Supporting Pollinators Despite the Threats of Invasive Species and Pesticides

- What are the Real Threats?

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First, a couple of invasive species updates

- Mile-a-minute vine
- and
- Jumping worms

Mile-a-Minute Vine

- Found at four Maine locations so far
  - Boothbay Harbor
  - Winthrop
  - Islesboro, and
  - Topsham

- Known as a hitchhiker plant
- On the do-not-sell list

Mile-a-Minute Vine

- Leaves are very triangular and not lobed at the base
- Stems have sparse but strong reflexed prickles, and
- Clasping leaf-like structures at the leaf base and flower stem (Ocrea)
- Pale green flowers are inconspicuous, and fruits are red, white, and blue





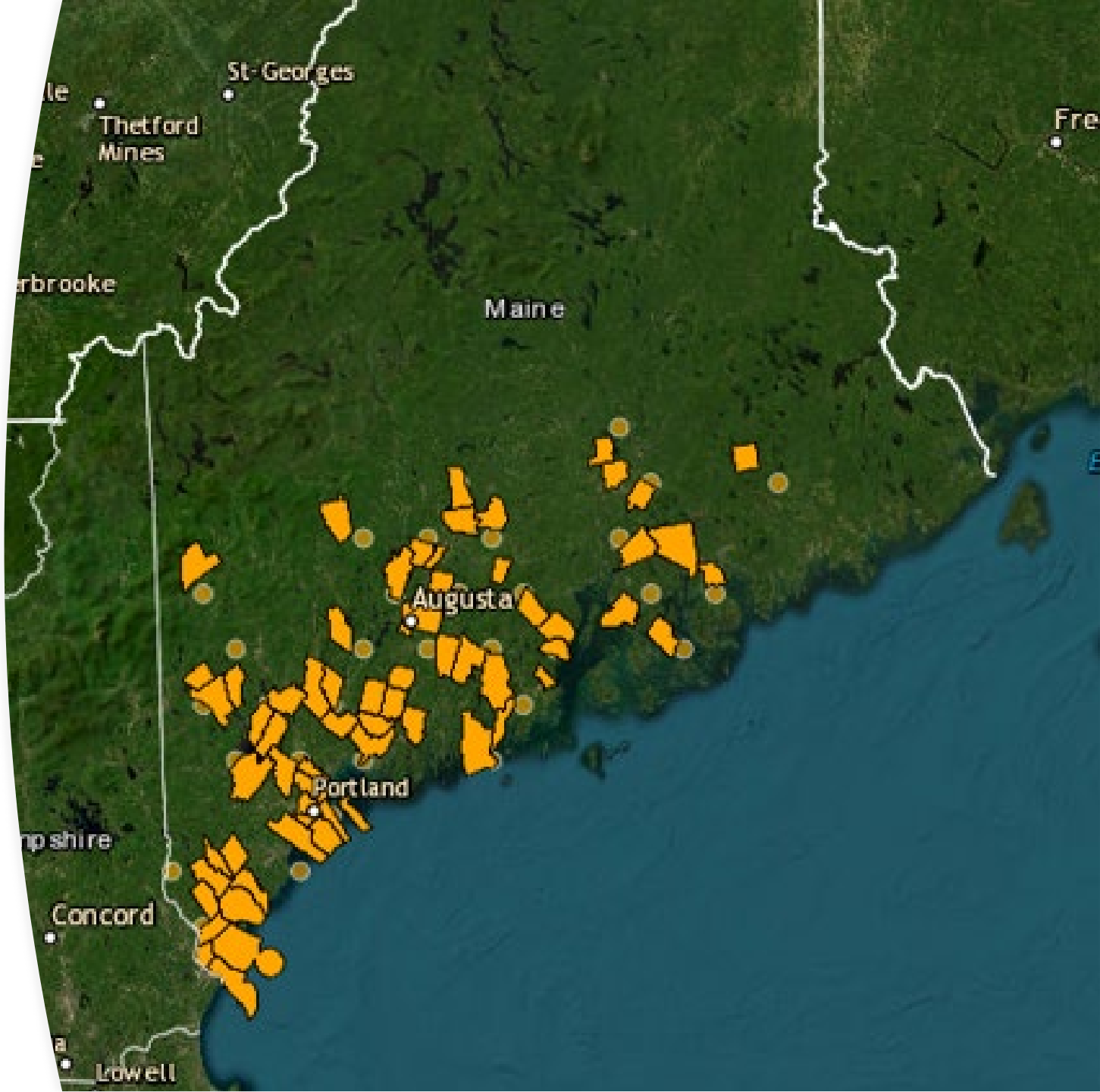

Look-alikes

- Species that have been mistaken as Mile-a-Minute vine include:
  - tearthumbs,
  - bindweeds,
  - American hog-peanut,
  - poison ivy,
  - Asiatic bittersweet, and
  - climbing nightshade.

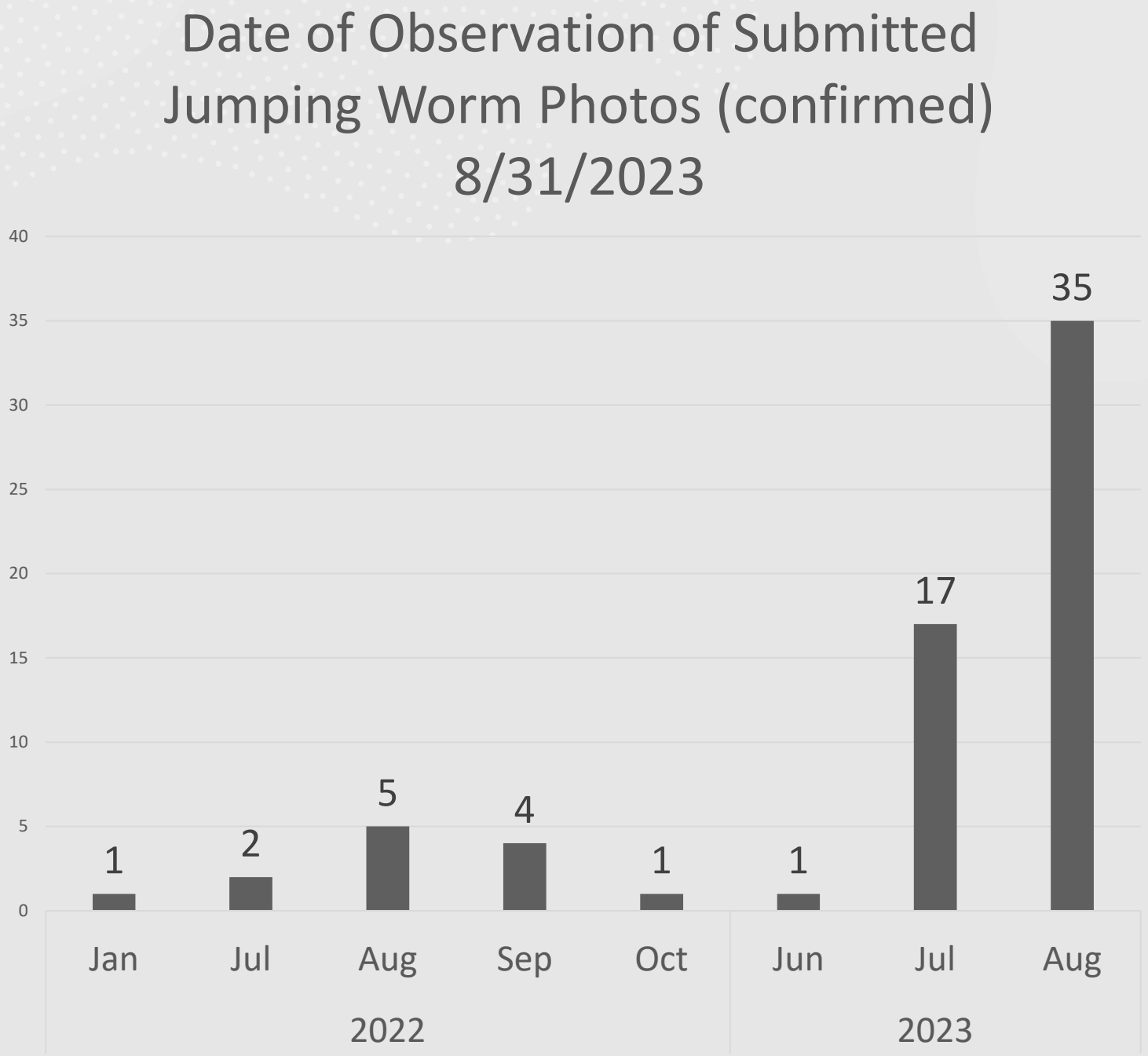
Who new worms are invasive too?

Jumping worms now widespread in Maine

- Reported in 13 of 16 counties
- Over 300 reports in 2023
- Reports increased by 10 x over 2022

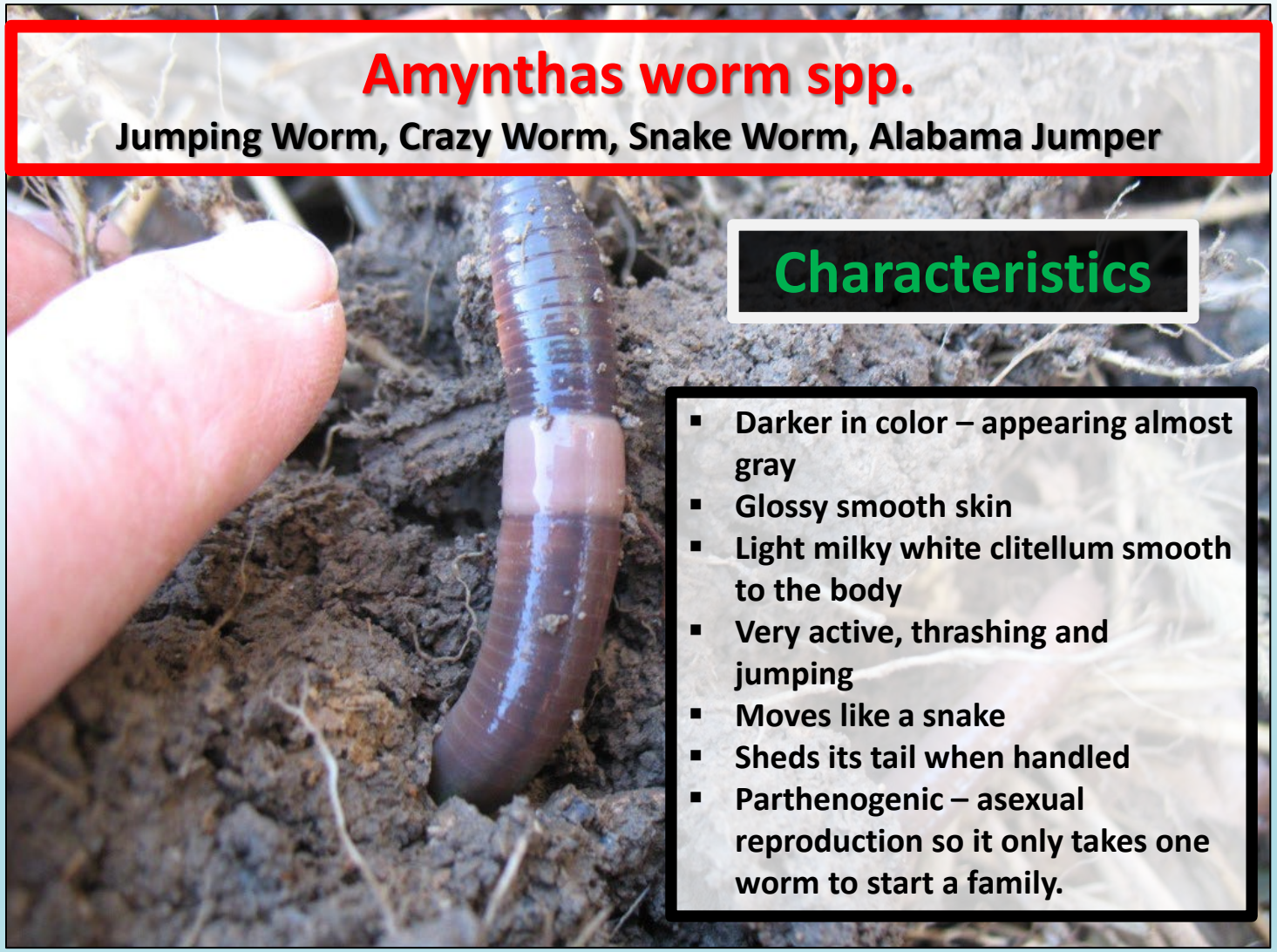


Jumping Worm Report Form Stats



Amynthas worm spp.

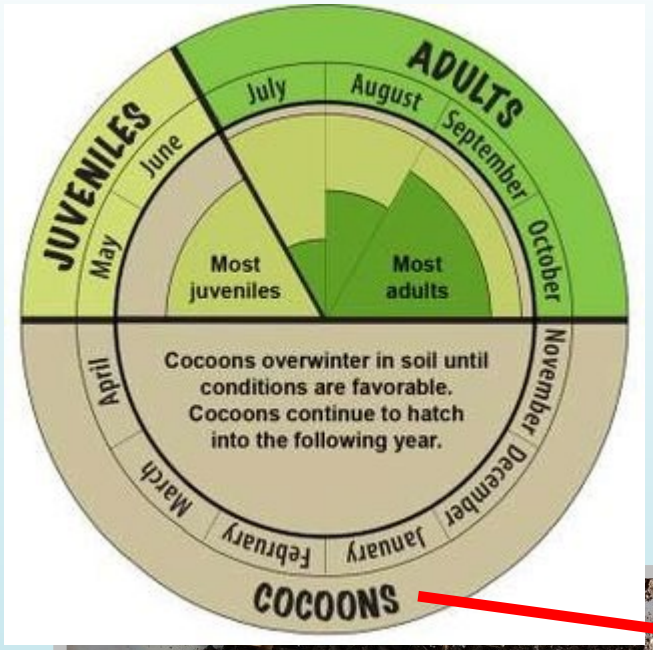
Jumping Worm, Crazy Worm, Snake Worm, Alabama Jumper



Characteristics

- Darker in color – appearing almost gray
- Glossy smooth skin
- Light milky white clitellum smooth to the body
- Very active, thrashing and jumping
- Moves like a snake
- Sheds its tail when handled
- Parthenogenic – asexual reproduction so it only takes one worm to start a family.


Amynthas tokioensis
Amynthas agrestis

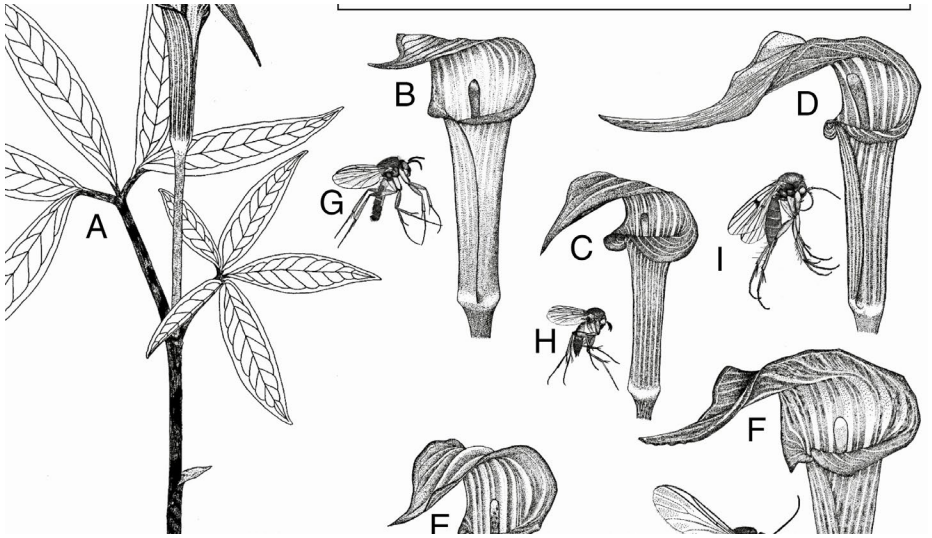

ADULTS
July
August
September
October
JUVENILES
June
May
Most juveniles
Most adults
Cocoons overwinter in soil until conditions are favorable. Cocoons continue to hatch into the following year.
April
March
February
January
December
November
COCOONS

Life Cycle

HOW ARE THEY SPREADING?

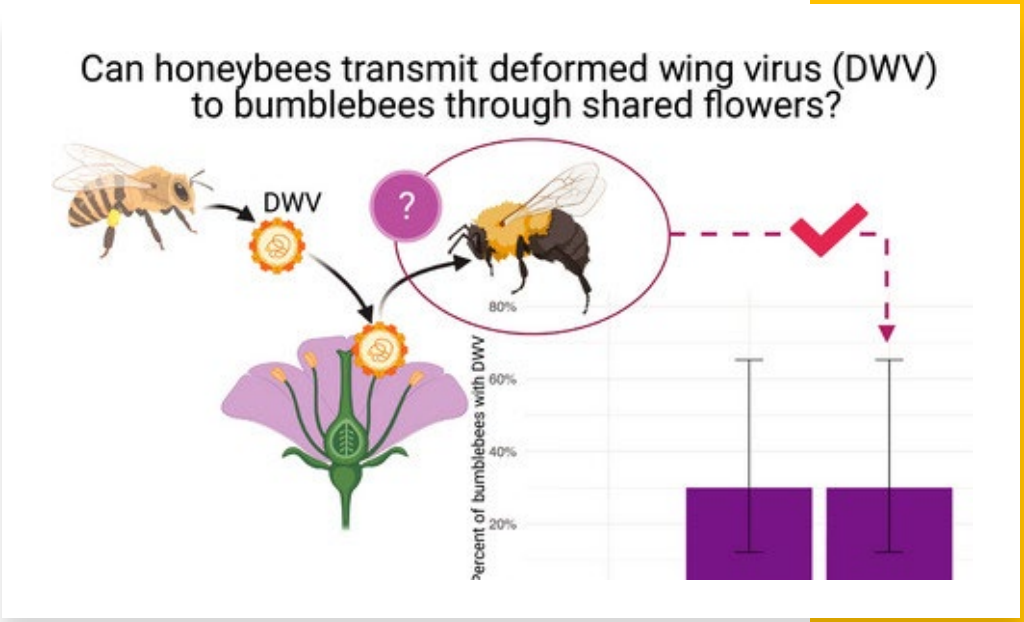
Are jumping worms a threat to pollinators?

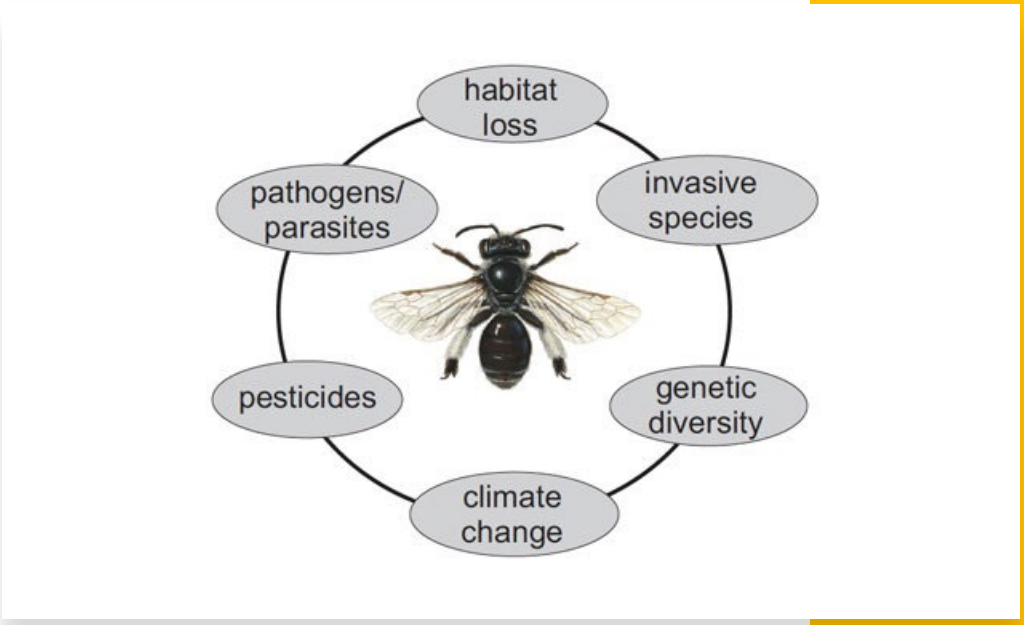
- YES - For some forest pollinators
- In highly affected hardwood forest areas, there are no understory plants
- Starflower provides pollen to halictid and andrenid bees and syrphid flies
- Jack-in-the-pulpit feeds fungus gnats



Back to the pollinators

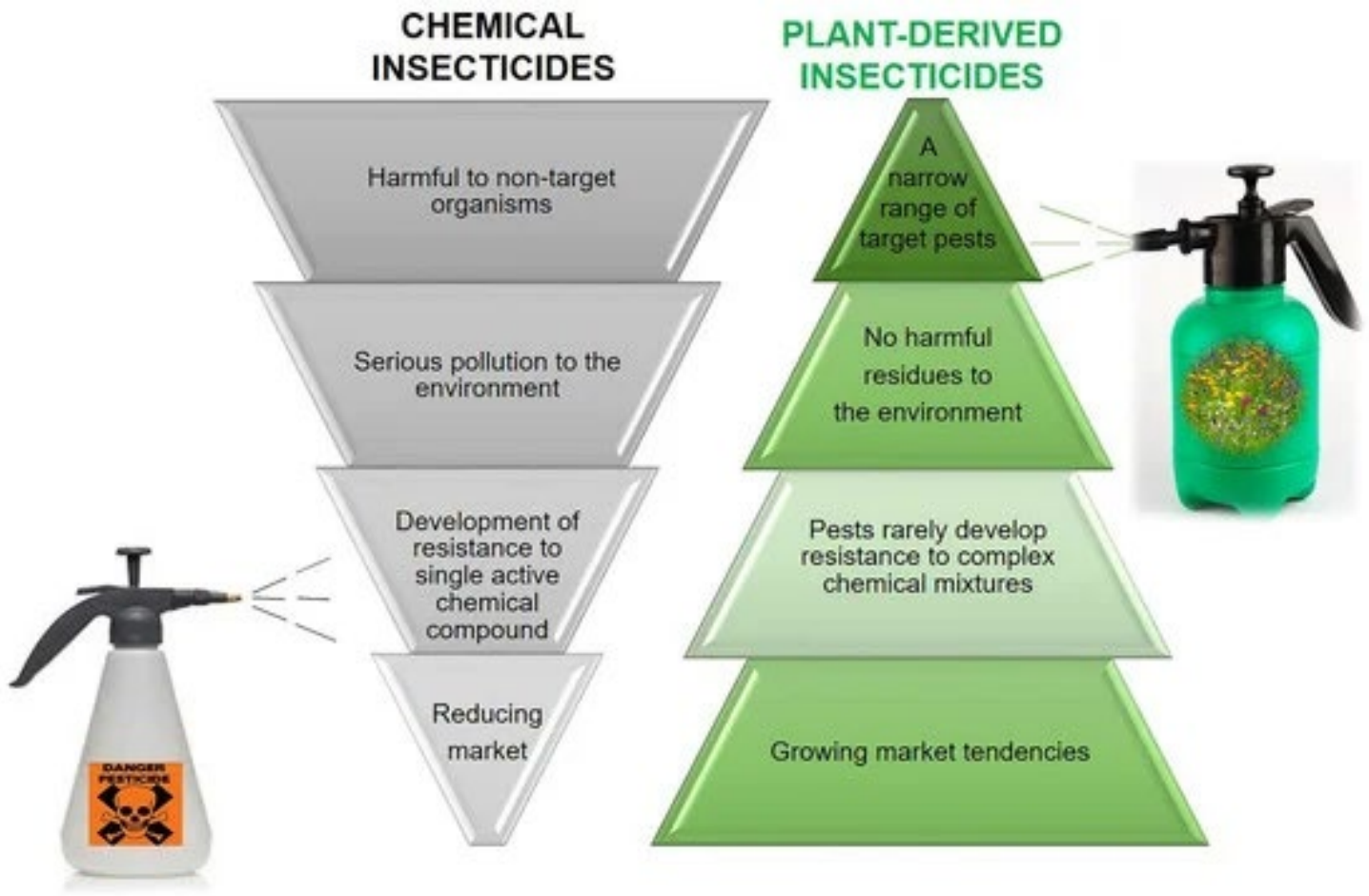
- What about pesticides?
- What about habitat loss?
- What about honey bees?
- What about climate change?





Can we blame pesticides?

- They are an easy target
- The popular press is very misleading
- Charts like this one simplify and don’t reflect reality
- We all are the drivers of pesticide use



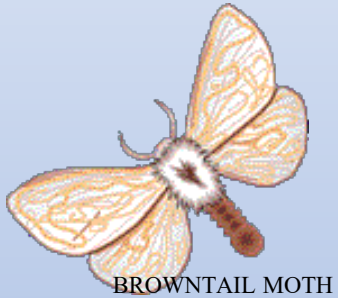
What are the benefits of pesticides?

- Aesthetics

- Unblemished plants & produce

What are the benefits of pesticides?

- Bountiful harvest



BROWNTAIL MOTH

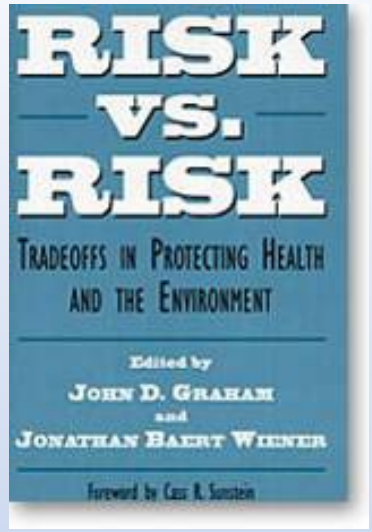
DEER TICK

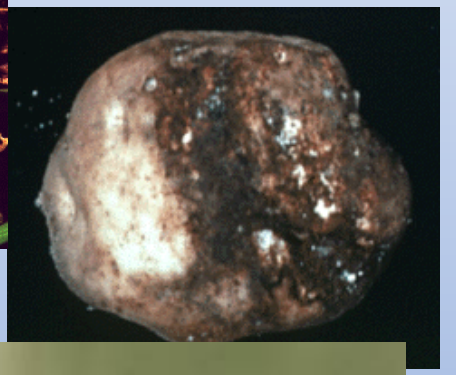
- Nuisance or public health pest control

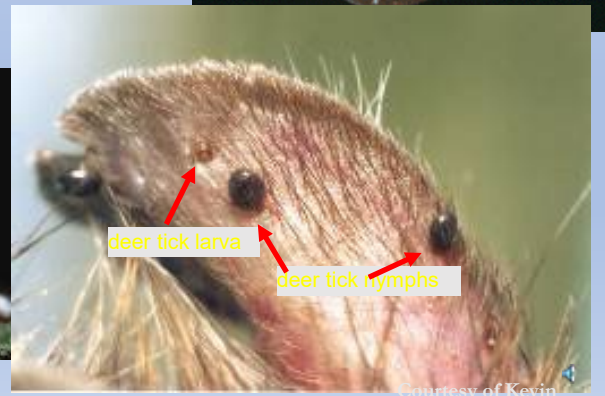
OH FOR CRYING OUT LOUD ETHEL, STOP SCREAMING, JUST HOW BIG CAN ONE GYPSY MOTH BE?

Risk vs. Risk

- West Nile Virus & EEE
- Potato Late Blight Disease
- Lyme Disease
- Large crop yield reductions
- Food shortages







Courtesy of Kevin Byron

There is no easy button

- Some say, just ban all synthetic pesticides
- The cities that have done that are already re-thinking those decisions
- People's lawns and gardens stir up lots of emotions, especially when white grubs start decimating their lawn

Pesticides approved for organic grower use can be highly toxic to pollinators

Toxicity of Common Organic-Approved Pesticides to Pollinators

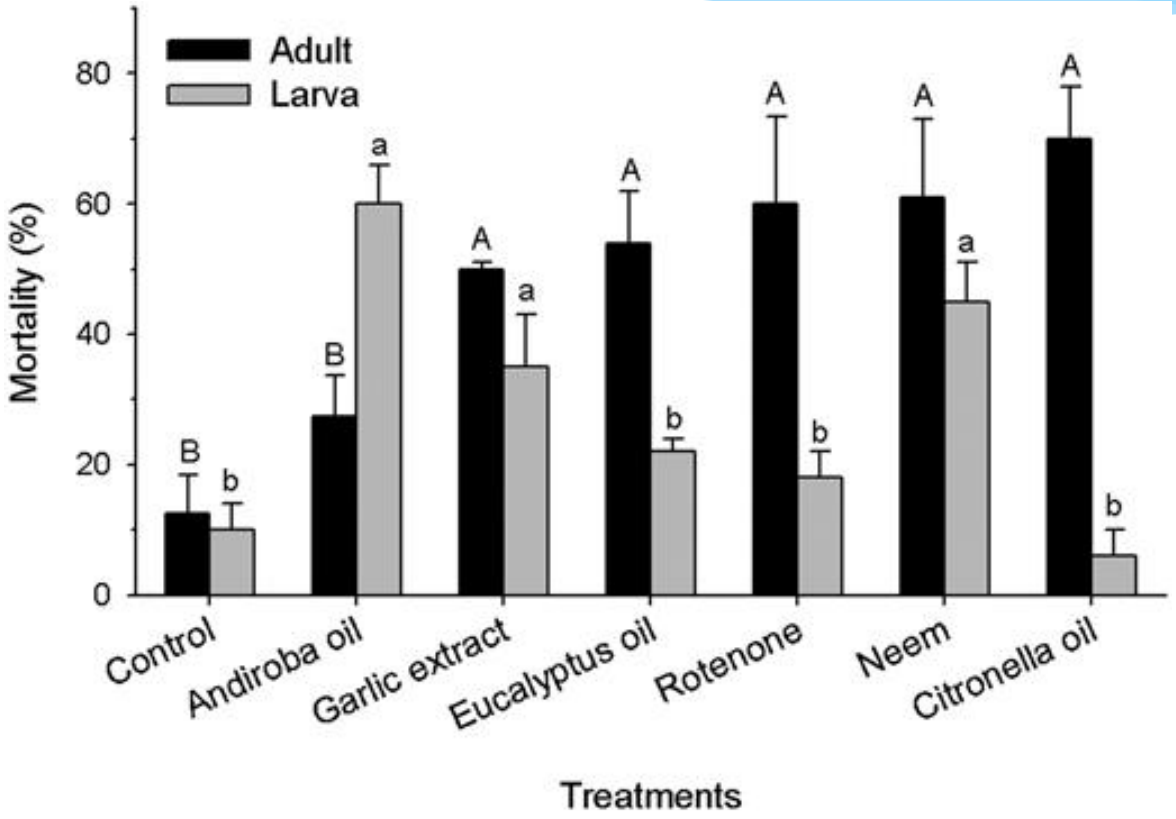
PESTICIDE	NON-TOXIC	LOW TOXICITY	HIGHLY TOXIC
Insecticides/Repellants/Pest Barriers			
Bacillus thuringiensis (Bt)	■		
Beauveria bassiana			■
Cydia pomonella granulosis	■		
Diatomaceous Earth			■
Garlic	■		
Insecticidal Soap			■
Kaolin Clay	■		
Neem		■	
Horticultural Oil			■
Pyrethrins			■
Rotenone			■
Sabadilla			■
Spinosad			■
Herbicides/Plant Growth Regulators/Adjuvants			
Adjuvants		■	
Corn Gluten	■		
Gibberellic Acid	■		
Horticultural Vinegar		■	
Fungicides			
Copper		■	
Copper Sulfate			■
Lime Sulfur	■		
Sulfur			■

Soaps and Oils, only when directly sprayed upon the pollinator

Eric Mader – The Xerces Society for Invertebrate Conservation

Even natural products affect bees

* Acute Toxicity and Sublethal Effects to Honey Bees
  * Andiroba oil, Garlic extract, Eucalyptus oil, Rotenone, Neem oil and Citronella oil applied to adults and fed to larvae
    * All but Andiroba oil caused significant mortality to adult bees
    * Andiroba, Garlic and Neem caused significant larval mortality
      * These may work like insect growth regulators preventing moulting



J. Insect Sci. (2015) 15(1): 137; DOI: 10.1093/jisesa/iev110

Management practices can make a big difference

- Mowing treatment plots and removing the clover blossoms just before treatment prevented the impact on bumble bees

Table 3. Absence of acute adverse effects on *Bombus impatiens* colonies after 2 weeks' exposure to turf with flowering white clover that had bloomed after the sward was mown to remove flowers present at the time of treatment.

	Adult workers per hive[a]		Immature bees per hive[b]				
Treatment	Live	Dead	Live	Dead	Honey pots	Total weight (g) of live adults[c]	Hive weight (g)
Clothianidin	93±9	11±4	12±8	6±1	52±6	13.0±1.3	585±11
Chlorantraniliprole	130±12*	7±2	8±4	6±2	69±6	16.7±1.6	621±16
Untreated	81±8	7±2	0	3±1	56±3	11.3±0.9	588±8

What about glyphosate?

- No national pesticide control agency classifies it as a carcinogen
- Even the WHO does not classify it as a carcinogen
- Lost lawsuits do not prove anything
- Most recent lawsuits have been thrown out or Bayer has prevailed

Litigation | Product Liability | Environment | Health | Litigation

Bayer on winning streak in Roundup litigation after huge initial losses

By **Brendan Pierson**

September 2, 2022 2:38 PM EDT · Updated a year ago


Bee-Friendly Gardens have Shelter, Plant Diversity, Lots of Blooms, Water, Some Bare Soil

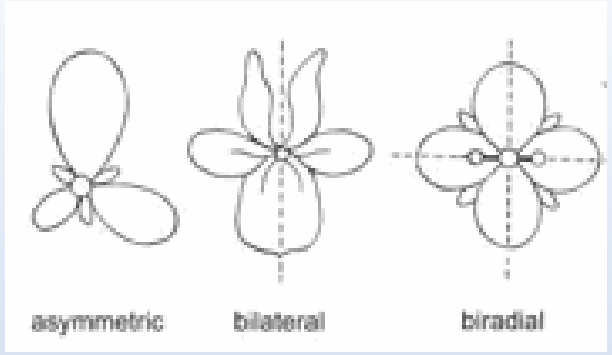
Social Behavior of Bees

- Social
  - 10% of bee species in the U.S.
  - Several generations in a nest at the same time
  - Cooperation in caring for young
  - Division of labor
  - Bumble and honey bees
- Solitary
  - 90% of bee species in the U.S.
  - Each female constructs and provisions her own nest

Foraging Selectivity

- Nectar - sugar and amino acids
- Pollen – protein
- Most gather nectar from several different flower species
  - Depends mostly on tongue length and skill
- Pollen collection is usually more selective
  - Some will use any flowering plant, many focus on one species of plant

Floral Resources



- Bee flowers
  - Bilateral symmetry
  - Tube-like or bell-shaped with a nectar reservoir
  - Some are complex to receive reward
  - Yellow, white, blue or purple with UV markers

Colors attract specific groups

Bees like blue, purple, white and yellow

Butterflies like orange, pink and red

Beetles prefer big fleshy disk shaped smelly white and green flowers

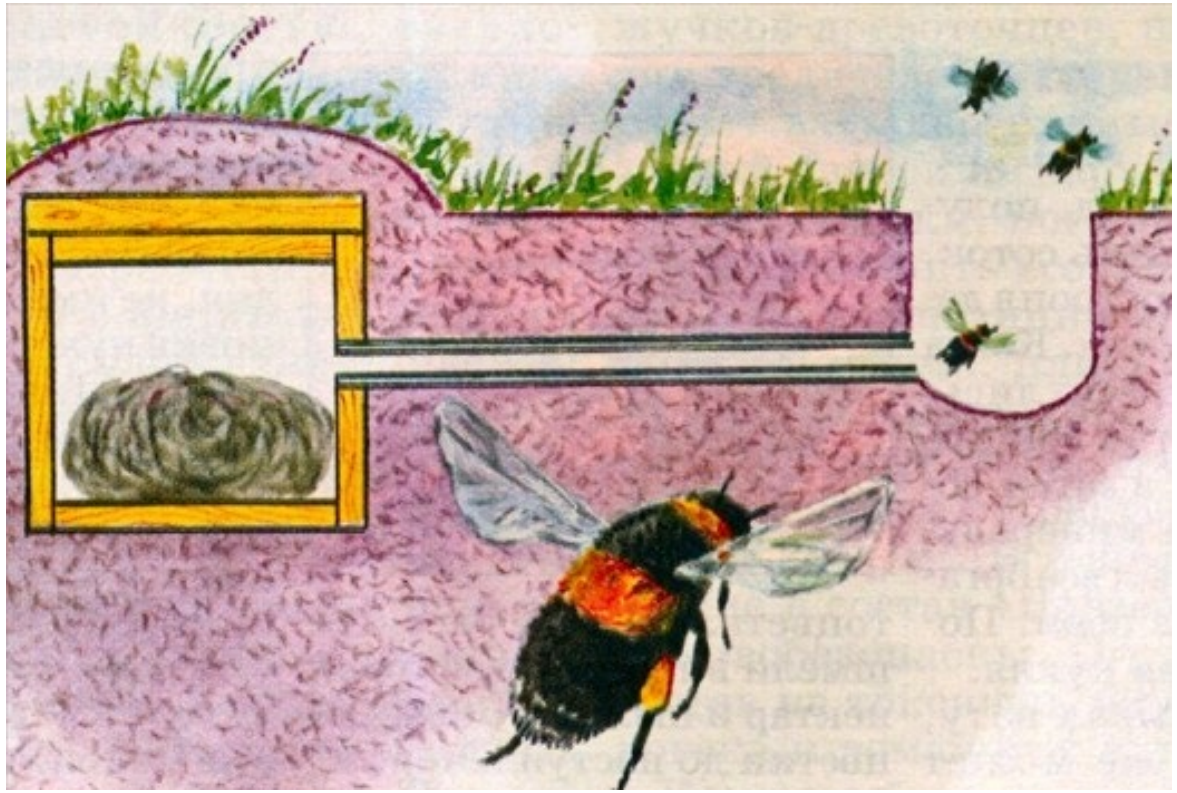
Wasps and flies like yellow, pink and white

Nesting

- Ground 70%
- Stem 30%
- Cavity
  - Bumble and honey bees

Nesting Resources – Ground Nesters

- Areas of bare or sparsely vegetated soil
  - Loose
  - Well drained
  - Full sun
  - Several yards across
- Flat and/or banked areas



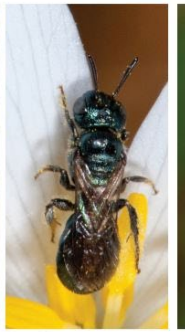
Nesting Resources – Cavity Nesters

- Dead trees, snags, or fallen logs
- Base of bunch grasses
  - Old rodent nests often found under grassy tussocks

Nesting Resources – Stem Nesters

- Pithy, soft centered or hollow stems
  - Sumac
  - Box elder
  - Elderberry
  - Raspberry
  - Allium
  - Asparagus
  - Sedum
  - Sunflower

CAVITY-NESTING NATIVE BEES



Small Carpenter Bees, *Ceratina* spp.

Mason Bees, *Osmia* spp.

CAVITY NEST

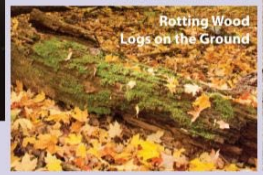
EGG

BEE BREAD

CAVITIES IN ROCKS

CAVITIES IN PLANT STEMS

CAVITIES IN WOOD



Leafcutter Bees, *Megachile* spp.

Yellow-Faced Bees, *Hylaeus* spp.

 Pollinators of Native Plants www.PollinatorsNativePlants.com

How to Create Habitat for Stem-nesting Bees

WINTER

Leave dead flower stalks in-tact over the winter.

SPRING

Cut back dead flower stalks leaving stem stubble of varying height, 8 to 24 inches, to provide nest cavities.

Female bees find cut or naturally-occurring open stems, start a nest, then lay an egg on the pollen balls. Larvae eat the pollen.

SUMMER

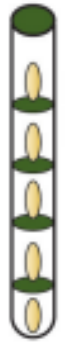
New growth of the perennial hides the stem stubble.

Bee larvae develop in cut dead stems during the growing season.

FALL

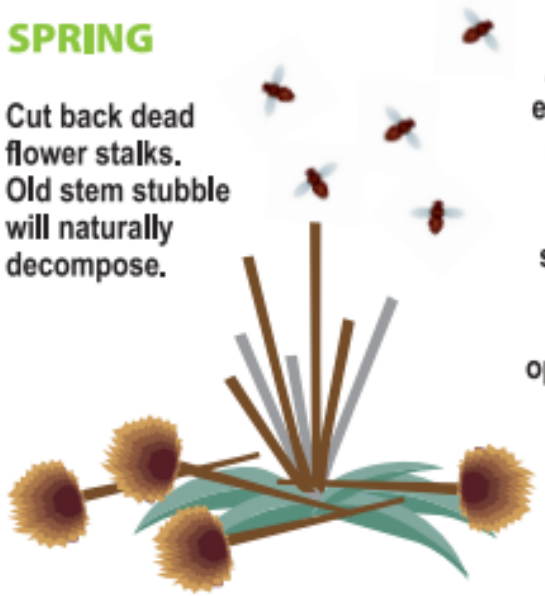
WINTER

Bees hibernate in stems during the winter.



SPRING

Cut back dead flower stalks. Old stem stubble will naturally decompose.



Adult bees emerge and start nests in newly cut dead stems or in naturally-occurring open stems.

Graphics and content: Coleen Satyshur, Elaine Evans, Heather Holm, Sarah Foltz-Jordan

https://drive.google.com/file/d/1PUNONY2PIiLyhVfCO3P_UfvDiy1jhE9M/view?usp=sharing

Nests for Native Bees

www.xerces.org

Pollinator-Friendly Gardens

- Plant diversity of flowering plants
- With overlapping bloom periods throughout the season
- Provide water (small puddles, plants that catch water and dew)
- Provide some shelter
- Replace invasive plants

Questions

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