

Beneficial Insects

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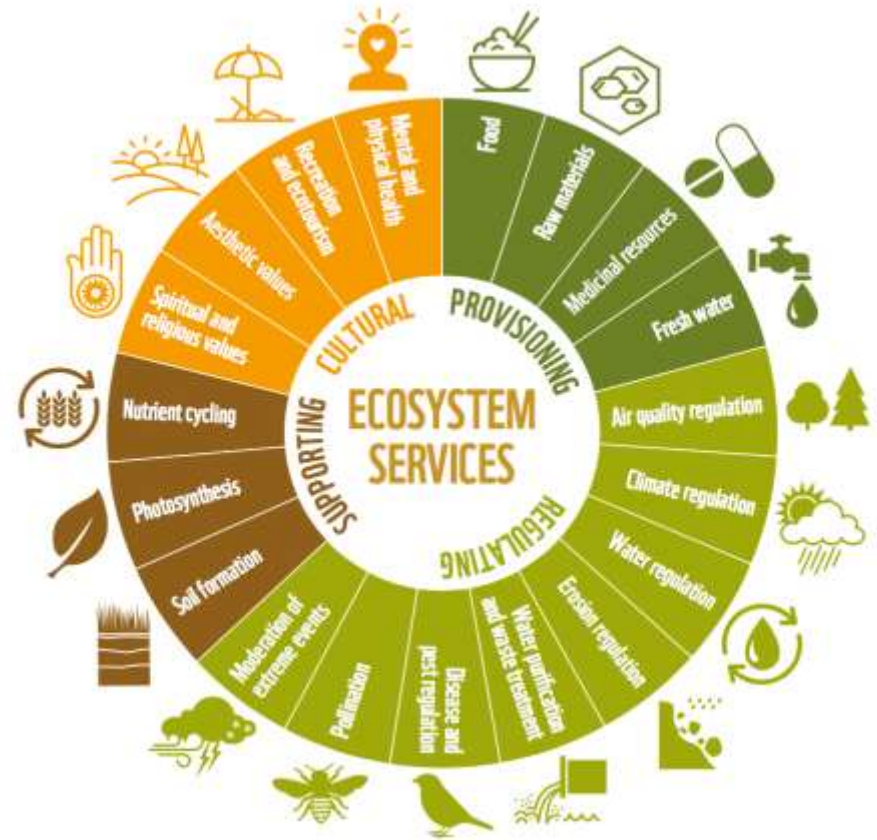
Agricultural Science Center
at Los Lunas



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Insects and Ecosystem Services

- Nutrient recycling
- Decomposing plant and animal waste
- Aerating soil particles and helping soil quality
- Food for fish, songbirds, and other wildlife
- Natural pest control
- Pollination



Beneficial Insects

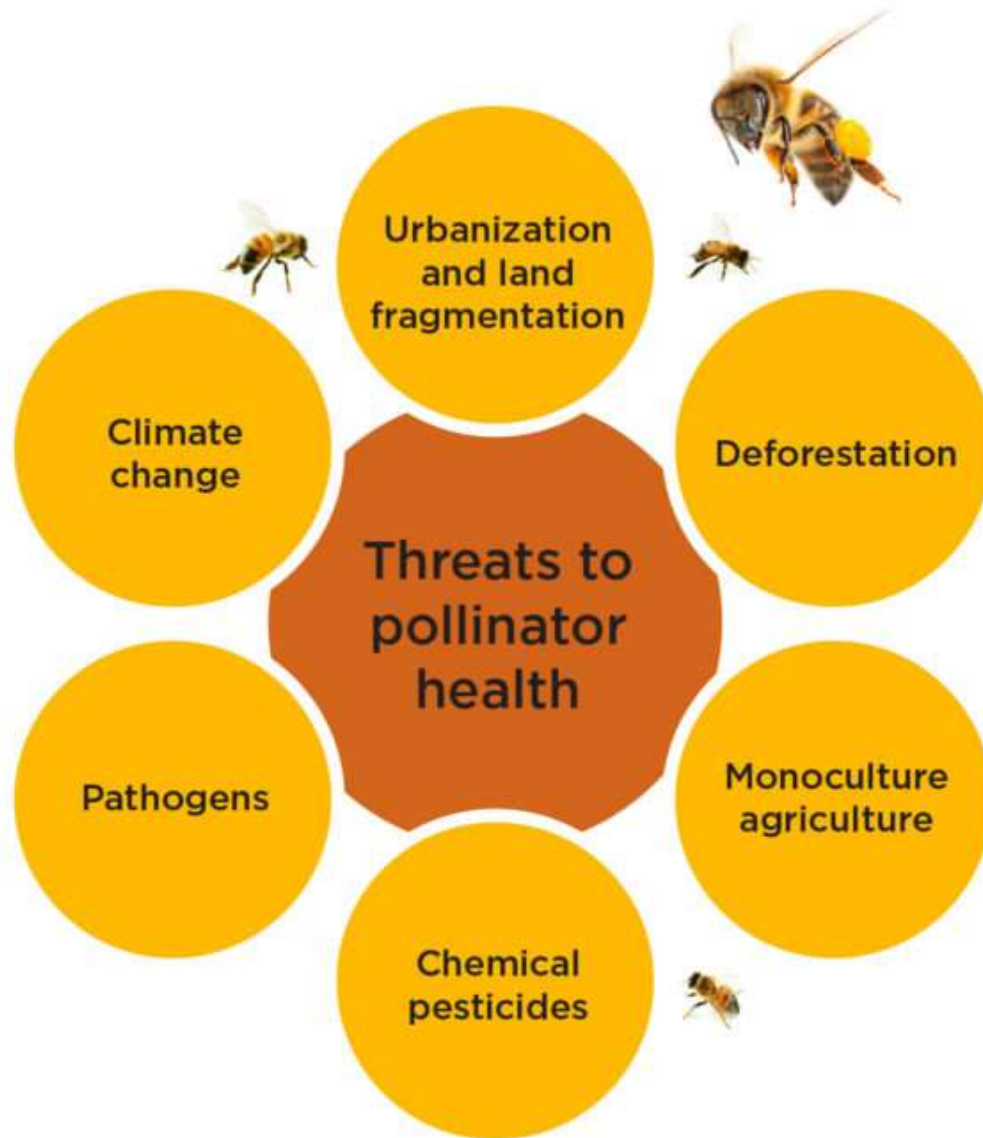
- Pollination
- Pest Control (Natural Enemies)
 - Predatory insects
 - Parasitoid insects



Importance of Pollinators

- Over 80% of plants pollinated by animals
- Food for humans and wildlife
 - Pollination Services: \$24 billion
 - Honeybees: \$15 billion
 - Native bees: \$9 billion
- Keystone species group
- Indicator species





Melissa Tinling



Bees

- 4000 species native to the U.S.
- Over 1000 species in New Mexico
- Specialist and generalists
- Activity based on season

Specialist Bees

- 35% of bees species in western United States
- New Mexico (417 spp.; 46% spp.)
- Mostly Asteraceae
 - Sunflowers
 - Chamisa
 - Goldenrod
- Willows (*Salix* sp.)
- Brassicaceae
- Globemallow
- Prickly pear and Cholla



https://jarrodfoowler.com/pollen_specialist.html

Peak Bee Activity

Family	Genus	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov
Colletidae	<i>Colletes</i>				★	★	★				
Colletidae	<i>Hylaeus</i>					★	★				
Andrenidae	<i>Andrena</i>			★	★	★					
Andrenidae	<i>Perdita</i>				★	★	★				
Melittidae	<i>Melitta</i>			★							
Halictidae	<i>Halictus</i>					★	★				
Halictidae	<i>Lasioglossum</i>				★	★	★				
Halictidae	<i>Augochlorella</i>				★	★	★	★			
Megachilidae	<i>Osmia</i>			★	★	★					
Megachilidae	<i>Megachile</i>				★	★					
Apidae	<i>Anthophora</i>				★	★	★				
Apidae	<i>Bombus</i>				★	★	★				
Apidae	<i>Ceratina</i>				★	★	★				
Apidae	<i>Melissodes</i>							★	★		
Apidae	<i>Xylocopa</i>				★	★	★				

Source: Bees in Your Backyard





Nesting behaviors of native bees

Stem Nesting

- Standing dead trees, woody debris, logs or dried stems left in gardens
- **30% of native bees**

Nesting behaviors of native bees

Ground Nesting

- Bare patches of ground, mounds of soil
- **70% of native bees**

Honey Bees



- Introduced
- Generalists
- Foraging distance: > 3 miles
- Cavity nesters
- Differ from other bees in North America:
 - Social (Queen and workers live in a hive)
 - Produce large amounts of honey
 - Activity based on temperature



Other insect pollinators

Common Natural Enemy Groups



Syrphid Flies

- Larvae: Predator
- Adult: Pollen and nectar
- Prey: aphids, scale insects, spider mites, thrips
- Active: Spring through fall



Tachinid Flies

- Larvae: Parasitoid
- Adults: Nectar
- Hosts: Larval stage - butterflies, moths, beetles, grasshoppers, etc.



Minute Pirate Bugs

- Predators but also feed on pollen and nectar
- Prey: Soft-bodied insects
- Active: Late spring to summer



Lady Beetles

- Larvae: Predators
- Adults: Predators but also feed on pollen, nectar, and honeydew
- Prey: Aphids, scale insects, mites, thrips, insect eggs
- Active: Spring through fall



Lacewings

- Immature: Predators
- Adult: Predators but also feed on nectar, pollen, honeydew
- Prey: soft-bodied insects
- Active: Spring to summer



Predatory Wasps

- Larvae: predators
- Adults: Predators; supplement diet with nectar
- Prey: Insects and spiders
- Active: Spring to fall



Parasitoid Wasps

- Larvae: Predators of hosts
- Adults: Visit flowers for nectar, pollen, and honeydew
- Hosts: Aphids, scale insects, butterflies and moths, leafhoppers, flies, stink bugs, etc.
- Target eggs, larvae, or adults



Photo: Shaun McCoshum

Parasitoid Wasps



Evidence of Parasitism



Evidence of Parasitism



Photo: Chazz Hesselein, Bugwood.org

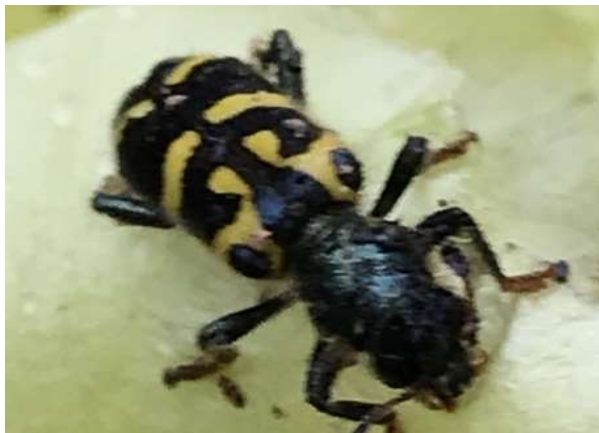
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Evidence of Parasitism



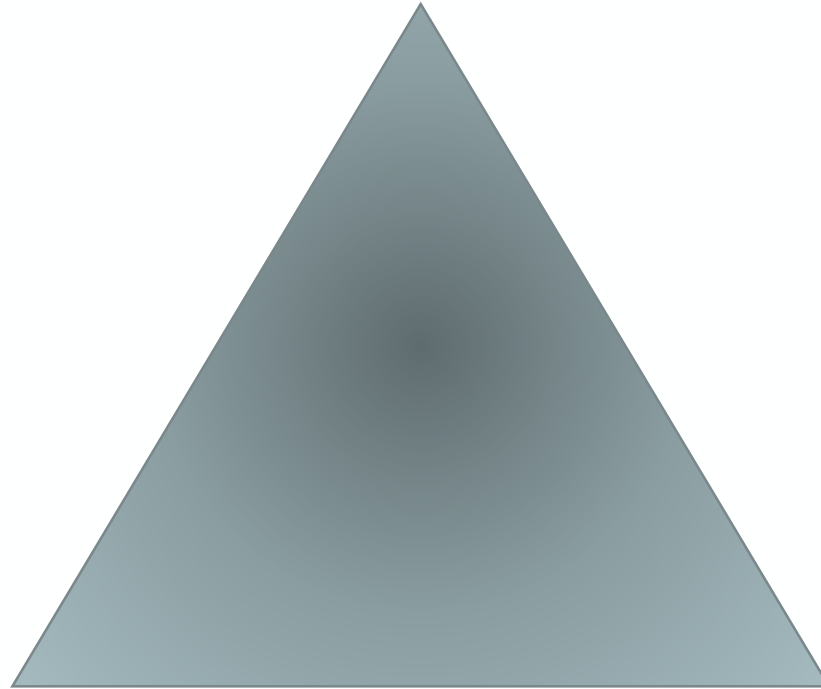
Photo: Lyle Buss

Other Natural Enemies



Flowers:

Specialist, diversity, abundance, phenology



Supplements:

Additional food
Nesting material
Hibernation sites

Reproduction:

Host plants
Nesting sites
Specific microhabitats

Ollerton, J. 2021. Pollinators & Pollination



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Beneficial Insect Habitat

- Adding flower resources
 - Pollen and nectar
 - Alternative prey
- Overwintering habitat/nesting sites
- Minimize chemical exposure
- Minimize tilling to conserve overwintering bees and natural enemies in soil



Annual Plants for Beneficial Insects

- Benefits:
 - Quick establishment
 - Readily produce flowers
 - Easy rotation
 - Low cost





Annual Plants for Beneficial Insects

- Suggested mixture:
 - California bluebell
 - Buckwheat
 - Dill
 - Plains coreopsis
 - Garden cosmos
 - Sweet alyssum



**Using Insectary Plants to Attract and Sustain
Beneficial Insects for Biological Pest Control**

Revised by Ashley Bennett¹

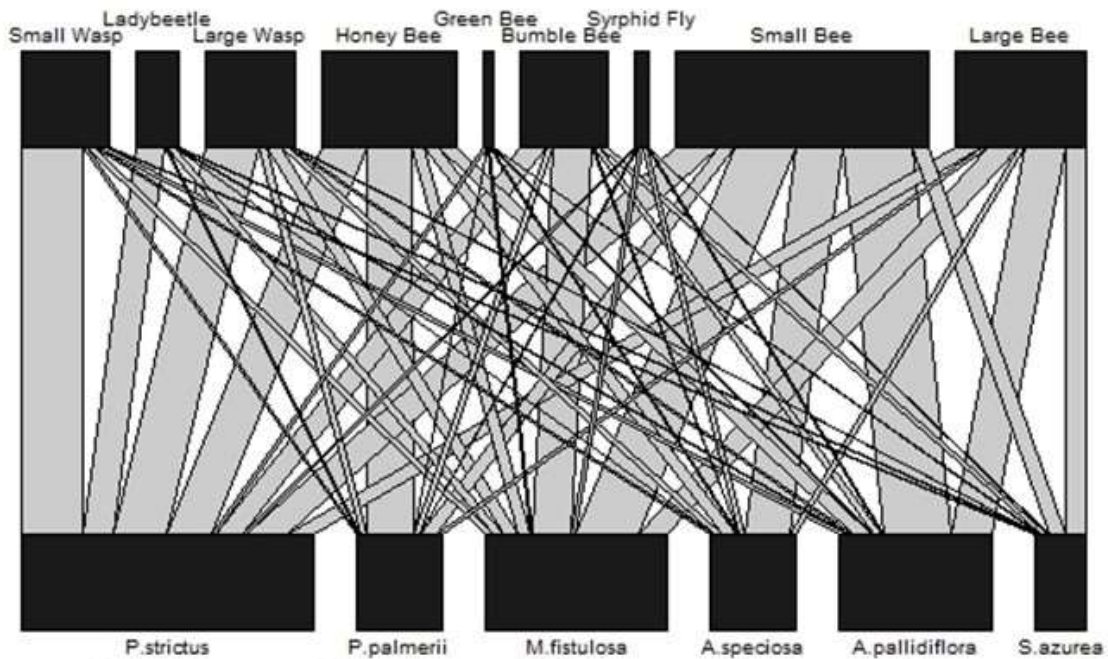
Perennial Plants for Beneficial Insects

Benefits:

- Yearly flower resources
- Many require less water once established
- Lower maintenance once established
- Attract diverse groups of insects



Mix 1: Bumble Bees



Rocky Mountain penstemon
(*Penstemon strictus*)



Palmer's penstemon
(*Penstemon palmerii*)



Wild bergamot
(*Monarda fistulosa*)



Showy milkweed
(*Asclepias speciosa*)



Giant hyssop
(*Agastache pallidiflora*)

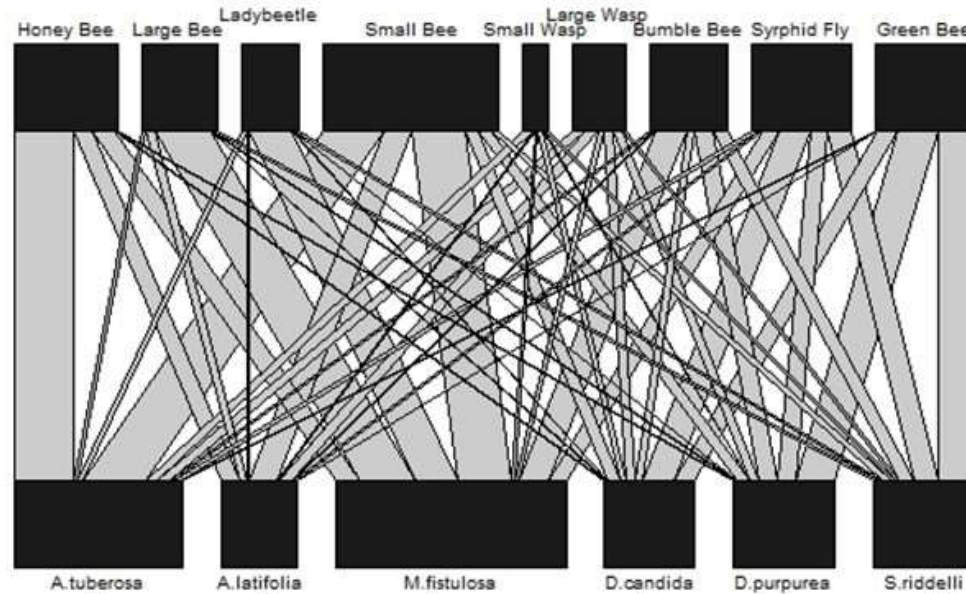


Blue sage (*Salvia azurea grandiflora*)

Plant Species	Year	May	June	July	August	September	October
Rocky Mountain penstemon (<i>Penstemon strictus</i>)	2018	Purple			Black		
	2019	Purple					
Palmer's penstemon (<i>Penstemon palmerii</i>)	2018	Grey			Black		
	2019	Grey					
Bergamont (<i>Monarda fistulosa</i>)	2018		Purple		Black		
	2019		Purple				
Showy milkweed (<i>Asclepias speciosa</i>)	2018			Pink	Black		
	2019	Pink					
Giant Hyssop (<i>Agastache pallidiflora</i>)	2018	Purple			Black		
	2019	Purple			Purple		
Blue sage (<i>Salvia azura grandiflora</i>)	2018	Black					
	2019			Blue			



Mix 4: Natural Enemies



Butterfly milkweed
(*Asclepias tuberosa*)



Broadleaf milkweed
(*Asclepias latifolia*)



Wild bergamont
(*Monarda fistulosa*)



White prairie clover
(*Dalea candida*)



Purple prairie clover
(*Dalea purpurea*)



Riddell's ragwort
(*Senecio riddellii*)

Plant Species	Year	May	June	July	August	September	October
Butterfly milkweed (<i>Asclepias tuberosa</i>)	2018						
	2019						
Broadleaf milkweed (<i>Asclepias latifolia</i>)	2018						
	2019						
Bergamont (<i>Monarda fistulosa</i>)	2018						
	2019						
White prairie clover (<i>Dalea candida</i>)	2018						
	2019						
Purple prairie clover (<i>Dalea purpurea</i>)	2018						
	2019						
Riddell's ragwort (<i>Senecio riddelli</i>)	2018						
	2019						



Beneficial Insect Habitat





Other Habitat Benefits

- Erosion control
- Reduced run-off
- Aesthetics
- Nutrient management
- Pollination services
- Soil health

Contact Information

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