

Bees, Butterflies & Blooms The Essential Partnership of Pollinators



The Garden Academy
Sustainability Series
Section: Insects

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- ** I do not represent the TMG or TMN organizations for this program. They are part of my garden experience and I highly recommend these programs for their value to the individual and the community. For information about joining these organizations, contact your local agricultural extension office.



**Most of us
know how to
plant for
butterflies!!**

**We want to
welcome flying
jewelry to visit our
gardens**

Agastache



Almond Verbena



Coneflowers



Goldenrod (Solidago)



Joe Pye Weed (Eupatorium)



White Mist Flower (Eupatorium)



Larkspur



Poppies



Queen Anne's Lace



Radish & Cilantro



Syrphid Fly

Sunflowers



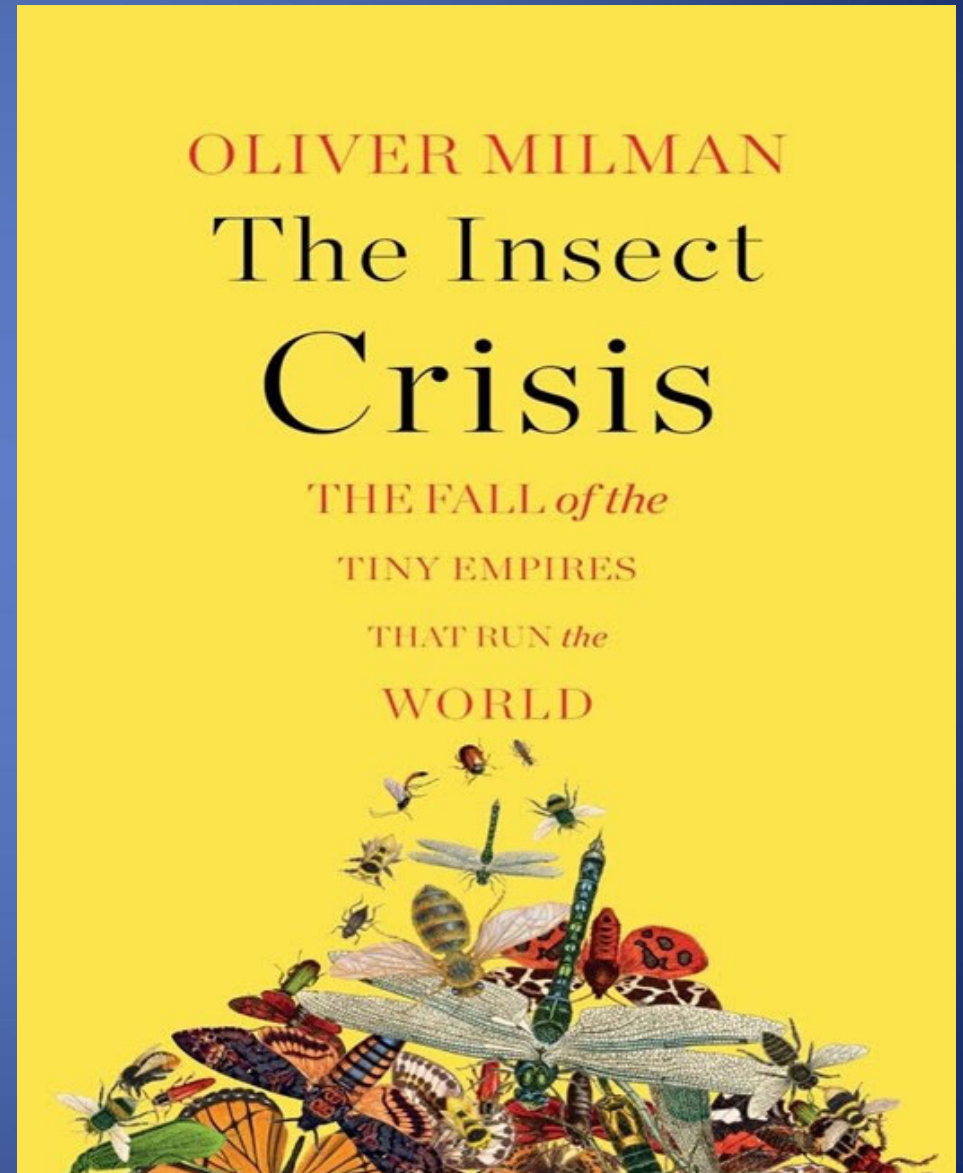
Zinnias



But do we need to do more?

In a 15-year German study (1989-2004), insect biomass decreased from **3.5 pounds** to **10.6 ounces per observation trap** (71% drop)

- Causes include:
 - Loss of habitat
 - Mono-cropping (biological deserts)
 - Overuse of nitrogen fertilizers
 - Destruction of hedgerows and ponds



Protecting a vital partnership

- Pollinators are required for:
 - Fruit development
 - Vegetable development
 - Seed production



There are economic factors to the loss of pollinators

- A Cornell University study has estimated that honeybees annually pollinate more than \$14 billion worth of seeds and crops in the United States, mostly fruits, vegetables and nuts. “Every third bite we consume in our diet is dependent on a honeybee to pollinate that food,” said Zac Browning, vice president of the American Beekeeping Federation.

It's easy to love butterflies

- We've come a long way about bees
- But what about all of the other insects?
- We either abhor or ignore most "bugs"
- Ecosystems would collapse without them



Wasps on fennel

Insect habitats are common in nature – it's how the balance is kept

- Indigenous insects evolved with indigenous plants
- Pests & Predators maintain a balance without human intervention
- Some cycles are short term, others may be a decade or more



The balance of nature has been greatly altered in most home gardens

- Limited palette
- Exotics
- Chemicals
- Most do not support natural predator-pest populations



We can start the change in our own gardens

- Create a managed habitat where beneficial insects can live out their entire life cycle
 - Food
 - Water
 - Shelter
 - A place to breed new generations



Pollination goes beyond bees and butterflies

- Bees
 - Honeybees
 - Native
- Butterflies
- Moths
- Ants
- Wasps
- Beetles
- Flies
- Mosquitos
- Birds
- Bats

Pollinating Partnerships

- Each pollinator evolved with the plants they pollinate
 - Attraction
 - Color
 - Fragrance
 - Mechanics
 - Shape
 - Position
 - Type of nectar
 - Location of pollen



Hummingbirds

- Colors – red, orange, yellow
- Shape – long, narrow central tube; pendulous or drooping to accommodate hovering
- Fragrance - little to none
- Pollen & Nectar – generally more pollen and nectar
 - Accommodates fewer visits per flower

Bats

- Color - white or pale colors
- Shape – varies; larger flowers (1.1/2” – 3”)
- Fragrance – sweet, fruity, fermenting
- Pollen & Nectar – copious amounts of dilute nectar
 - Bats also feed on insects in the flowers facilitating pollination during feeding
- Open at night
- Both species of nectar feeding bats in Texas are endangered species



Moths

- Color – white or dull colors
- Shape – in clusters; often have landing platforms
- Fragrance – heavy, sweet
- Pollen & Nectar – ample nectar; nectar deep in flowers
- Open at night
- Hawk moths, sphinx moths, and hummingbird moths are large and beautiful



Flies

- Color – Purple, brown, dark & dull colors
- Shape – Funnel-like, complex traps, clusters
- Fragrance – putrid like rotting meat, dung, blood
- Pollen & Nectar – not heavy with nectar, but pollen bearing



Bees & Butterflies

- Butterflies are far less effective pollinators than bees
- Proboscis is long and there is less contact with pollen
- Sheer number of flowers visited and time spent foraging makes up for lack of efficient pollen movement
- Bees are one of our most common, best known, and most efficient pollinators

Native bees

- 4000 species of native bees in North America
- Native bees evolved with native plants
- Some bees have adapted to be pollinators of a specific plant



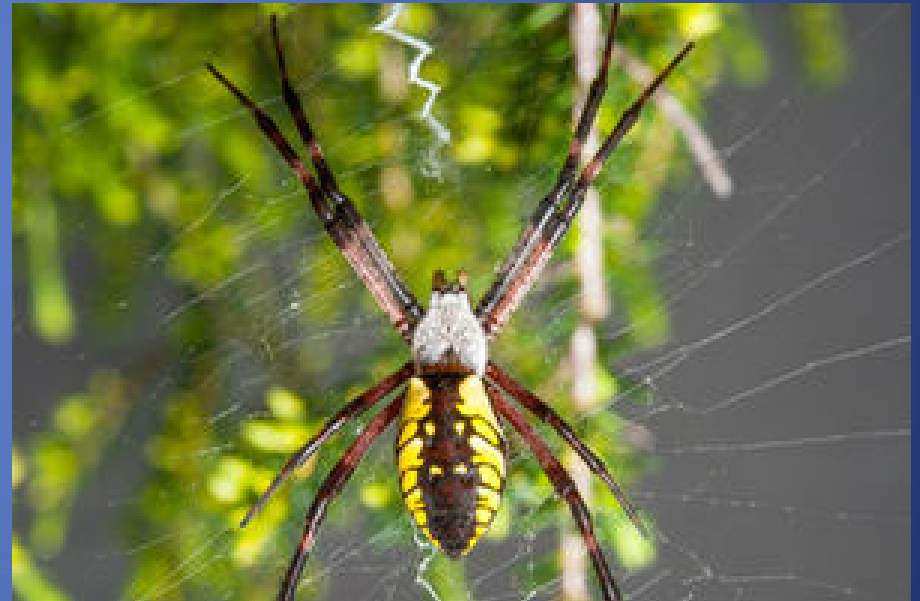
Honey Bees

- *Apis mellifera* is not native to America
- Imported with European immigrants in 1700's to pollinate food crops they brought with them
- Inextricably linked to our modern food supply
- Beekeeping common in homesteads through 1900

Everyone welcomes this



Who loves you, baby?



Attitudes can change when compassion is sparked by awareness

I remember when I used to see a
bee and go, YIKES, a bee!

And now I'm all.....Oh wow, a
bee. Hi!

You ok there? Need anything?
Can I get you a drink? A cushion?
Wanna' borrow the car?



Home Garden Insectaries

- Insectaries can be incorporated into the garden in several ways
 - Must have a **sufficient diversity** of plant material to **attract many species**
 - Must have the **sufficient density** of planting to **support an effective population** of those beneficial insects it attracts

Components of an insectary garden

- Food
- Water
- Shelter
- Safety
- Breeding areas



Food – Pollinators

- Pollinators require pollen and nectar
 - Nectar is a carbohydrate resource
 - Pollen is a protein resource



Food - Predators

- Predators require pest insects
- If there's nothing to eat, they're leaving



Food – Parasitoids

Parasitic wasps require target pests



Some predators need nectar and/or pollen during part of their life cycle

- Predatory wasps and flies prefer the nectar of small flowers that are borne in large flower heads
 - Queen Anne's Lace, Patrinia, radishes, mustards, lettuces, and many herbs



More than flowers

- Butterflies love overripe fruit
- Hang a butterfly feeder
- Feeders are designed to hold a variety of fruits such as orange halves, slices of apples and bananas
- Once they find it and get used to feeding there, the feeder will be visited daily
- Feeders are a great place to allow the family to observe specific butterflies, or for photographs of your favorites
- Experiment with fruit types to see which work the best
 - They should all be slightly overripe and at peak sugar content

A Cantaloupe feeding frenzy



Water

- Necessary for all life
- Provided in the dew for many insects



Water

- Bees and wasps prefer fresh open water, and a lot of it
- It is used to keep the hive cool in addition to consumption by individuals



Tubs with lilies provide safe landing and sipping pads



Providing water

- Insects are drawn to mineral rich water
 - Butterflies obtain minerals by sipping from wet soil
 - Beekeepers observe similar behavior in bees
 - Provide minerals using real salt or red salt



Puddling



Minerals are required for mating

- Male butterflies require minerals to produce the pheromones that attract females
- Males transfer minerals, sodium, and proteins to the females during mating
- This transfer supports the female and her eggs, increasing the survival of her larvae



Replicate a mud puddle

- Shallow saucer
- Fill with a mixture of garden soil and gravel which should be **kept quite damp at all times**
 - It will be visited more often if it is in the sun, but you will need to pay attention to keep it wet
 - A dripper is a great addition to an insect watering station
 - Add a handful of compost or real salt



Shelter

- Hard to address due to varied needs of the population
 - Many hang on undersides of leaves
 - Hide in mulch, grass, leaves
 - Brush piles for butterflies & beetles
 - Mason bee houses



Mason bees



5/16" holes; 5"- 6" deep

Brush piles

- Butterflies
- Beetles
- Will also attract some insect eating creatures



Dead Hedge



The Nest @ RHS Wisely, Surrey



Entomologists discourage insect “hotels”



Safety

- Cannot protect beneficials from birds, frogs, lizards – this is part of nature's cycle and keeps things in check
- Shelter will provide some cover
- Suspend the use of pesticides and herbicides



If you must treat, isolate

- Should a plant in your garden require treating, cover it with a laundry bag, or tulle yardage to isolate it from beneficials



Healthy = Happy

- Healthier gardens require fewer pesticides
- Healthier garden attract more pollinators!
- Build healthy soils
 - Incorporate good quality compost
 - Use slow release organic amendments
 - Mulch with organic mulches
- Foliar feed regularly – raise Brix
- Use repellents, not insecticides
- Remove plants that require excessive maintenance

Breeding areas

- If all other requirements are met, reproduction will happen
- Predatory insects often lay their eggs on plants where pest species are present



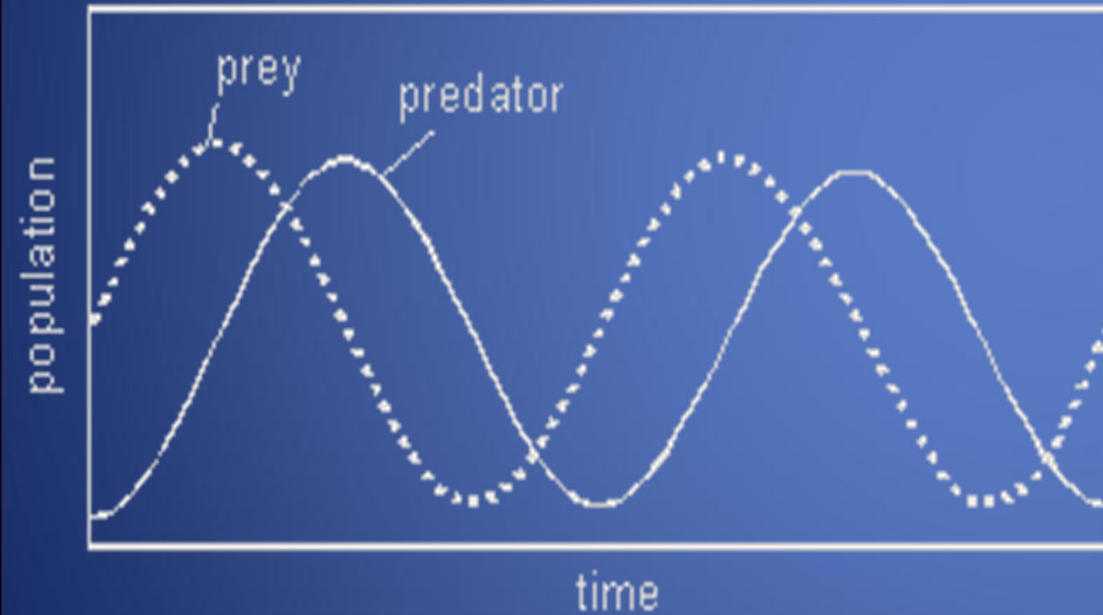
How long to see results?

- Natural controls are never instant
- Predator population will rise in response to pest pressure



Lacewing larvae hatch in 3 – 5 days, feed for 2 – 3 weeks, pupate, emerge, and lay 200 eggs as adults

The Pest-Predator Cycle



Explanation:



Remember – predators need pests

- Your goal is not to eliminate every single pest in your yard
 - Keep them at a level where damage does not exceed a natural or tolerable level
- The weakest plants will be the first ones that are attacked
 - Keeping plants healthy by addressing soil biology, proper watering, fertilization and foliar feeding will lower the stresses that make them attractive to pests in the first place

How to build an insectary garden



Location – Sunshine & Proximity



Provide natural food resources

- Native plants and indigenous pollinators evolved together – they have partnerships
- All pollinators have a drive for natural nectar
- Not all nectar plants suit all pollinators
 - Butterflies have a long proboscis for sipping nectar from deep, tubular blooms
 - Bees do not have this mechanism and are more likely to be attracted to open blossoms
 - Some bees will chew through the side of a tubular flower to get at the nectar



Plan for year round activity

- Plant “winter annuals” to provide late winter and early spring forage
- Let things go to seed over winter
- Don’t rush to cut grasses back
- Keep seed packets on hand to fill in seasonal gaps



Diversity & Drifts

- A diversity of nectar flowers planted in drifts will attract more pollinators than single specimens



What is a “drift”?

- A “drift” is a group of 3 or more of the same plant, planted closely together in a random pattern to provide an unbroken chain of nectar flowers
- Bees will browse individual specimens, and so will butterflies, but butterflies are more attracted to drifts
- Rudbeckias, Coneflowers, and trailing Lantanas are good varieties for drifts
- Drifts are also a good landscape technique and will take your color gardening to a new level

Drifts



Drifts



Start with surefire favorites

- Include plants known for heavy nectar and pollen production
- Bottlebrushes (*Callistemon*) and Coral Vine (*Antigonon leptopus*) will be visited by every pollinator in the neighborhood
- Almond Verbena
- Catmints
- Coneflowers
- Butterfly Weed

Offer many choices

- After you have made sure you have a few surefire favorites, add in as much pollinator friendly diversity as you have room for
 - Native plants should be included
 - Adapted plants
 - Plan for year round availability

Be a good host

- Since you are providing host plants, you must not spray!
 - Host plants will be decimated by larval feeding
 - Most will return to their full glory after the larvae leave to pupate
 - Nature has allowed for this cycle



Provide sacrificial plants

- Plant a fast growing, hybrid bush tomato plant
- Move hornworms to this sacrificial plant
- Allows moths to reach adulthood to pollinate dragon fruit, cestrum, brugmansia, night blooming cactus, epiphyllums



Plant host plants

Pipevines

Parsley-Carrot Family

Citrus

Cassias

Passionvines

Asters

Milkweeds



A Call to Action – Make your garden an insectary

- More forage for butterflies, bees, hummingbirds
- Begins to restore habitat for indigenous insects
- Feeds birds & small wildlife - nectar, seeds, excess insects
- Creates “Habitat Highway” – a path to a better balance with nature



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