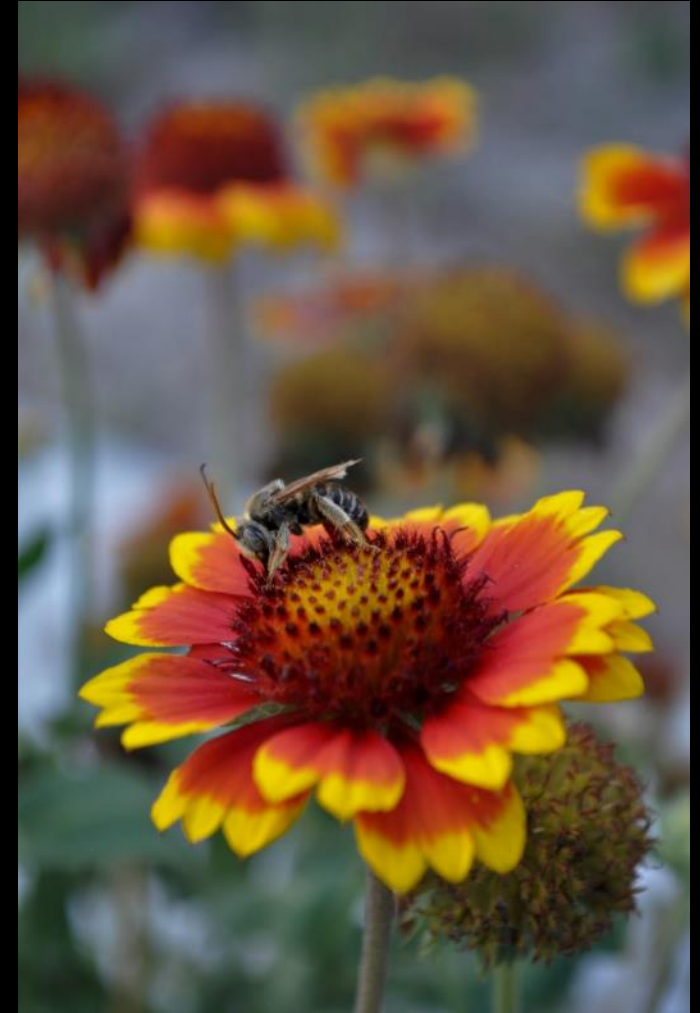


Supporting native bees in your garden

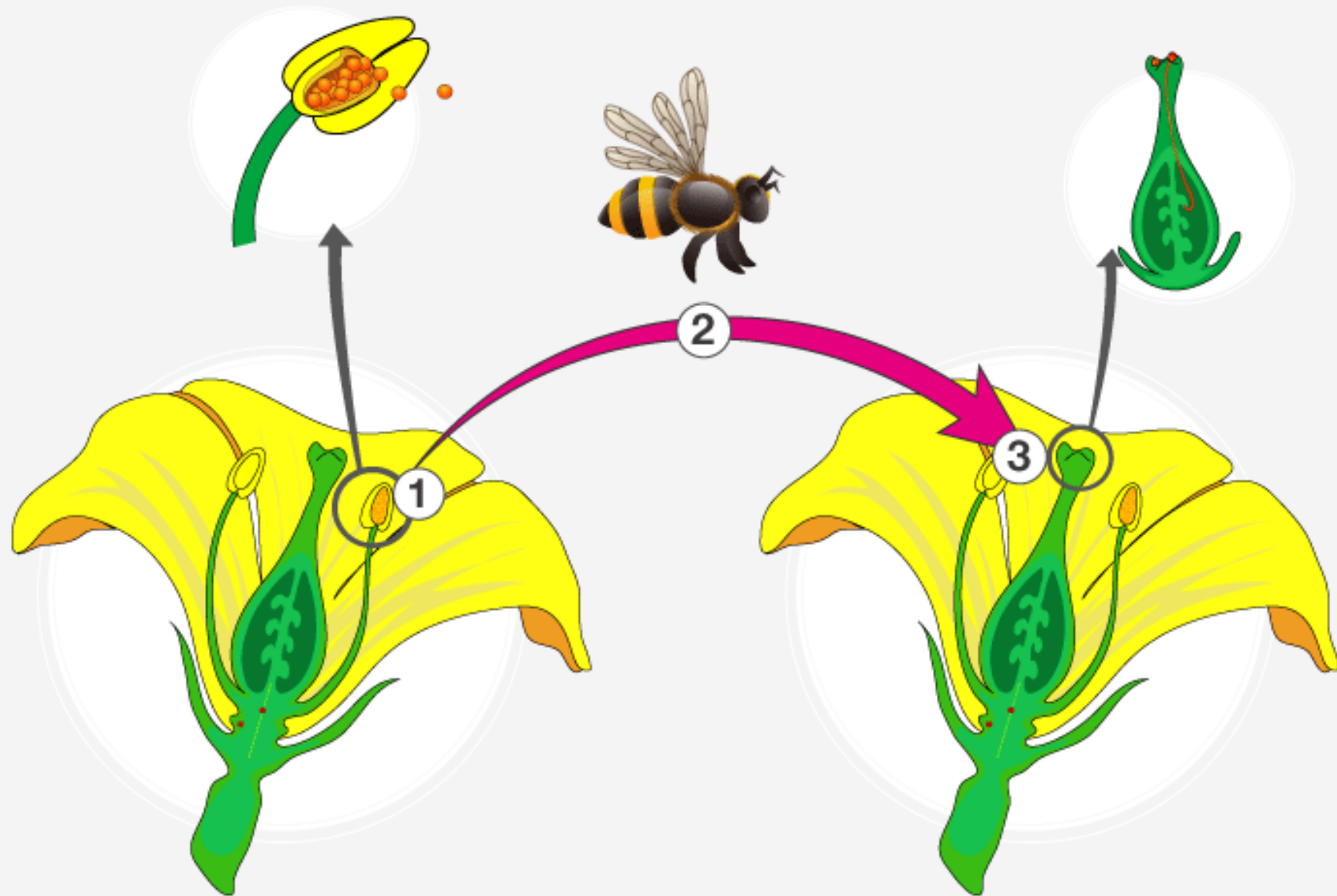


Dr. Rachel Mallinger





POLLINATION



Why are pollinators important?

- 85% flowering plants are animal-pollinated
- Maintain plant biodiversity
- Produce fruits and seeds
 - Food source for birds and mammals



Agriculture and pollinators

- 87 of 115 crops
- 35% of crop production worldwide



Native wild bee decline in North America

- 1,437 (of 4,337) species assessed
- 749 (over half) are declining
- 347 (1 in 4) are imperiled

POLLINATORS IN PERIL



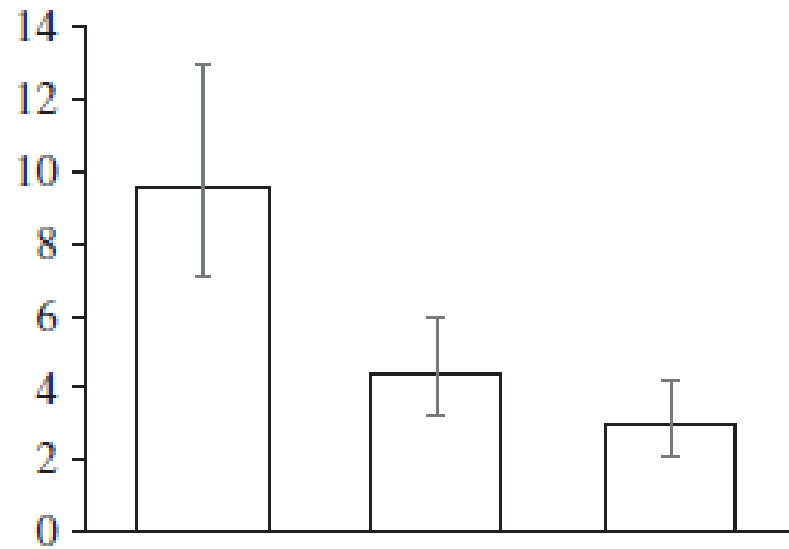
A systematic status review of North American and Hawaiian native bees

Kelsey Kopec & Lori Ann Burd • Center for Biological Diversity • February 2017

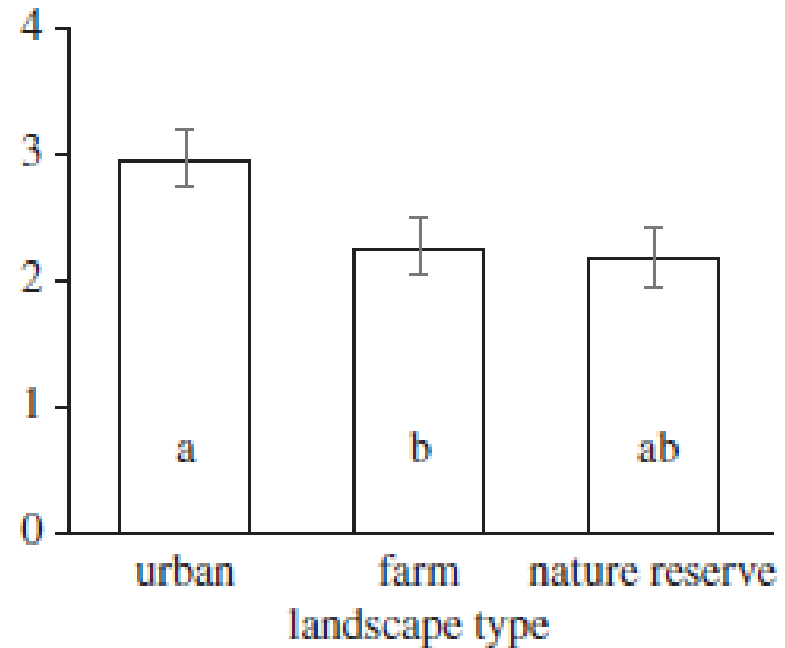




(b)



(e)



Baldock et al. 2015



What is a bee?

Kingdom: Animalia

Phylum: Arthropoda

Class: Insecta

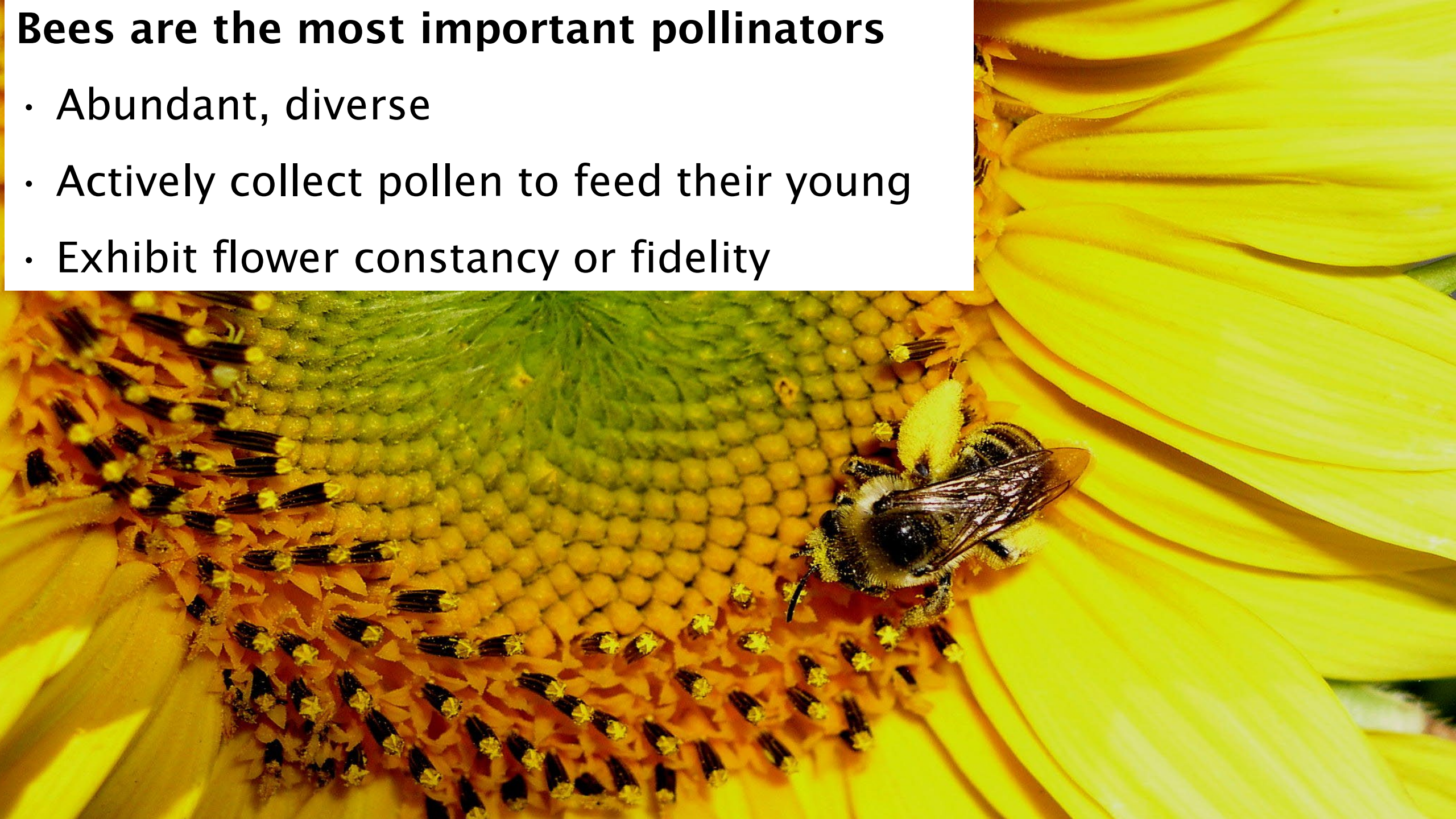
Order: Hymenoptera

Family: 7 families



Bees are the most important pollinators

- Abundant, diverse
- Actively collect pollen to feed their young
- Exhibit flower constancy or fidelity



How Many Bees?



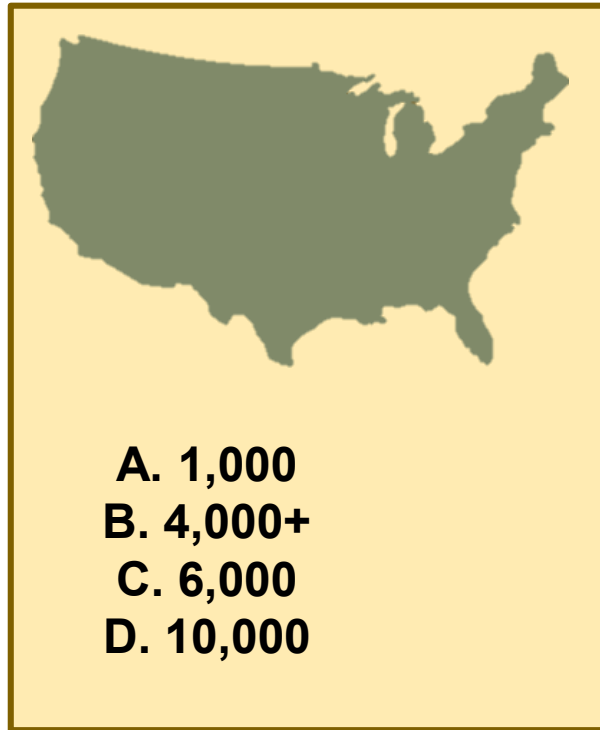
How Many Bees?



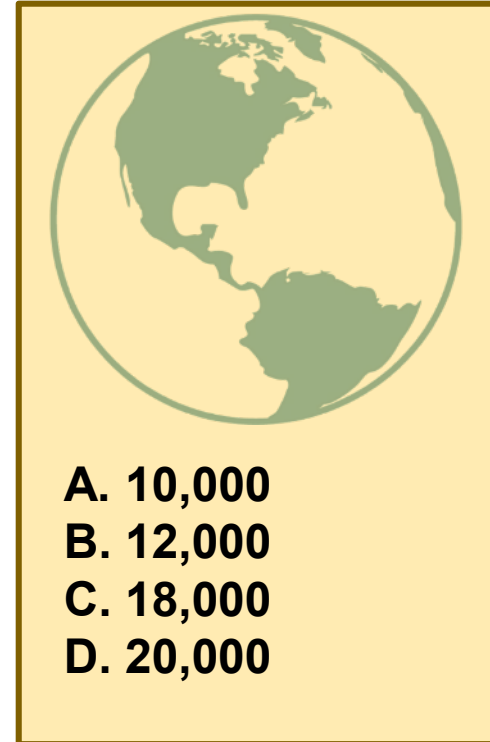
- A. 55
- B. 175
- C. 320
- D. 5550



How Many Bees?



How Many Bees?



Honey bees



Apis mellifera

Single species in U.S.
Non-native



Native Bees in North America

Main groups:

- Mining bees
- Plasterer bees
- Leafcutter bees
- Mason bees
- Resin bees
- Sweat bees
- Bumble bees
- Long-horned bees
- Carpenter bees
- Cuckoo bees



Honey bees

- Eat pollen and nectar for whole life
- Can sting



Other bees

- Eat pollen and nectar for whole life
- (most) Can sting



Honey bees

- **Social, large colonies**
 - Queens and workers
- **Managed bee**
- **Live aboveground**



Other bees

- **(mostly) Solitary, no large colonies**
 - No division of labor – each female is a mother
- **Wild organisms**
- **(most) Live belowground**



Conserving bees in your garden

1. Flowers
2. Nest habitat
3. Protection from toxins



Flowers

Bees eat pollen and nectar throughout entire life (larvae – adults)



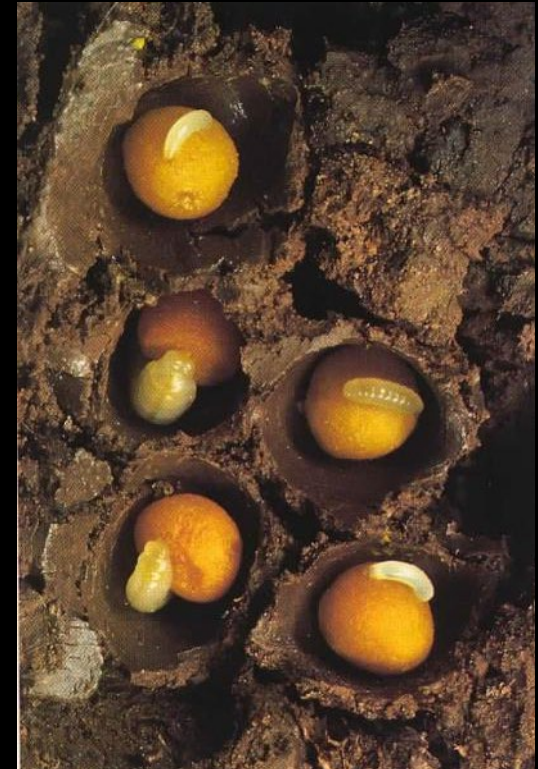
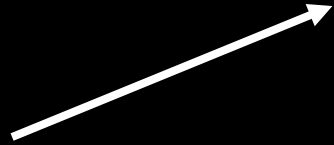
Flowers

Mothers provision nests with pollen and nectar

No migration

Majority generalists

Specialist bees rely on pollen from specific plants or plant groups

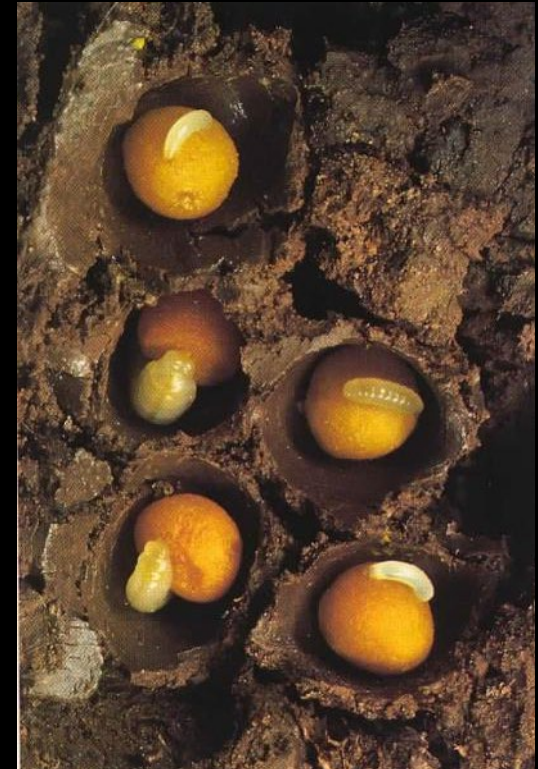


Flowers

Different bees forage at different times

Some species forage throughout most of the year (bumble bees)

Other species forage for a short period ~1 month



Tips for flowers

Diversity of flowering plants throughout the year



Tips for flowers

- Early blooming plants: trees and shrubs
- Late blooming plants: herbaceous wildflowers



Tips for flowers

- Native plants
 - May be more attractive
 - Better for specialist bees
 - Non-native plants can provide valuable nectar



Tips for flowers

- Color: Yellow, white, purple/blue flowers
- Bees not as attracted to red/orange/pink
- Shape: Relatively short flower tubes (flat flowers)
- Bees cannot access nectar from long tubes

Not a bee plant



Bee plant



Bee plant



Best trees/shrubs for bees



Chaste tree



Sweet almond



Sabal palm



Saw palmetto



Eastern redbud



Partridge pea



Walter's virburnum



Sparkleberry

Florida wildflowers



Monarda/bee balm/dotted horsemint



Blanketflower



Coreopsis



Salvia



Liatris/blazing star



Stokes aster



Sunflower (beach)



**False rosemary
(*Conradina* spp.)**

Herbs, fruits, vegetables

- Basil (African Blue Basil)
- Borage
- Mint
- Thyme
- Rosemary
- Cucurbits (melons, squash)
- Cherries
- Plums & peaches
- Passion fruit



Weeds for bees

- Spanish needle (*Bidens alba*)
- Thistles
- Spiderwort
- Goldenrod



What about these?

- Pentas
- Zinnias
- Cosmos
- Coral honeysuckle
- Nasturtiums
- Lantana
- Azaleas
- Marigold
- Cannas
- Roses
- Camellias



Conserving bees in your garden

1. Flowers
2. Nest habitat
3. Protection from toxins



Nesting resources

- Majority (70%) nest underground
 - Tunnels or shallow cavities
- Aboveground nesters (30%)
 - Some excavate own nests
 - Others use pre-existing cavities



Belowground nesters



Photo by P. Westrich





Aboveground nesters

Tips for nesting resources



- Well drained soil
- Relatively bare
- No heavy mulch
- No weed barrier
- Sunny spot
- No disturbance

Tips for nesting resources



Tips for nesting resources

Small and long cavities (4 – 12 mm diameter holes, at least 150 mm long)

Replaceable liners (paper)

Cavities that can be cleaned



Tips for nesting resources

Secure a few feet above ground to post/stake/wall

Face east or southeast

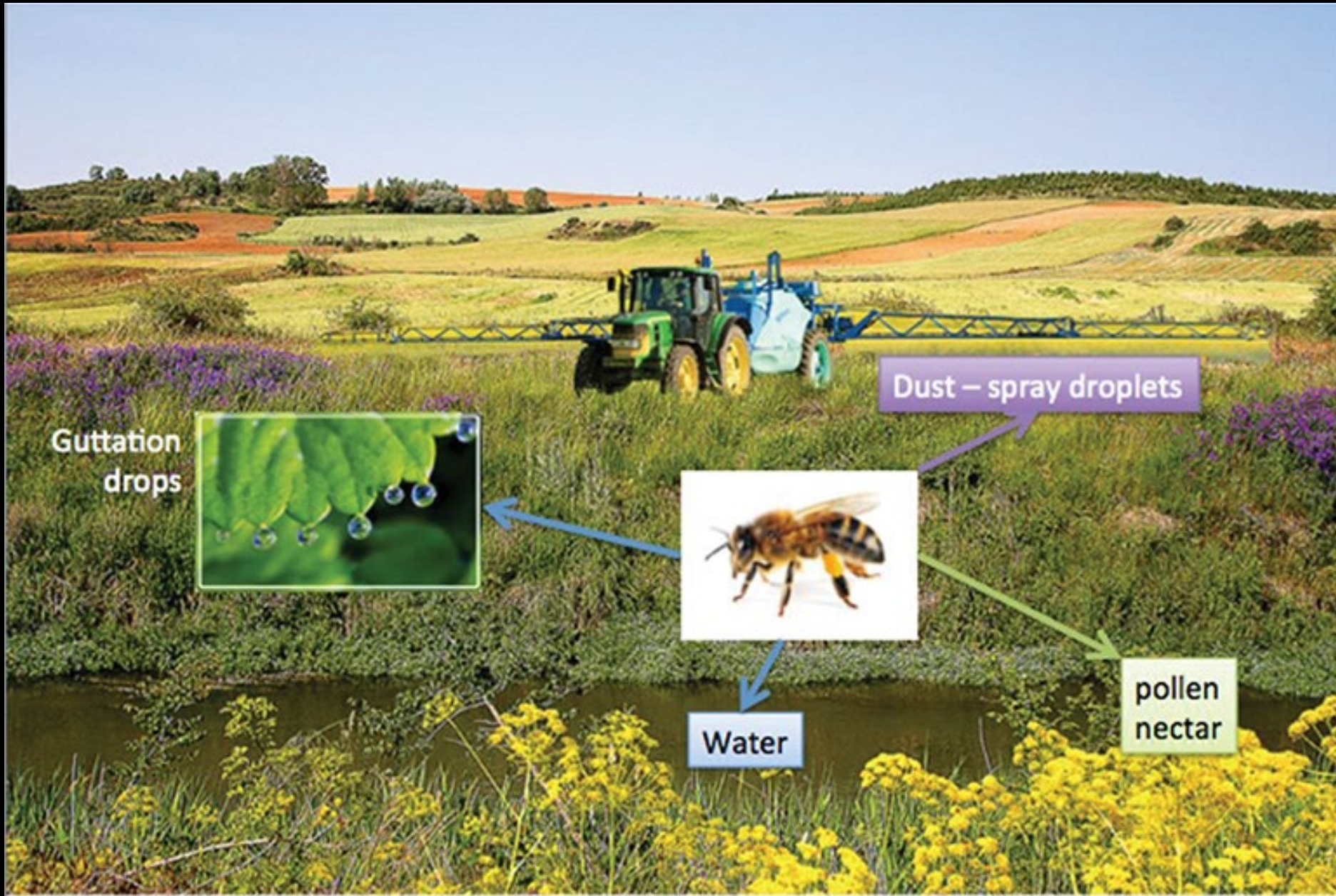


Conserving bees in your garden

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2. Nest habitat
3. Protection from toxins

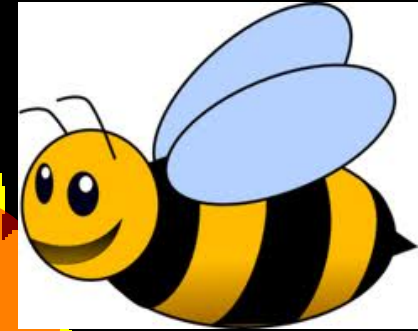
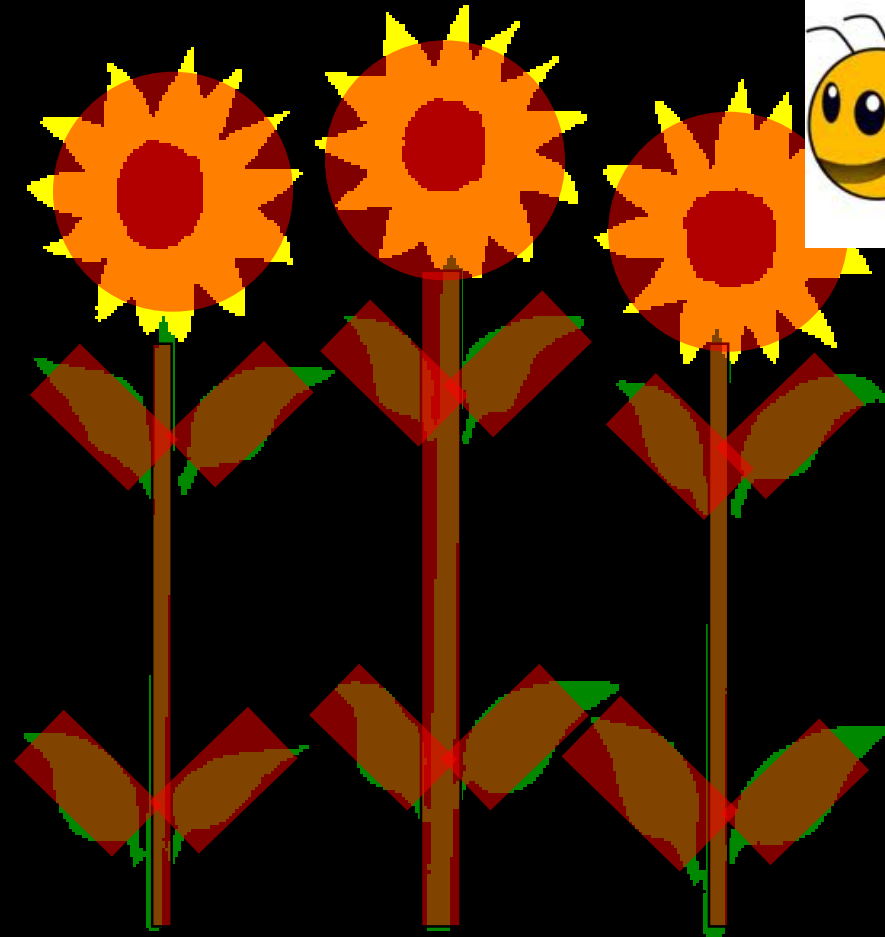


Protection from toxins



Tips for protection

Avoid seeds or starts that have been treated with systemic pesticides



Systemic neonicotinoids



*imidacloprid, acetamiprid,
clothianidin, dinotefuran,
nithiazine, thiacloprid and
thiamethoxam*

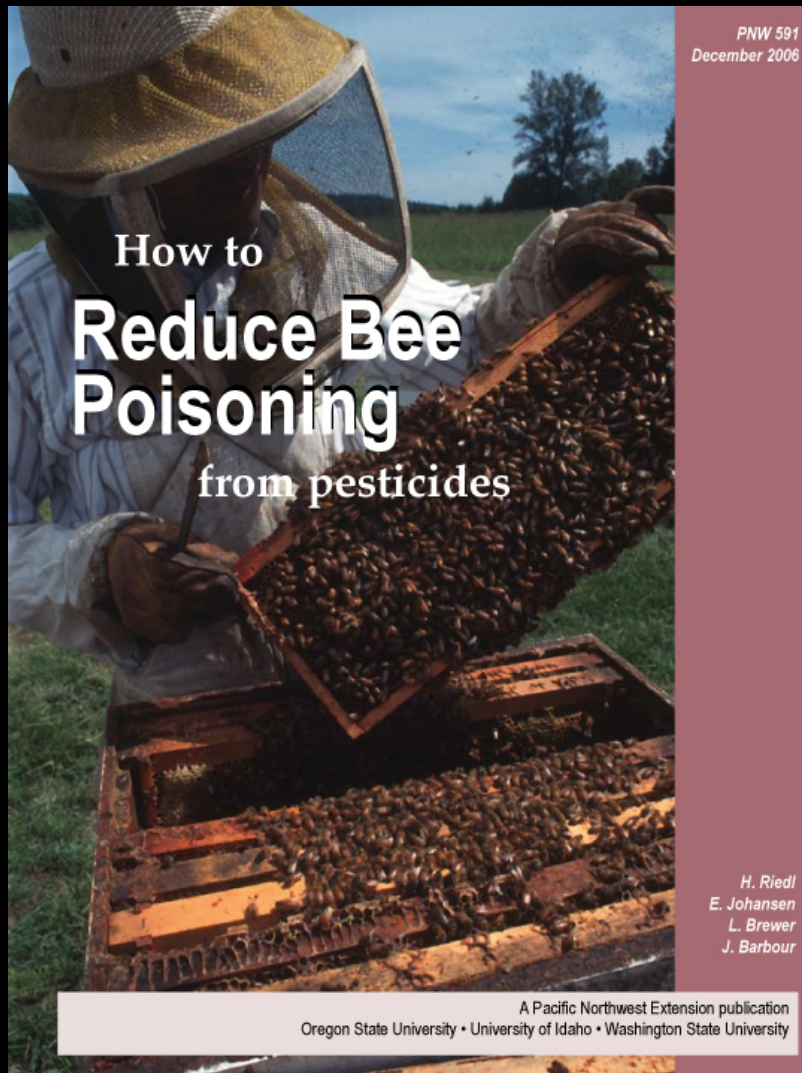


Tips for protection



- Do not spray plants in bloom
 - Look for flowering weeds
- IF spraying flowers
 - Spray late in day/night
 - Use chemicals with short activity period
- Minimize all chemicals
 - Including fungicides and insecticides

Tips for protection



- Low acute toxicity to bees
- Minimal residual activity
 - Systemic pesticides = high residual activity
 - Organic pesticides = shorter residual activity



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