Bring Back the Pollinators: Stewardship of the Desert Ecosystem in New Mexico

Elliott Gordon

Xerces Ambassador

ABQ Backyard Refuge Neighborhood Ambassador

Albuquerque, New Mexico

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Photo: Elliott Gordon

xerces.org

The Xerces Society

Named for the Xerces blue butterfly

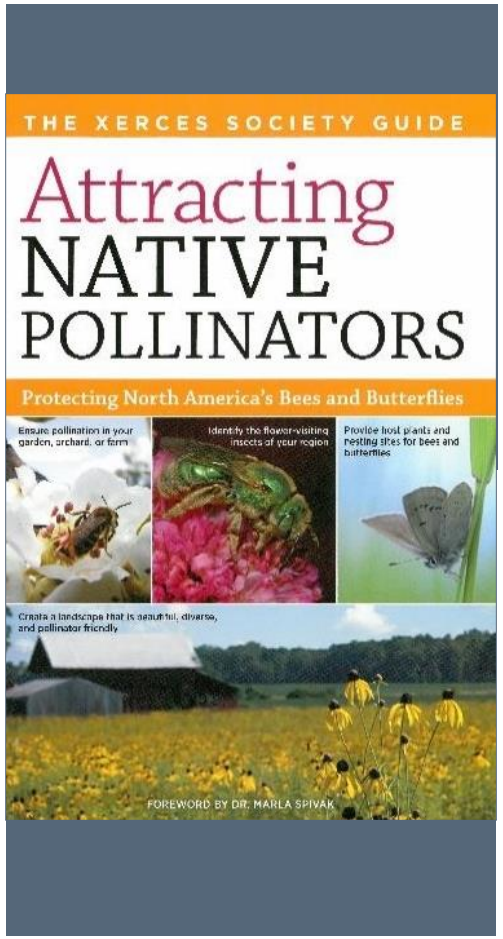
Last seen flying in 1943

The Xerces Society for Invertebrate Conservation is an international nonprofit organization that protects the natural world through the conservation of invertebrates and their habitats

xerces.org

Protecting the Life That Sustains Us

- Conservation
- Advocacy
- Research
- Education



Photos: Paul Jepson; Dick Dewey; Xerces Society/Brianna Borders

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Thank You to Xerces' Partners

We don't work in isolation—the Xerces family is large and diverse

- Over 17,000 Xerces Society members in 15+ countries.
- Scores of private foundations that provide funding.
- More than 100 scientists at universities around the world.
- Dozens of federal, state, and local agencies.
- Hundreds of farmers and land managers that have worked with us on habitat projects.
- Over 50 companies supporting us.
- Thousands of people who act to protect invertebrates in their neighborhoods.

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Why Care About Pollinators?

Photo: Elliott Gordon

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Pollination 101

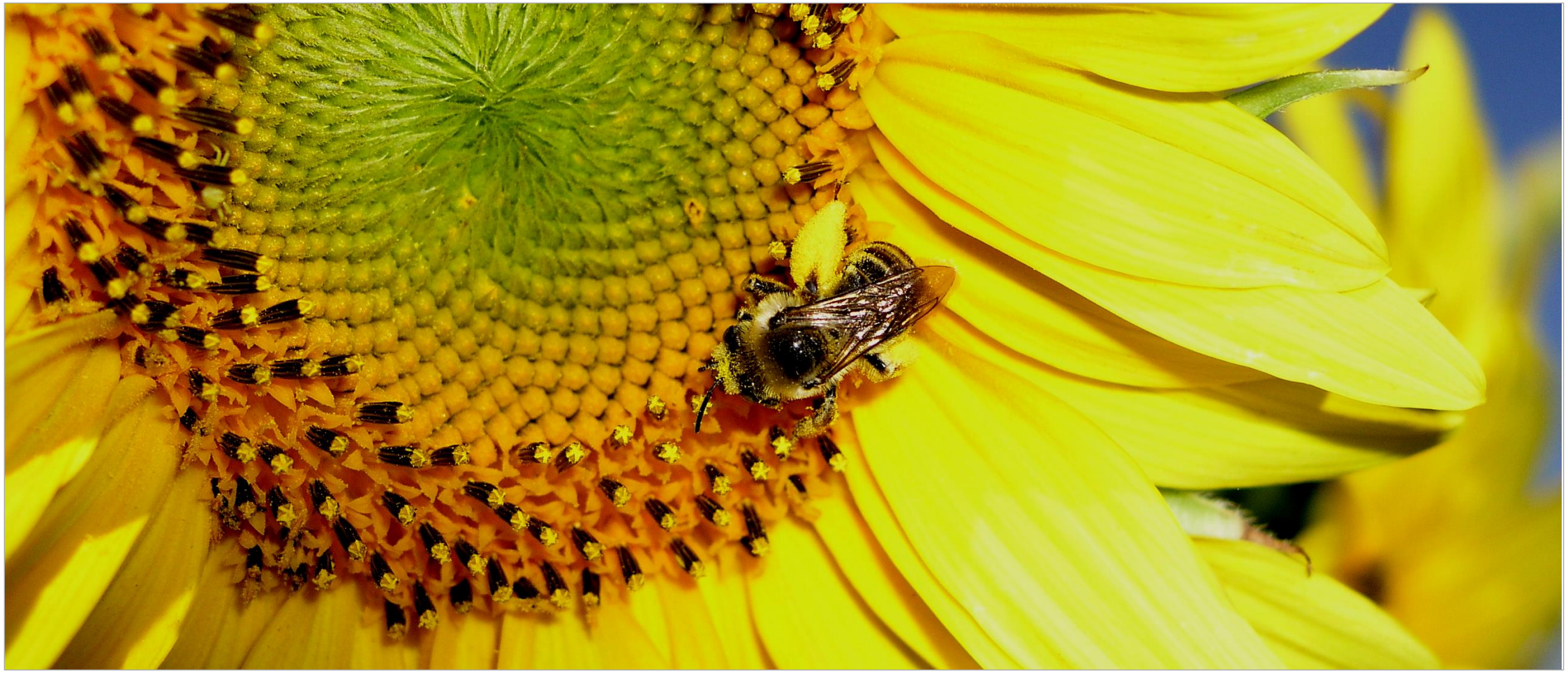

Photo: Sarah Greenleaf

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Plant Reproduction

85%

of flowering plants require a pollinator to move pollen thus fertilize the flower

Photo: Obscure skipper (Bryan E. Reynolds)

xerces.org

Food Production

1 in 3

mouthfuls of food and drink we consume

>$30 billion

value of crops in North America

Photo: Pixabay

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Importance of Pollinators

Photo: Whole Foods Market

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Importance of Pollinators

Photo: Whole Foods Market

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Pollinator Diversity

Photo: Elliott Gordon

xerces.org

Main Groups of Pollinators

Photos: Bryan E. Reynolds (3); Matthew Shepherd; Xerces Society/Sarah Foltz Jordan; Xerces Society/Mace Vaughan

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Bees are the Most Important

- Collect and transport pollen
- Forage in area around nest
- Exhibit flower constancy

Photo: Elliott Gordon

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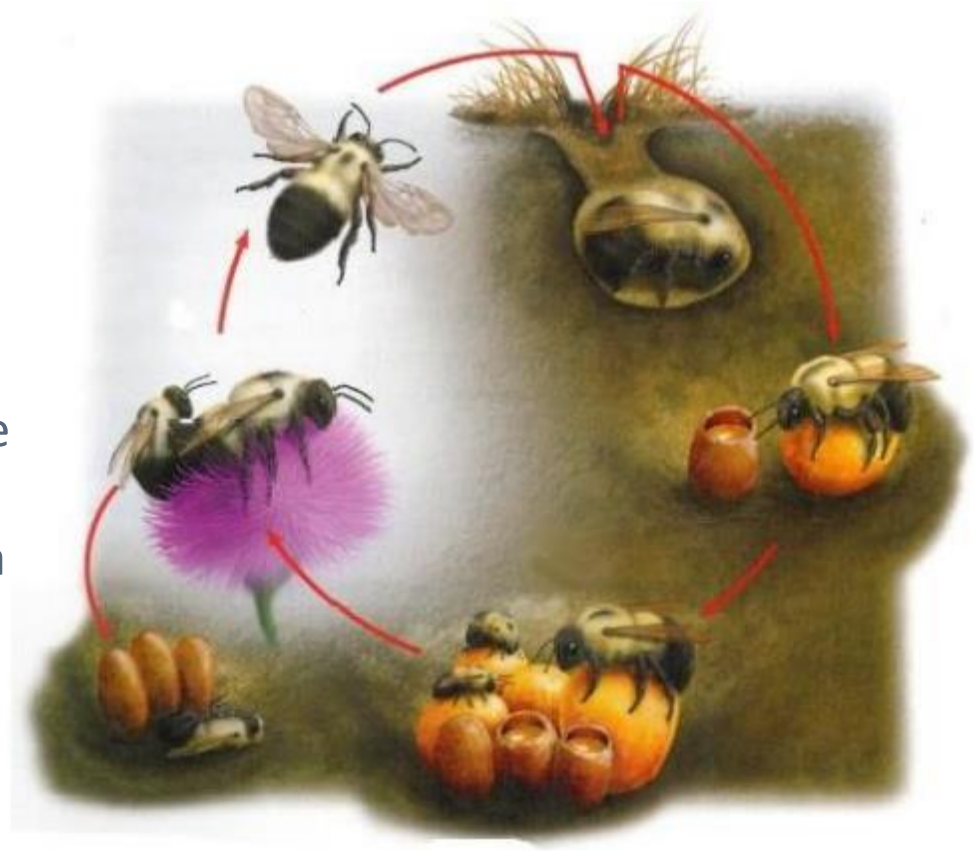
Bumble Bee Life Cycle

Winter: Hibernating queen

Fall: Mated queens seek overwintering sites, founding queen dies

Spring: Queen establishes nest and lays eggs



Early Fall: Males leave nest, then new queens leave to find a mate

Early Summer: Worker females help grow the colony

After mating, males die

Summer: Colony peak

Illustration: David Wysotski

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Bee Diversity

Number of species

USA & Canada	New Mexico	In a single county	In a single garden
3,600	1,200	200–400?	50-100

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Native Bee Diversity

Photo: Stephen Buchmann

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Spring Bees – Anthophora & Osmia

Photos: Elliott Gordon

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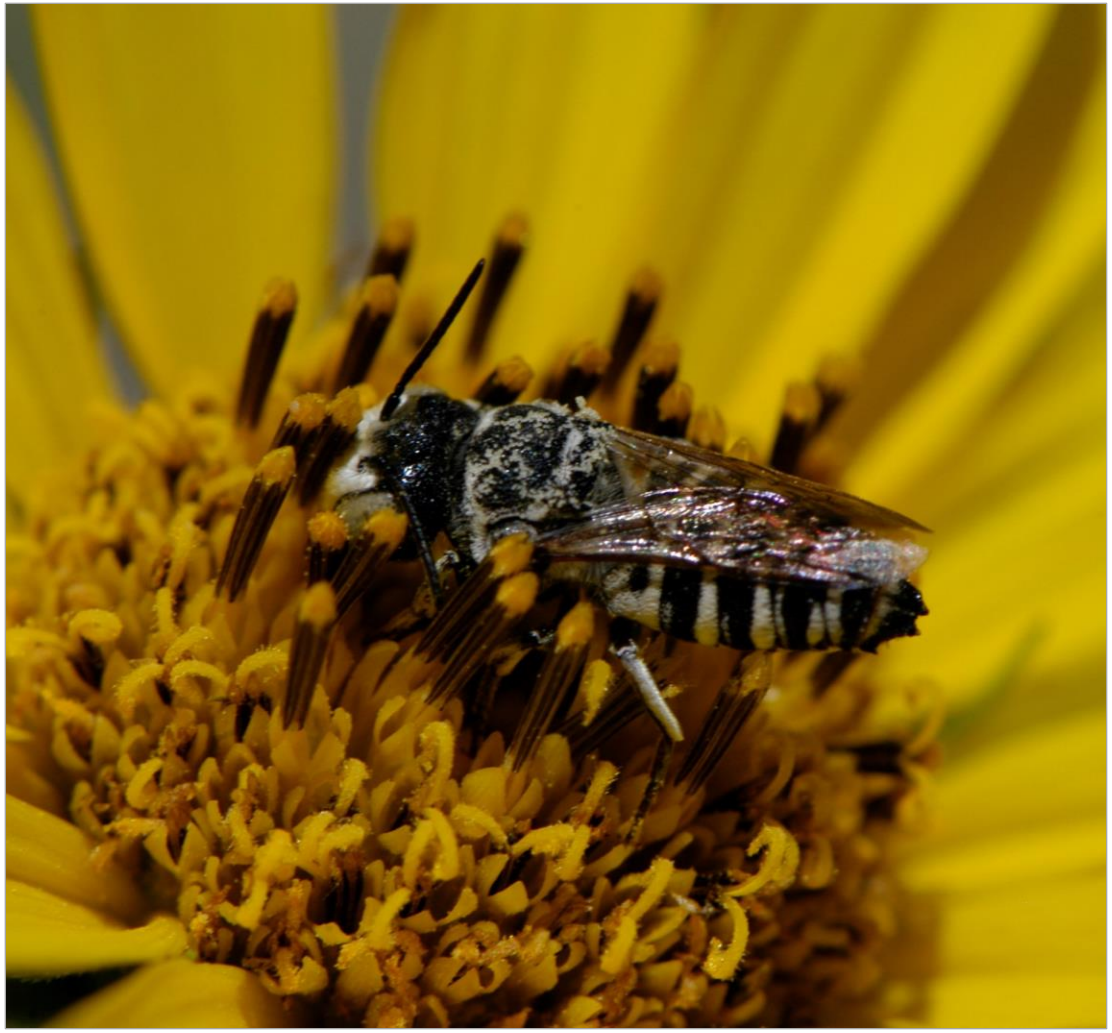
Summer Bees – Macrotera & Halictus & Coelioxys



Photos: Elliott Gordon

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Fall Bees & Small Bees – Protandrena & Perdita

And yellow and orange and green and blue bees!

Photos: Elliott Gordon

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Cactus Bees – Diadasia & Lithurgopsis

Photos: Elliott Gordon

xerces.org

Cute Bees – Megachile & Perdita

Photos: Elliott Gordon

xerces.org

Other Pollinators – Hoverflies & Moths

Photos: Elliott Gordon

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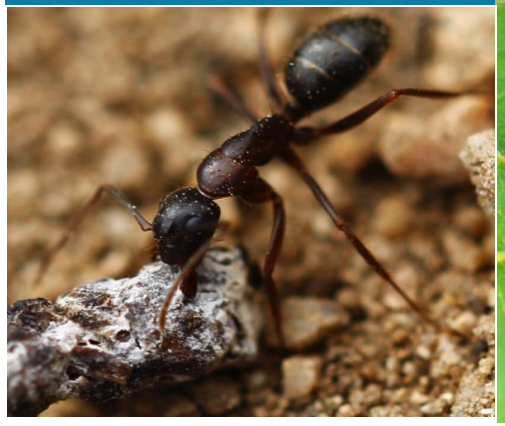
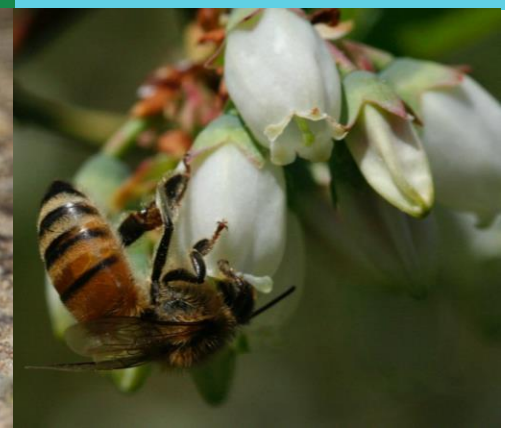
Threats

Photo: Matthew Shepherd

xerces.org

“The fate of the world’s insects is inseparable from our own”

Soil health, pest control, water quality, food for wildlife, crop pollination and higher yields…

Recycle nutrients throughout the ecosystem	Offer free pest control services	Food sources for other animals	Help plants reproduce
			

Photos: (left to right): Magnus Robinson; USDA ARS Scott Bauer; Marcel Holyoak via flickr; Emily May / Xerces Society
Quote from NYT Editorial Insect Armageddon October 29, 2017

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Habitat Loss

Photo: Matthew Shepherd

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Pesticides

Photo: Xerces Society/Matthew Shepherd

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Climate Change

Photo: John Weiss, Flickr

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Conservation

Photo: Elliott Gordon

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Beekeeping ≠ Bee Conservation

There are lots of reasons for keeping honey bees

But bee conservation is not one of them

Photo: Thien Gretchen, Flickr

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Can (Sub)Urban Areas Support Pollinators?

Photos: Google Earth; Elliott Gordon

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Main Elements of Pollinator Habitat

Food

- floral resources (forage)

Shelter

- nesting and overwintering sites

Safety

- protection from pesticides and disease

Photo: Donnie Barnett

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Bee Needs: Access to Soil

Roughly 70% of native bee species are ground-nesting

- Resemble ant-nests from above ground
- Conserve sandy soil, bare ground

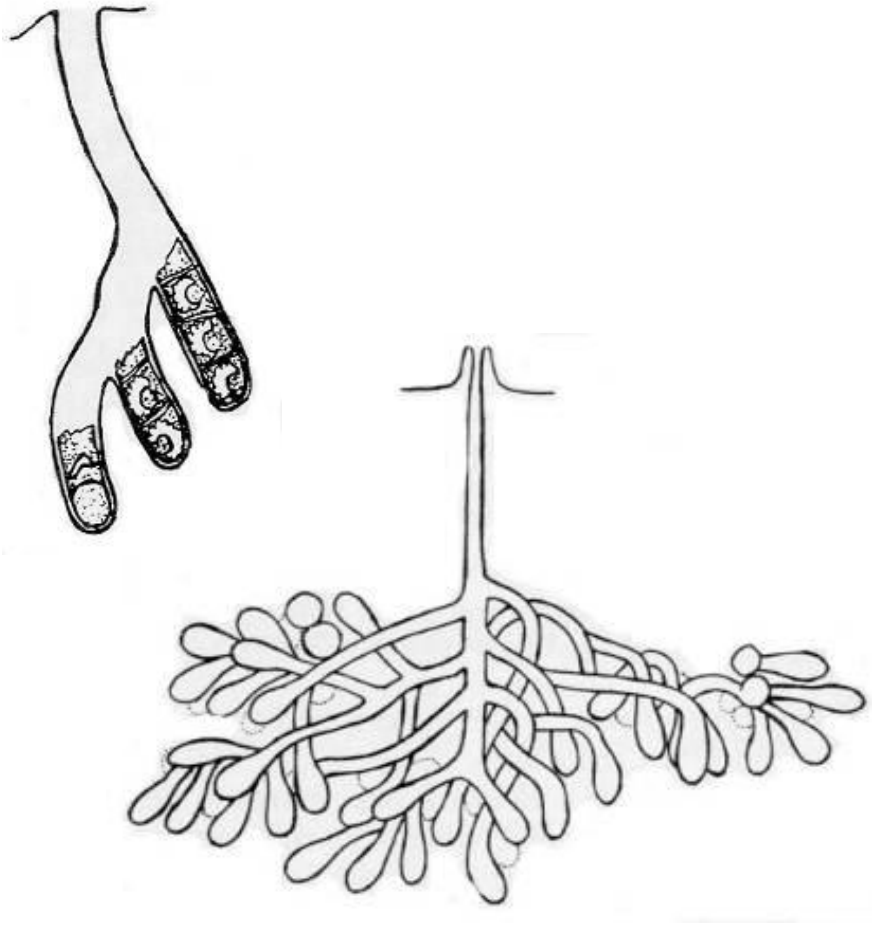

Photo: Xerces Society/Matthew Shepherd.
Drawings from Stephen, Bohart, and Torchio, 1967

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Wasps and ants also need access to soil

Weed cloth and mulch are not natural ground cover in the Chihuahuan desert

Photos: Elliott Gordon

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Bee Needs: Dead Trees and Branches

Roughly 30% of native bee species are tunnel-nesting

- Keep dead trees
- Don’t trim all dead twigs and branches

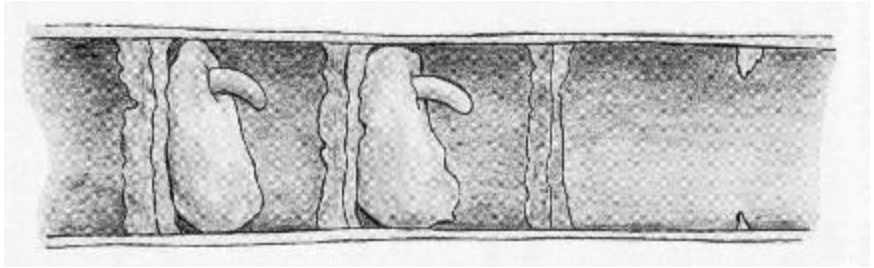

Photo: Xerces Society/Matthew Shepherd.
Drawings from Stephen, Bohart, and Torchio, 1967

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Support Stem-Nesting Bees

- Masked bees (Hylaeus) will use skinny cut/dried stems like globemallow and blanket flower
- Small carpenter bees (Ceratina) can chew into sunflower stalks

Photos: Elliott Gordon

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Bee Needs: Nest Materials

Some species collect leaf pieces, resin, soil, etc. for constructing nest cells

Photo: Clay Bolt

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Bee Needs: Roosting Spots

Males often aggregate in flowers to spend the night

Photo: Elliott Gordon

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My Version of Pollinator Habitat

Food

- Diverse plant community

Shelter

- Bare ground between gravel, leaf litter, and old stems

Safety

- Chemical-free
- Low disturbance

Photo: Elliott Gordon

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Plant Selection for Pollinators & People

- Remember to have fun!
- Pick plants that benefit wildlife AND yourself
- Native is best, but even ornamentals like roses can contribute

Photo: Elliott Gordon

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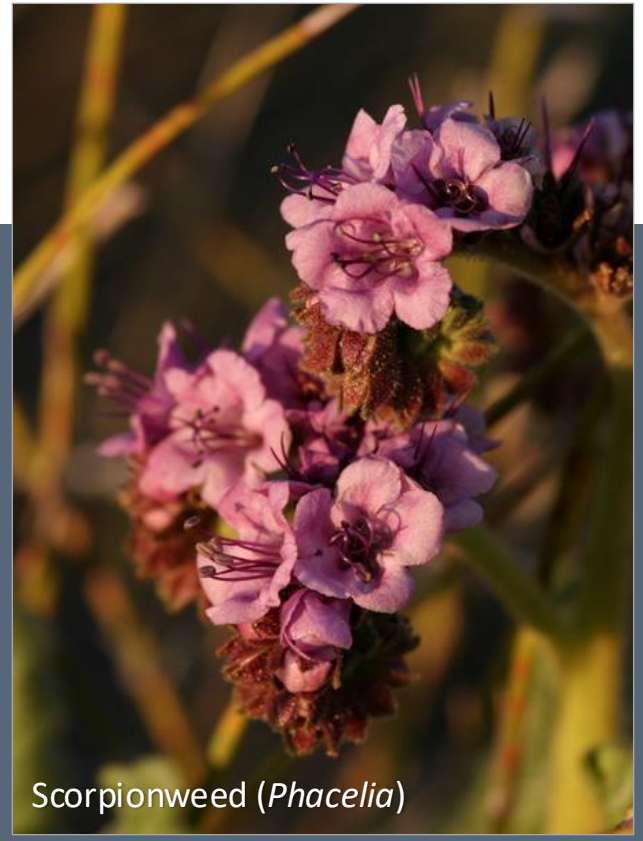
Plant Selection: Continuous Bloom Across Seasons

Spring ---------- Summer ---------- Fall


Scorpionweed (*Phacelia*)


Beardtongue (*Penstemon*)


Globemallow (*Sphaeralcea*)

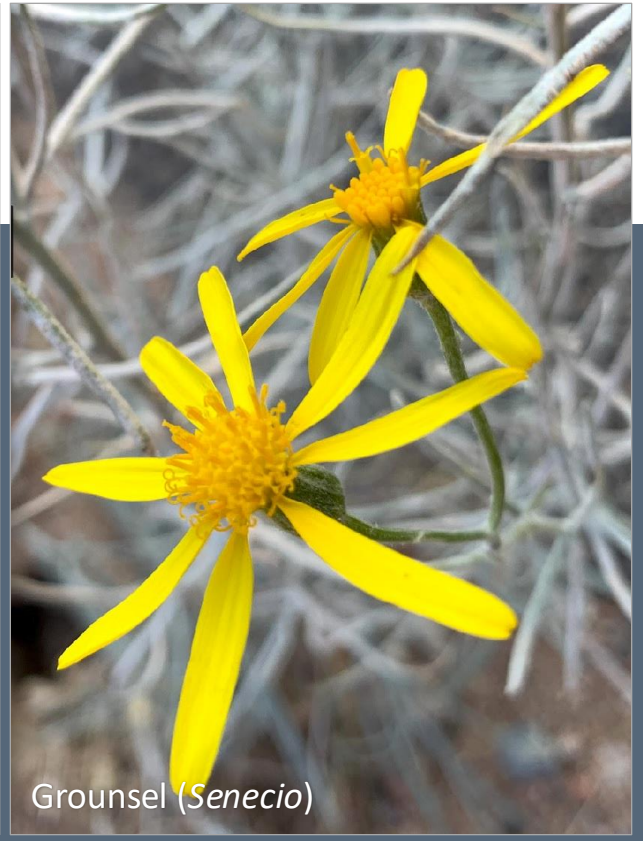

Grounsel (*Senecio*)

Photo: Patrick Alexander; Emily May/Xerces Society; Kaitlin Haase/Xerces Society x2

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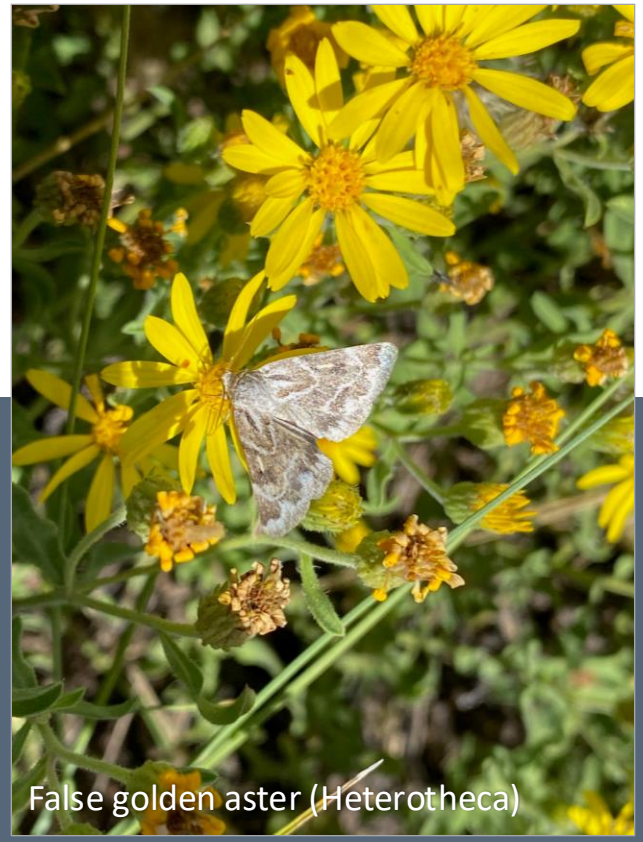
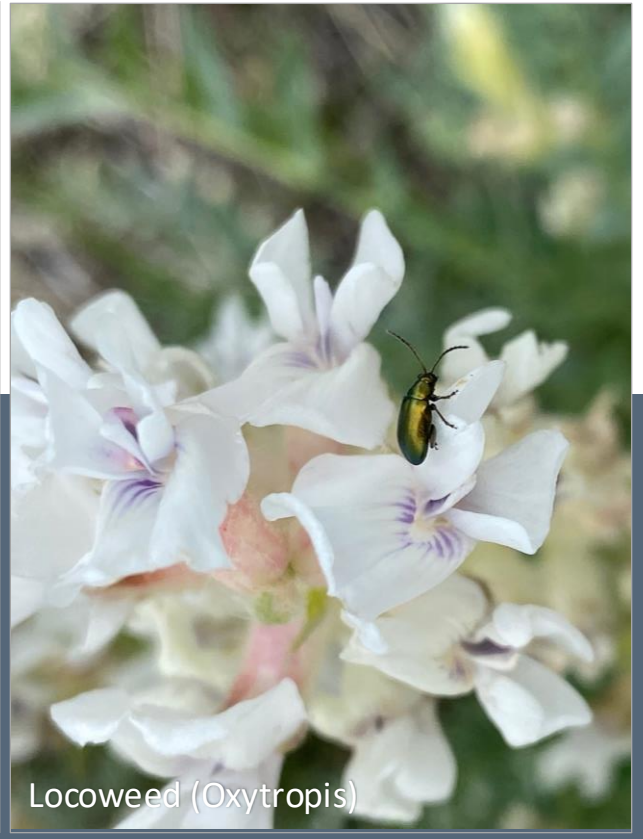
Plant Selection: Northern New Mexico


Utah Serviceberry (Amelanchier)


False golden aster (Heterotheca)


Locoweed (Oxytropis)


Sagebrush and rabbitbrush (Artemisia and Ericameria)


Wax currant (Ribes)

Photos: Elliott Gordon

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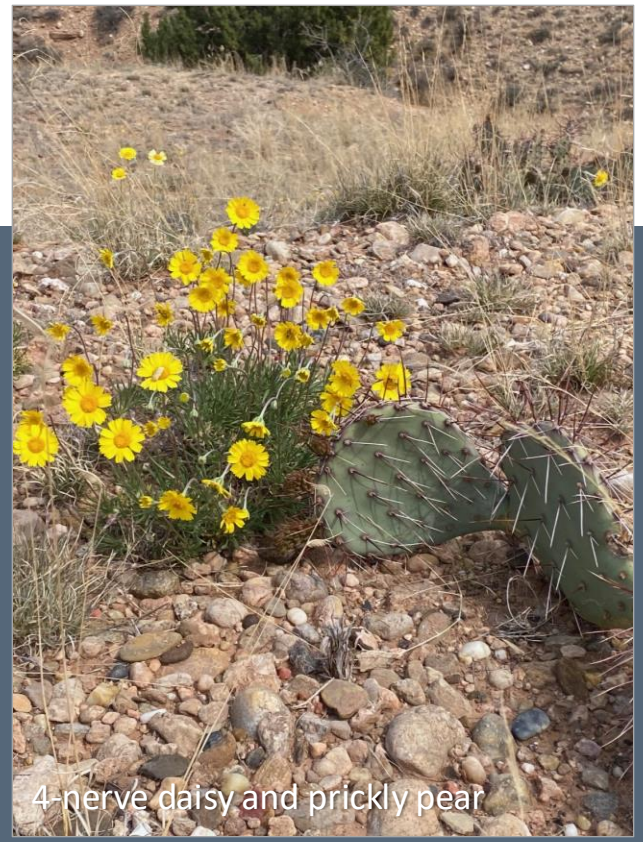
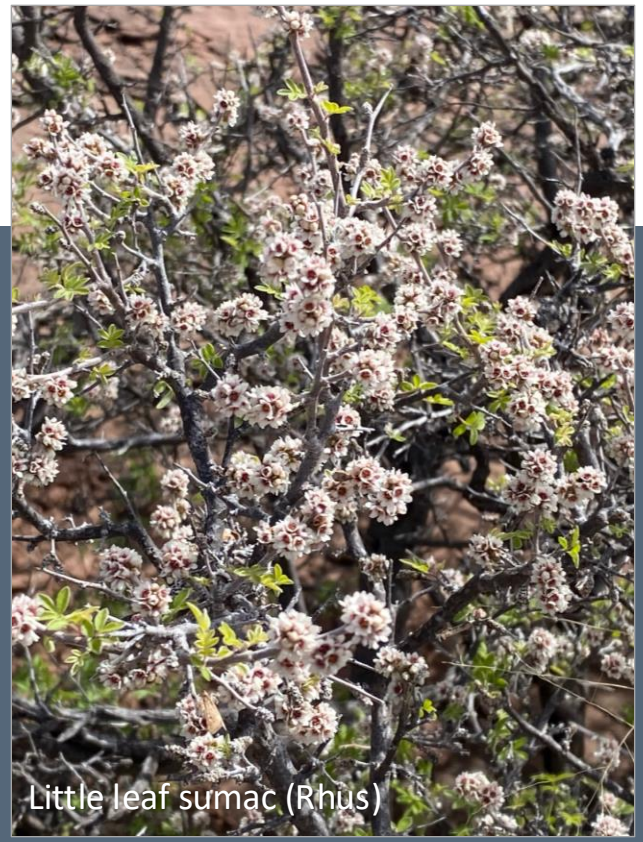
Plant Selection: Eastern New Mexico


4-nerve daisy and prickly pear


Little leaf sumac (Rhus)


Feather bush (Dalea)


Sandmats (Euphorbia)

Photos: Elliott Gordon

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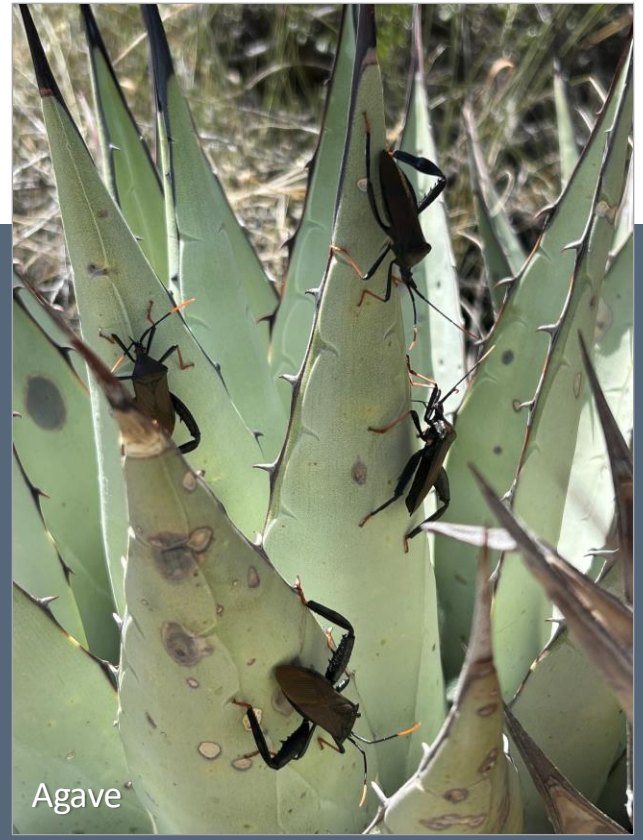
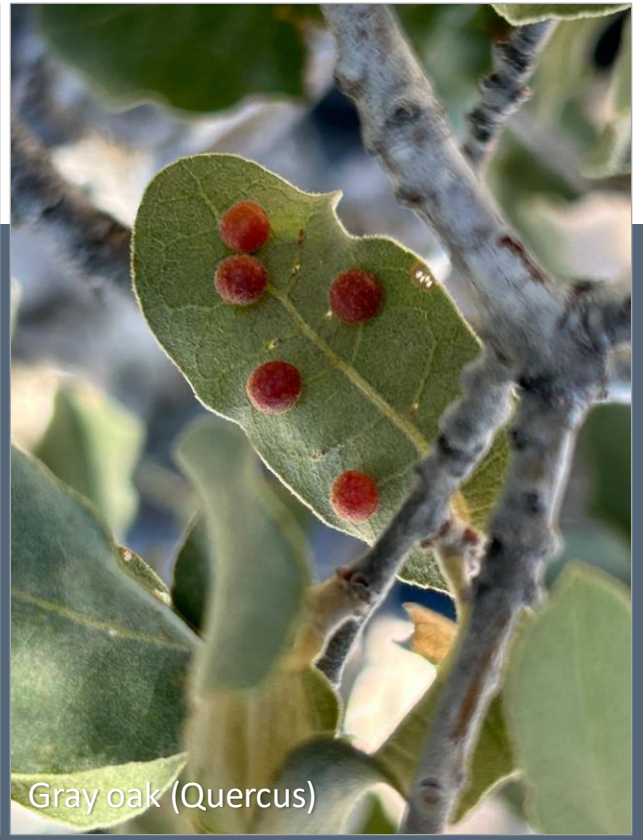
Plant Selection: Southern New Mexico


Agave


Creosote (Larrea)


Gray oak (Quercus)


Juniper, prickly pear, sotol, and various bushes

Photos: Elliott Gordon

xerces.org

Oaks across the state

Silk moth adult and caterpillars left and top, oakworm moth right

Gambel's, Gray, Sonoran, Emory's

You can't go wrong

Photos: Elliott Gordon

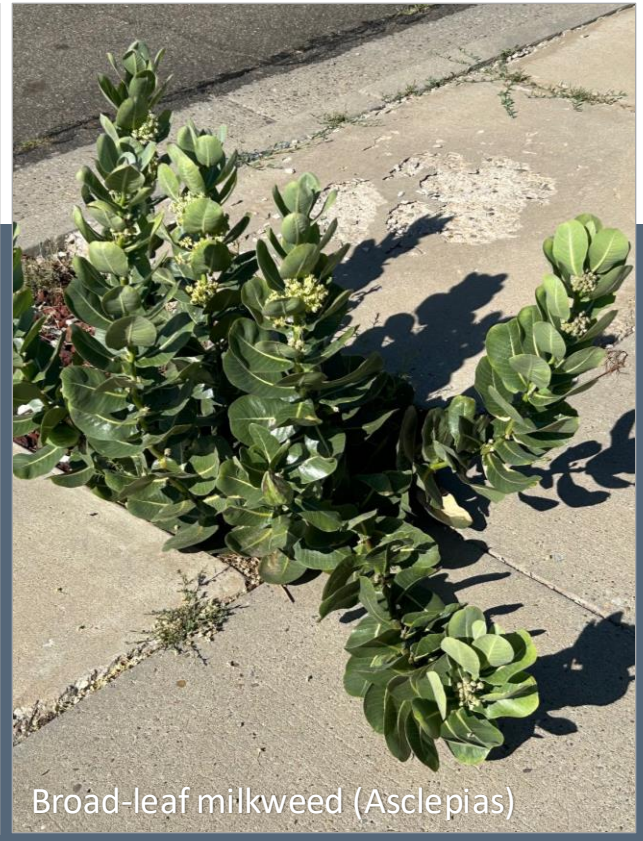
xerces.org

Plant Selection: Central New Mexico


Tansy mustard (Descurainia)


Five-eyes (Chamaesaracha)


Spiny goldenweed (Xanthisma)


Broad-leaf milkweed (Asclepias)

Photos: Elliott Gordon

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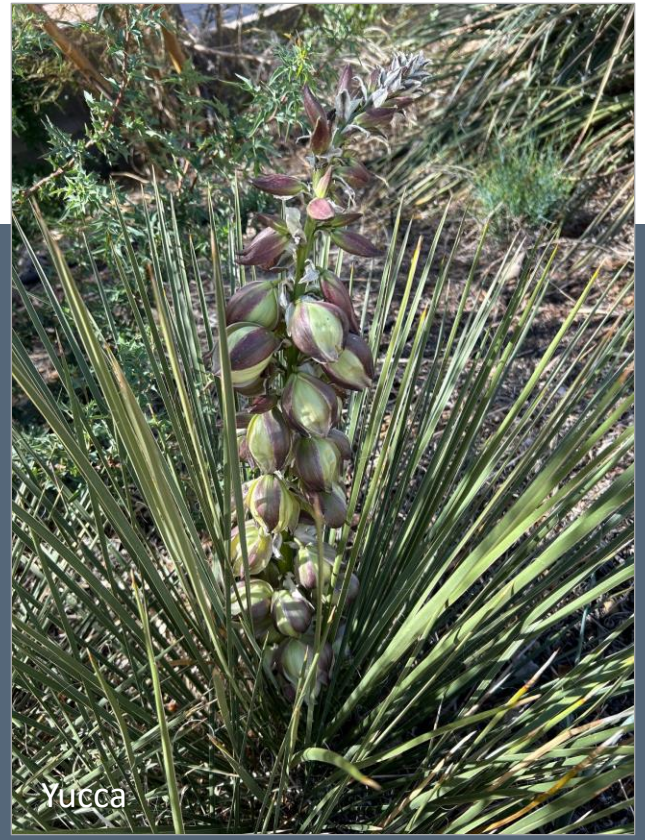
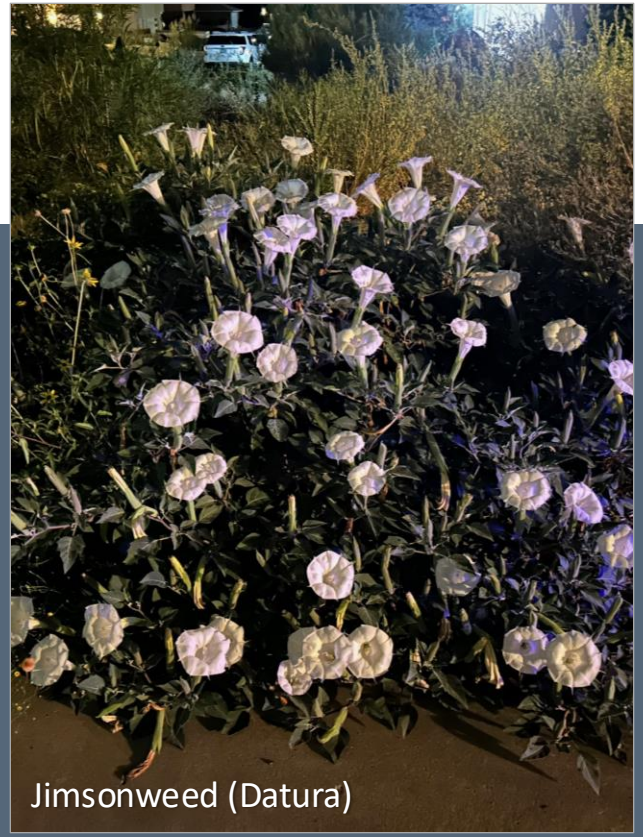
Plant Selection: Central New Mexico


Yucca


Jimsonweed (Datura)


Evening primrose (Oenothera)

Photos: Elliott Gordon

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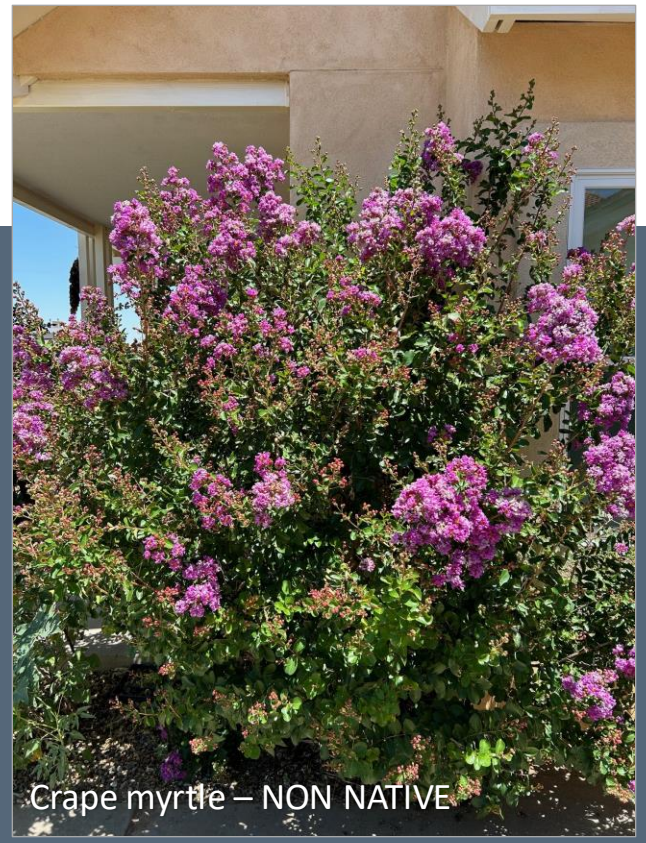
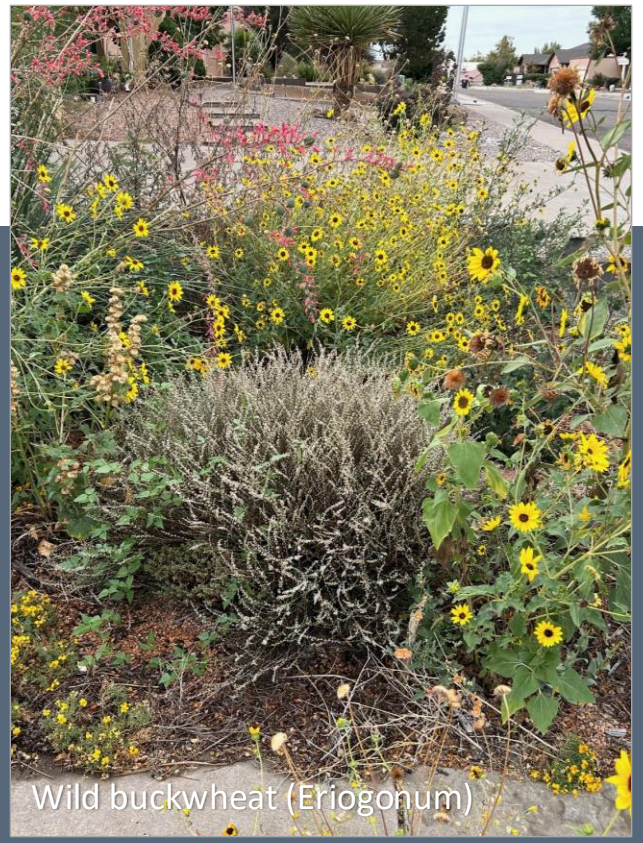
Plant Selection: Central New Mexico


Crape myrtle – NON NATIVE


Wild buckwheat (Eriogonum)


Club cholla (Grusonia)

Photos: Elliott Gordon

xerces.org

Xeriscape not ZEROscape

Photos: Elliott Gordon

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Just Say No to Lawns and Rocks

- Grass lawns provide little in the way of habitat and use a lot of water
- Consider replacing lawns and heavy rock mulch with landscaped areas or drought tolerant ground cover

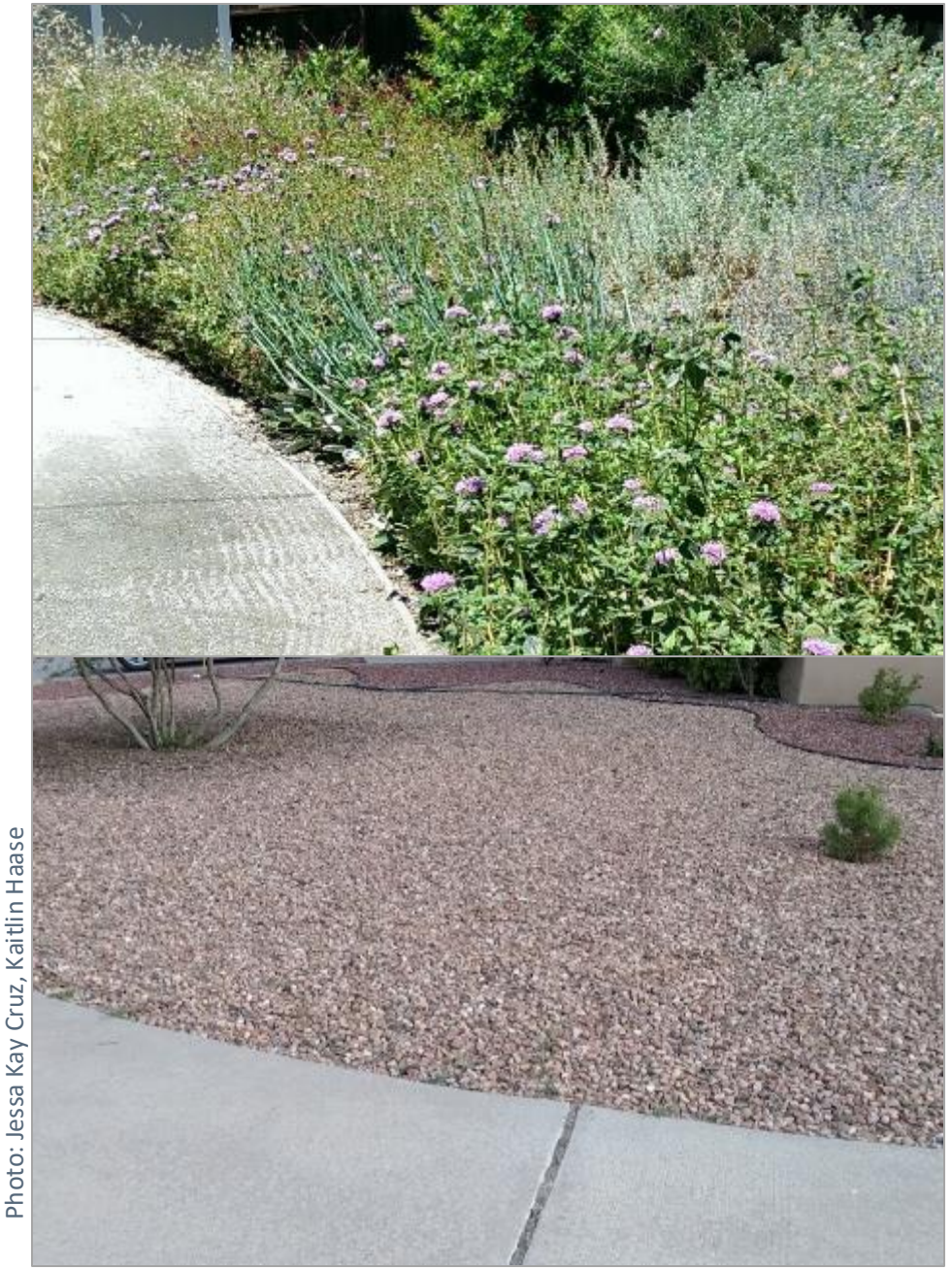

Photo: Jessa Kay Cruz, Kaitlin Haase

Photo: Matthew Shepherd

Leave the Leaves

Overwintering for beetles, flies, and more

- Leave a thin layer of leaves on grassy areas
- Spread on vegetable or flower beds for soil building & weed protection
- Pile around ornamental trees, shrubs, and perennials for mulch
- Avoid shredding leaves

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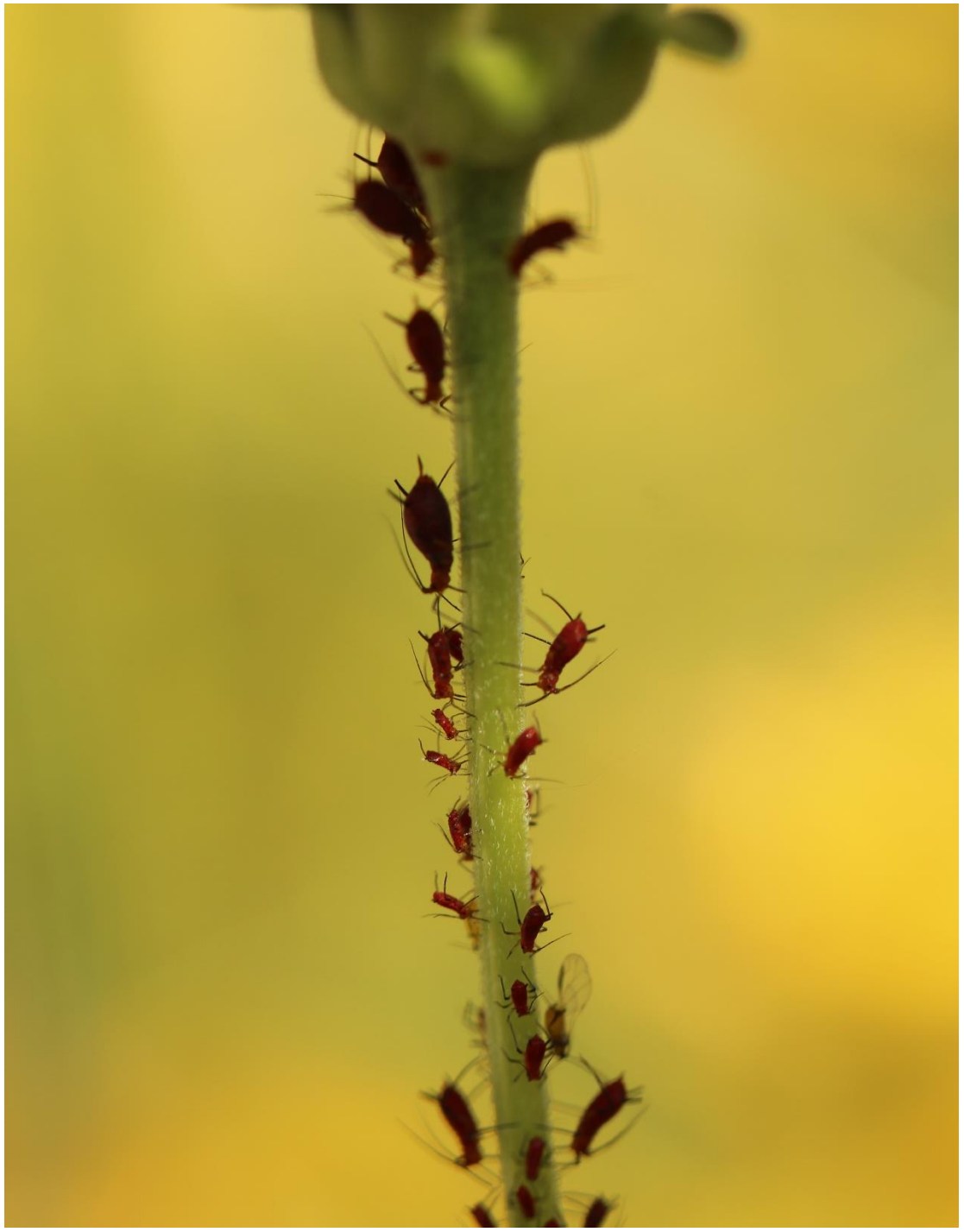

Photo: Jennifer Hopwood

Rethinking “damage”

- Exposure to pests and pathogens can help plants become immune to pests in the future.
- Pests are part of the garden ecosystem. Without a few pests we can’t feed the natural enemies!

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Photo: Elliott Gordon

Common Beneficial Insect Groups

- Insect Predators
- Insect Parasitoids
- Some are also pollinators:
  Flies, wasps, beetles
- Some also play a role in soil health

- Non-insects
  Spiders, harvestmen, centipedes, mites, pseudoscorpions

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Photos: Adult green lacewing & adult antlion – Elliott Gordon; Lacewing larva – Katja Schulz via flickr

Predators: Lacewings

- Larvae can consume 400+ aphids per week!
- Adults of some species also predaceous, and eat nectar, pollen
- Overwinter in leaf litter, soil, under bark
- More active in cool weather than other predators

Predators: Flower Flies/Hover Flies

- Predaceous larvae, adults feed on pollen and nectar
- Overwinter in leaf litter or soil

Photos: Elliott Gordon; Mario Ambrosino

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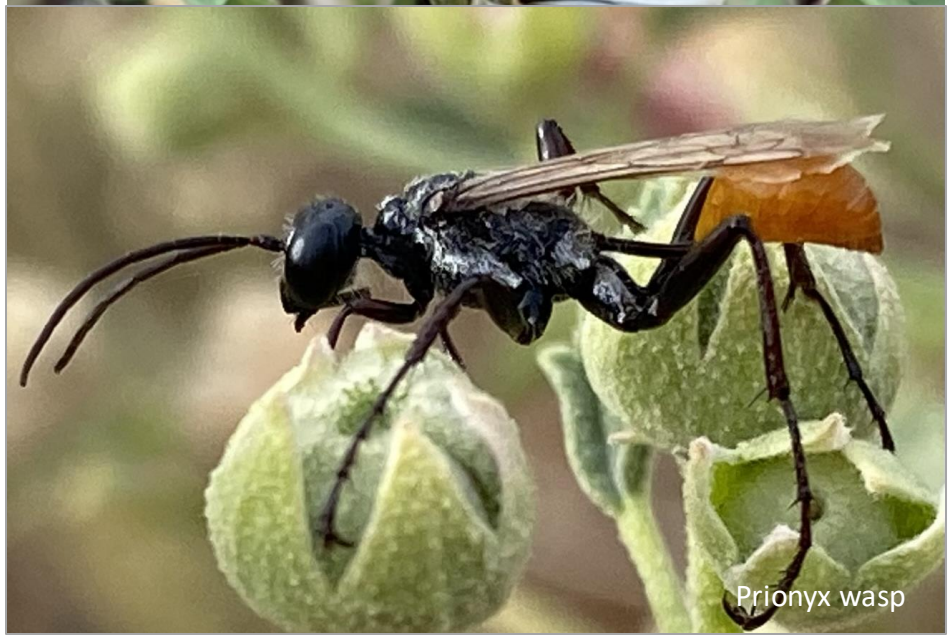
Predators: Lady Beetles

- Predatory during all life stages
- Some species have preferred prey (e.g. mites, mealybugs)
- Adults also feed on pollen and nectar
- Overwinter as adults under vegetation or bark

Photos: Lady beetle larva eating aphid, by Alex Wild;, Lady beetle eating milkweed aphid, by Thelma Heidel-Baker

Predatory and Solitary Wasps

- Larvae consume prey, adults feed on flower nectar
- Nest underground or in tunnel cavities
- Many are solitary species, but social paper wasps also beneficial



Photos: Elliott Gordon

Parasitoids

Lay eggs on or in hosts or host eggs, larval stage feeds and eventually kills host

Photos: Elliott Gordon; Alex Wild, Vegedge, UMN

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Native Bees Attract Parasitic Insects

Photos: Elliott Gordon

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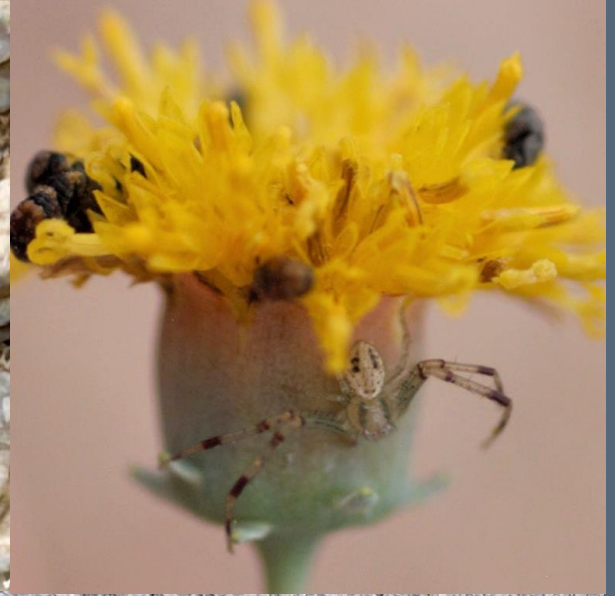

Photos: Elliott Gordon

Beyond Insects: Spiders and other Arachnids

- *Huge diversity*:
  - Orb-weavers, sheet-weaving spiders, wolf spiders, crab spiders, jumping spiders, scorpions, vinegaroons … all important predators
- Both immatures and adults are predators
- Generalist predators, do not discriminate
- Can live in crop canopy or on soil
- Some species need structure for webs, others need leaf litter

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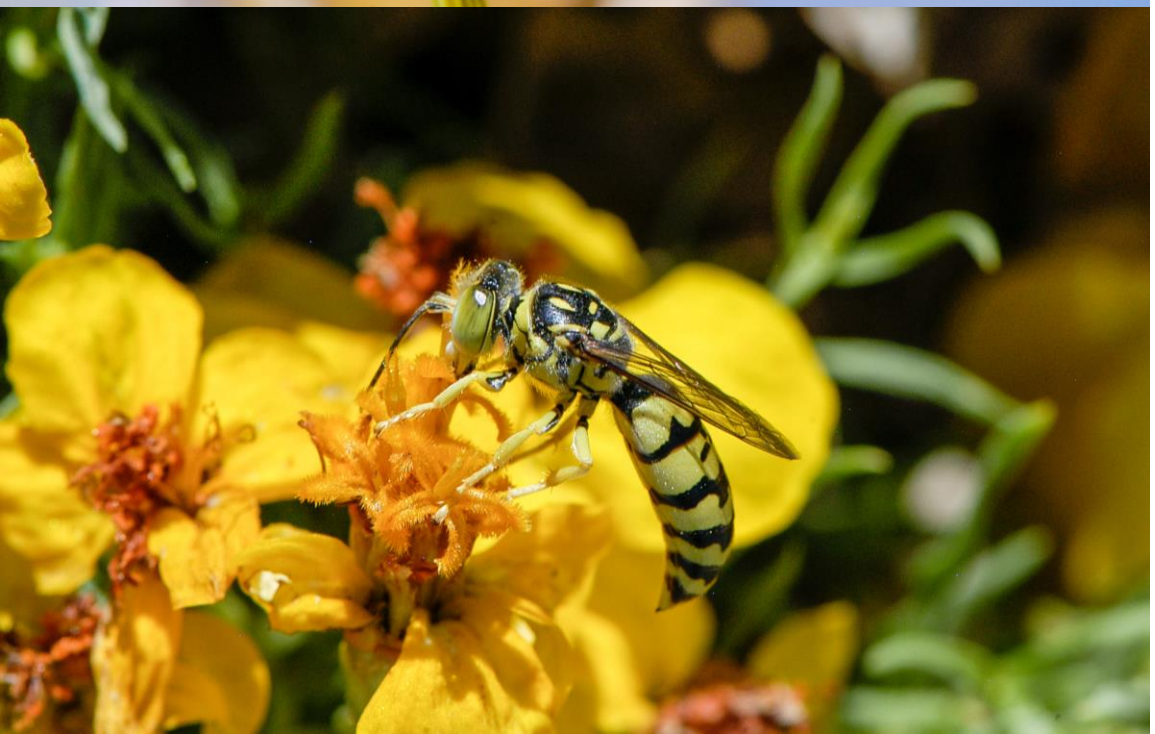

Documenting Biodiversity

- Typical subdivision lot – approx. 10,000 sq feet
- 6 years of gardening
- >8,000 iNaturalist observations at my house

- Plants – 283 species, 52% native (incl annuals & dead)
- Vertebrate Animals – 63 birds, 7 mammals, 4 reptiles
- Invertebrates – 67 Arachnids, plus worms, pillbugs, snails, centi & millipedes

- Pictured: Sandia Hairstreak (state butterfly) and sand wasp *Steniolia duplicata* (solitary hunters)

Photos: Elliott Gordon

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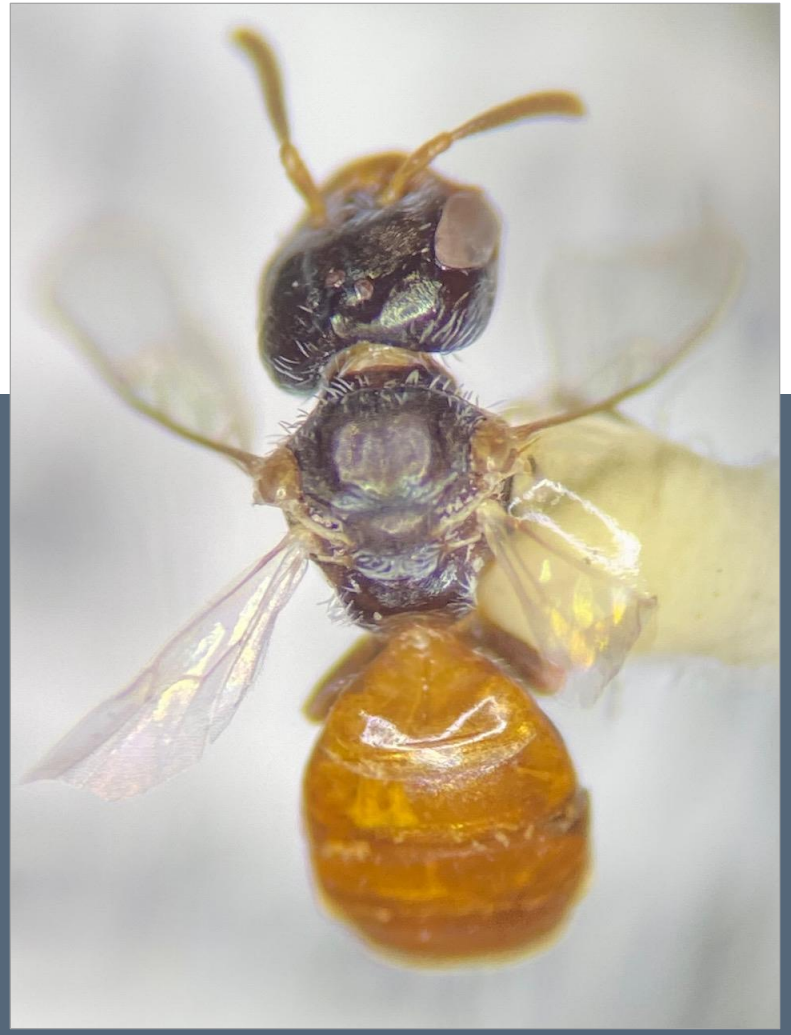
Specimens vs Live Photos



Photos: Elliott Gordon

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Moths and Nocturnal Observations

Lights are an easy way to see more

Porch lights work well, but UV/blacklight lamps draw in a wider range of nocturnal invertebrates.

Sun moth →

← Schinia

Photos: Elliott Gordon

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Six-Legged Friends

A.K.A. Insects and Springtails

- 1,626 species and still growing!
- 94 species of native bees in 5 families
- 488 species of butterflies and moths
- ~200 beetles, flies, ‘true bugs,’ and Hymenoptera minus bees (ants, wasps, and sawflies) each
- Mayflies, caddisflies, antlions, dragonflies, snakeflies – you name it!

- Pictured: Firefly *Pyropyga modesta*, parasitic wasp in *Figitidae*, and plant bug *Parthenicus sp.*

Photos: Elliott Gordon

xerces.org

Beetles, Bugs, Flies, and more

Photos: Elliott Gordon

xerces.org

Photo: Xerces Society / Suzanne Granahan

Bring Back the Pollinators

BringBackThePollinators.org

Sign the Pollinator Protection Pledge and follow the four principles:

Grow pollinator-friendly flowers

Provide nests & egg-laying sites

Avoid using pesticides

Share the word

xerces.org

BEE CITY USA®

AN INITIATIVE OF THE XERCES SOCIETY

BEE CAMPUS USA™

AN INITIATIVE OF THE XERCES SOCIETY

Bee City USA

Bee City USA & Bee Campus USA bring people together to make their communities better places for pollinators—native bees, in particular—by increasing the abundance of native plants, providing nest sites, and reducing pesticides.

Affiliates commit to create habitat, reduce pesticide use, and host outreach activities.

Driven by local desire to help pollinators.

beecityusa.org

xerces.org

X Kids Program

Activity booklet with badge upon completion

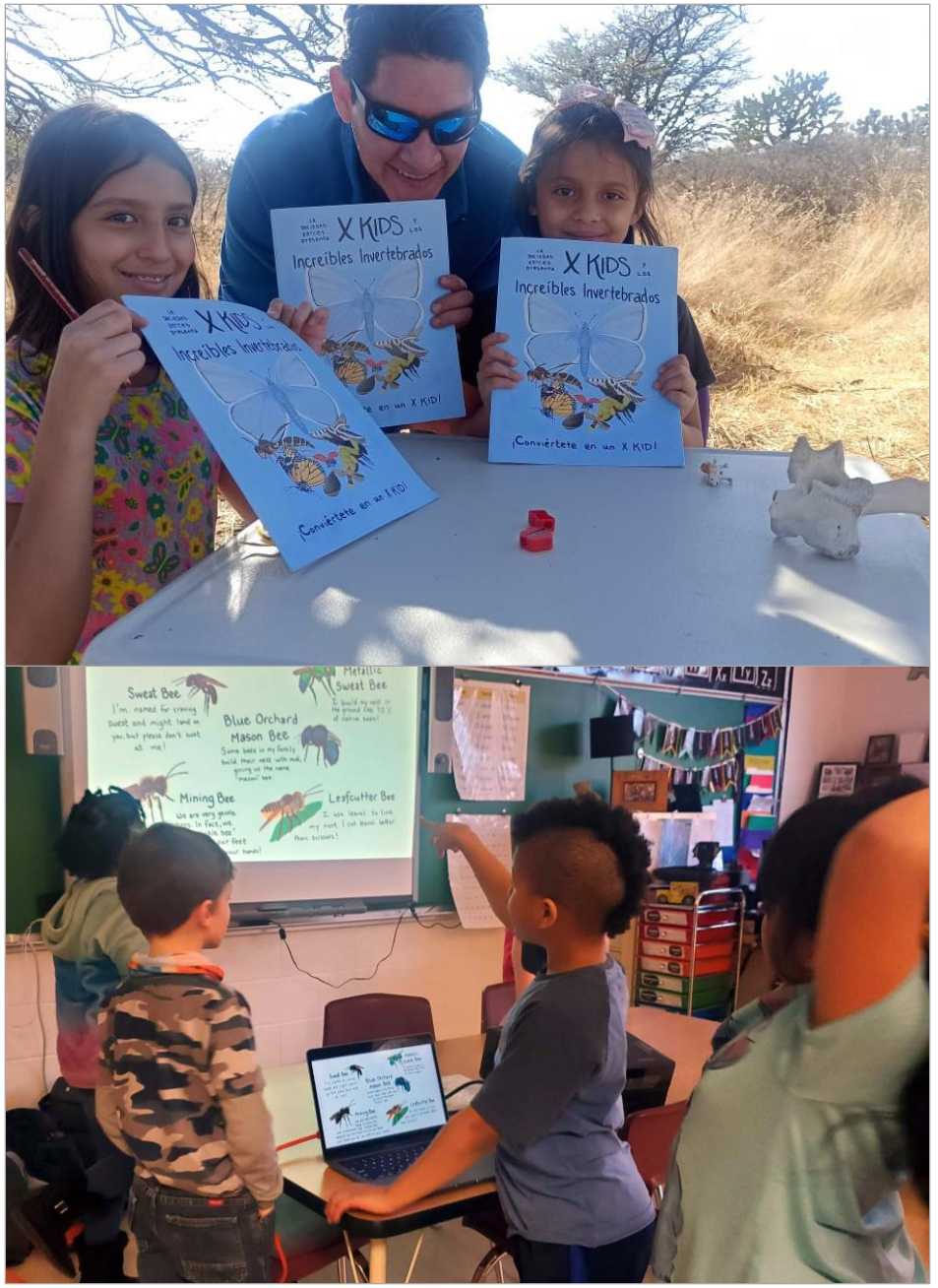
Target grades 3 – 5

Individuals and groups

Available in English and Spanish

Xerces.org/xkids

Questions? xkids@xerces.org



Credit: top, Héctor Avila; bottom, Leah Zerbe

Photo: Xerces Society / Matthew Shepherd

Community Science

Xerces Society

Bumble Bee Watch

PNW Bumble Bee Atlas

Western Monarch Milkweed Mapper

Other organizations

Journey North

Project Monarch Health

Monarch Larva Monitoring Project

Great Sunflower Project

iNaturalist & Seek

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Books by the Xerces Society

xerces.org

Download from xerces.org

Fact sheets & brochures

Guidelines & reports

xerces.org

Bug Banter Podcast

Information at:
xerces.org/bug-banter

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buzzsprout.com/2237087

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Photo: Elliott Gordon

Thank you!

Any questions?

Photo: Elliott Gordon

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