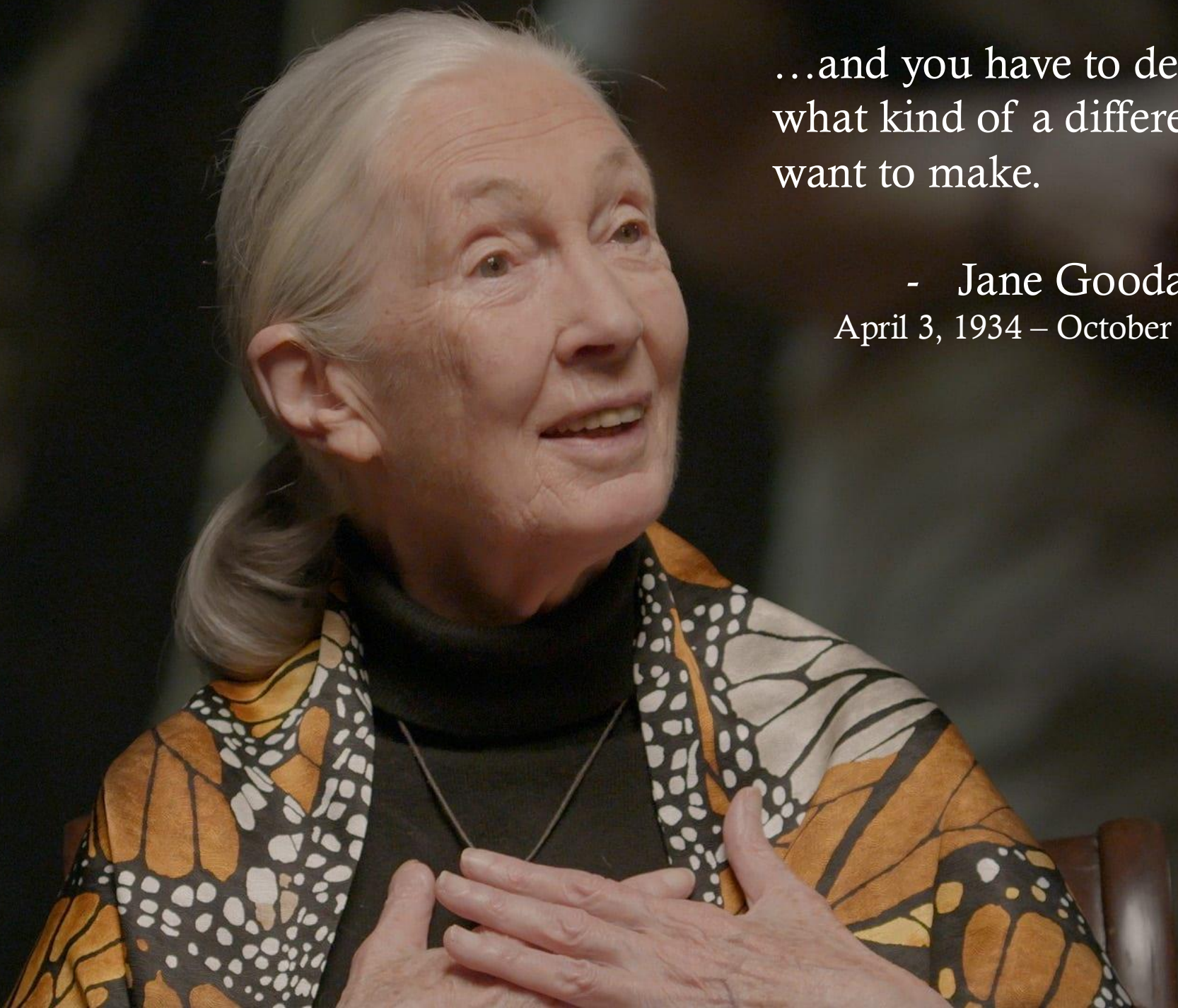




FROM SOIL TO SANCTUARY: STRATEGIES FOR MINIMIZING HARMFUL GARDEN CHEMICALS

Presented by: Angela Johnson

A portrait of Jane Goodall, an elderly woman with short, wavy grey hair, looking slightly upwards and to the right with a gentle smile. She is wearing a black turtleneck sweater under a patterned shawl with orange, black, and white designs. Her hands are clasped in front of her chest.

You cannot get
through a
single day
without having
an impact on
the world
around you.

What you do
makes a
difference...

...and you have to decide
what kind of a difference you
want to make.

- Jane Goodall

April 3, 1934 – October 1, 2025

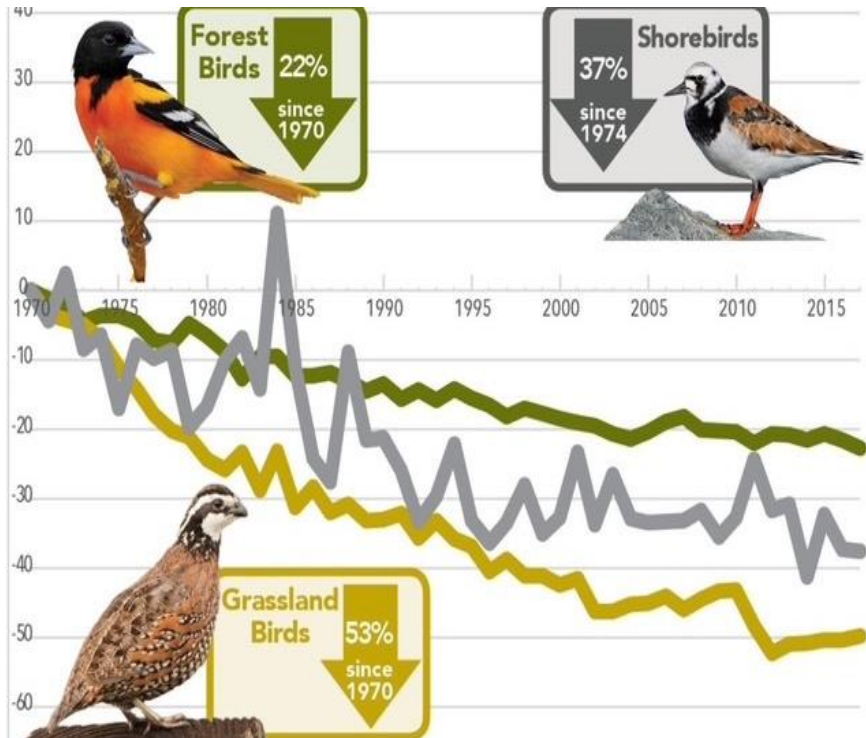


PRESENTATION AGENDA

- Why We Should Care
 - Tools for Change
 - Troubleshooting
 - Resources
-

WHY WE SHOULD CARE : CASE STUDIES

STEEP DECLINES IN BIRD POPULATIONS



Habitat Loss

Primary driver in decline, especially in grassland prairies and loss of keystone trees.

Climate Change

Rising temperatures and changing weather patterns are disrupting migration and birds' ability to find food sources and nesting grounds.

Pollution and Pesticides

Pesticide and other toxic chemicals contaminate food sources and nesting areas leading to reproductive issues and increased mortality rates. Especially true for birds of prey eating poisoned rodents.

Collision and Predation

Threats of collision with buildings and automobiles. Predation by free-roaming domestic cats.

Invasive Species

Loss in host plant species through introduction of ornamental plants that also become invasive in natural areas.



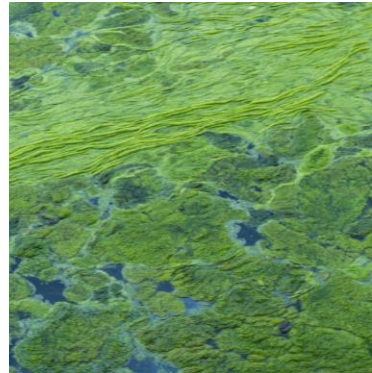


CHEMICALS AND WATER



Chemical Runoff into Waterways

Rain events cause fertilizers and pesticides from lawns, oil and gas in driveways and sidewalks and tar and heavy chemicals from rooftops to flow into nearby streams and groundwater, contaminating water sources.



Aquatic Ecosystem Harm

Chemical contamination promotes harmful algal blooms and creates toxic runoff, damaging aquatic plants and animals.



Human Health Risks

Polluted water can carry dangerous chemicals into drinking water supplies, posing risks to community health.







THE PROBLEM WITH LAWNS

Dogs and Cancer

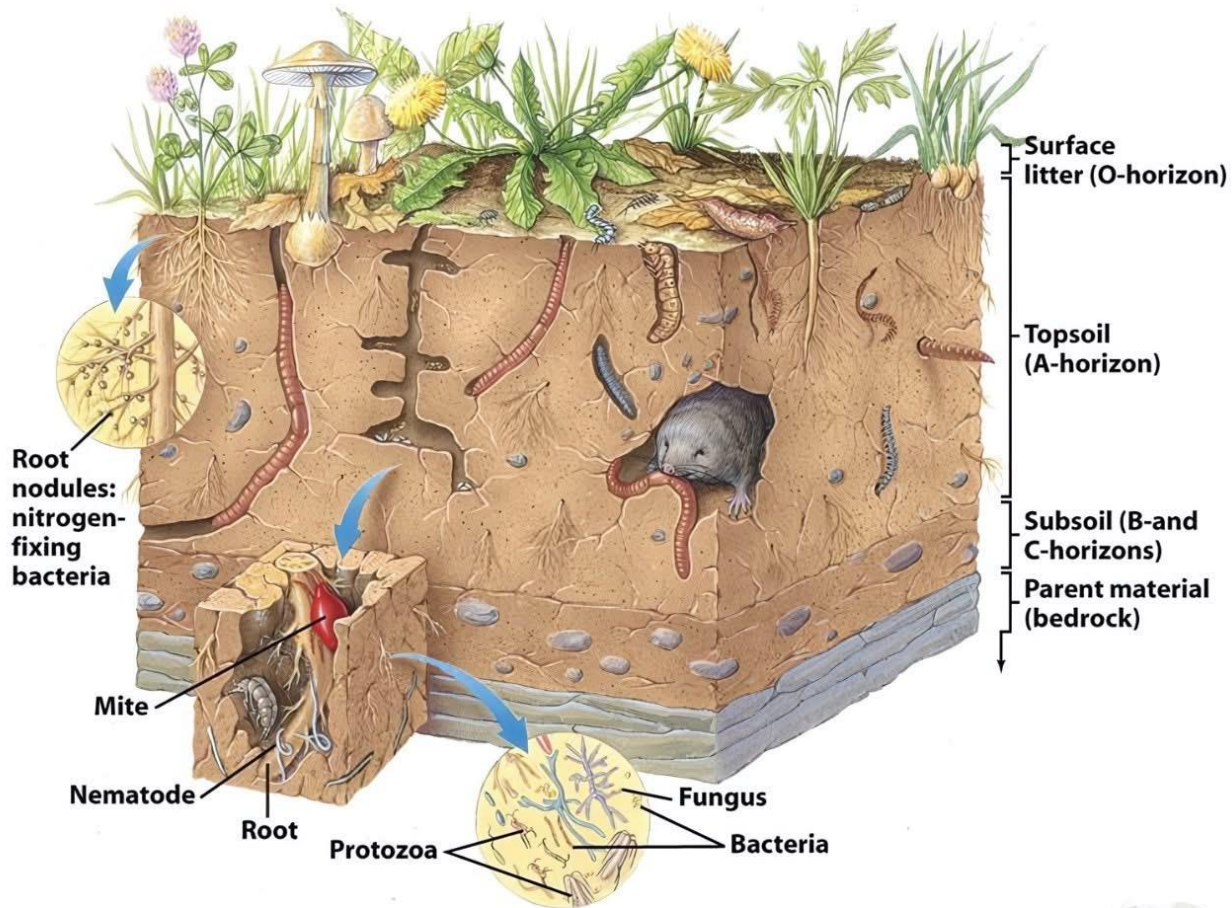
2012 case study by Perdue University showed dogs exposed to professionally applied lawn pesticides had a 70% higher risk of developing malignant lymphoma

Golf Courses and Parkinson's

2025 study demonstrated that those living within a mile of a golf course had a 2.25 times increased risk of developing Parkinson's

Soil is LIFE

The life in the soil is the
fertility of the soil



TURF STATISTICS

- 40 million acres of turf, single largest monocultural crop in US.
- 800 million gallons of gas to maintain by mowing with 17 million additional spilled.
- 3 million tons of fertilizer used per year.
- 9 million gallons of water used in irrigation PER DAY.
- Not to mention the money wasted by the consumer.

MONARCHS AND PESTICIDES

January 2024 study linked pesticides to monarch butterfly deaths in Pacific Grove, California overwintering habitat.

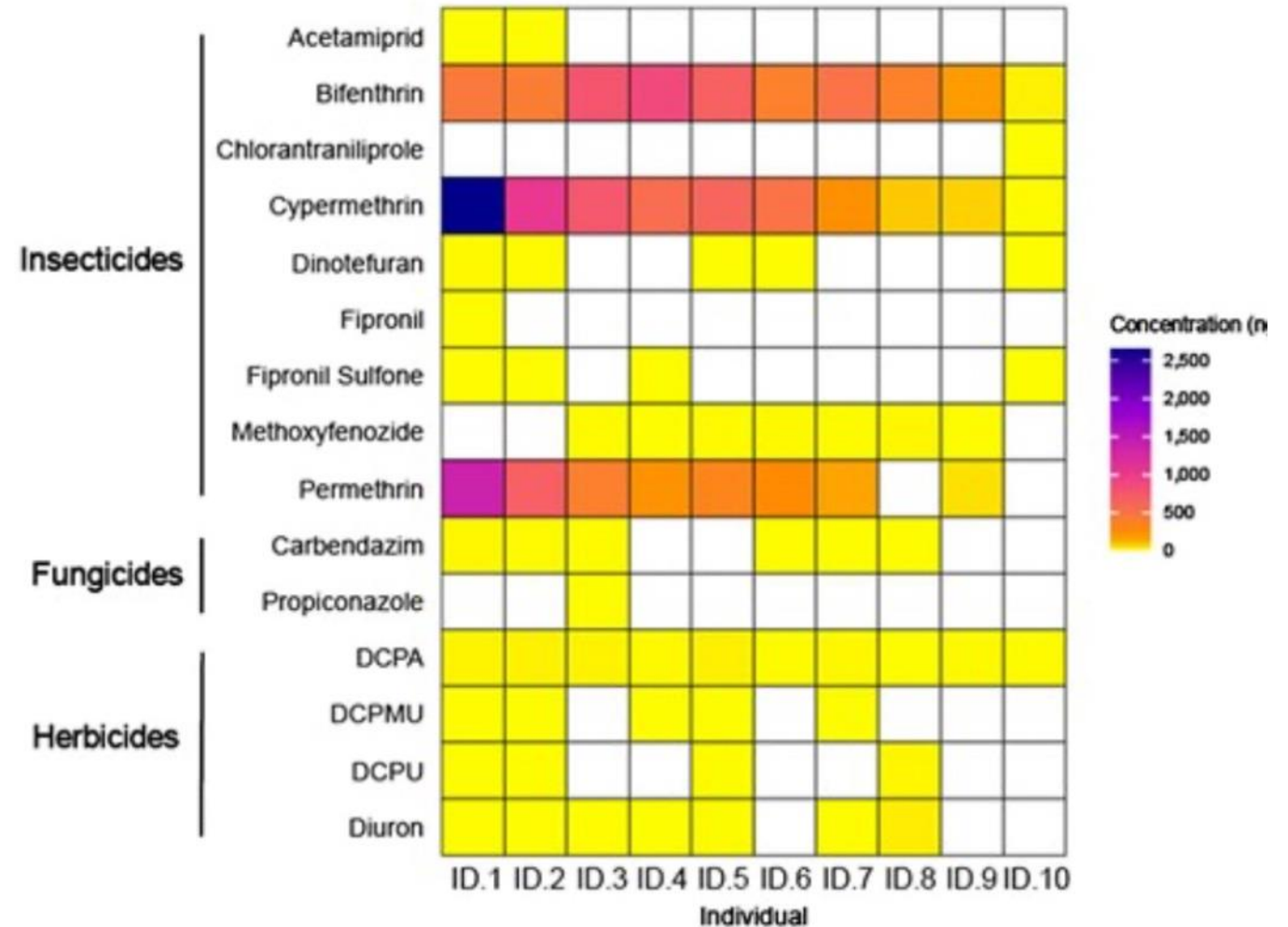
On average 7 different pesticides per butterfly in hundreds found

Highest 3:

Bifenthrin – Fire Ant Killer

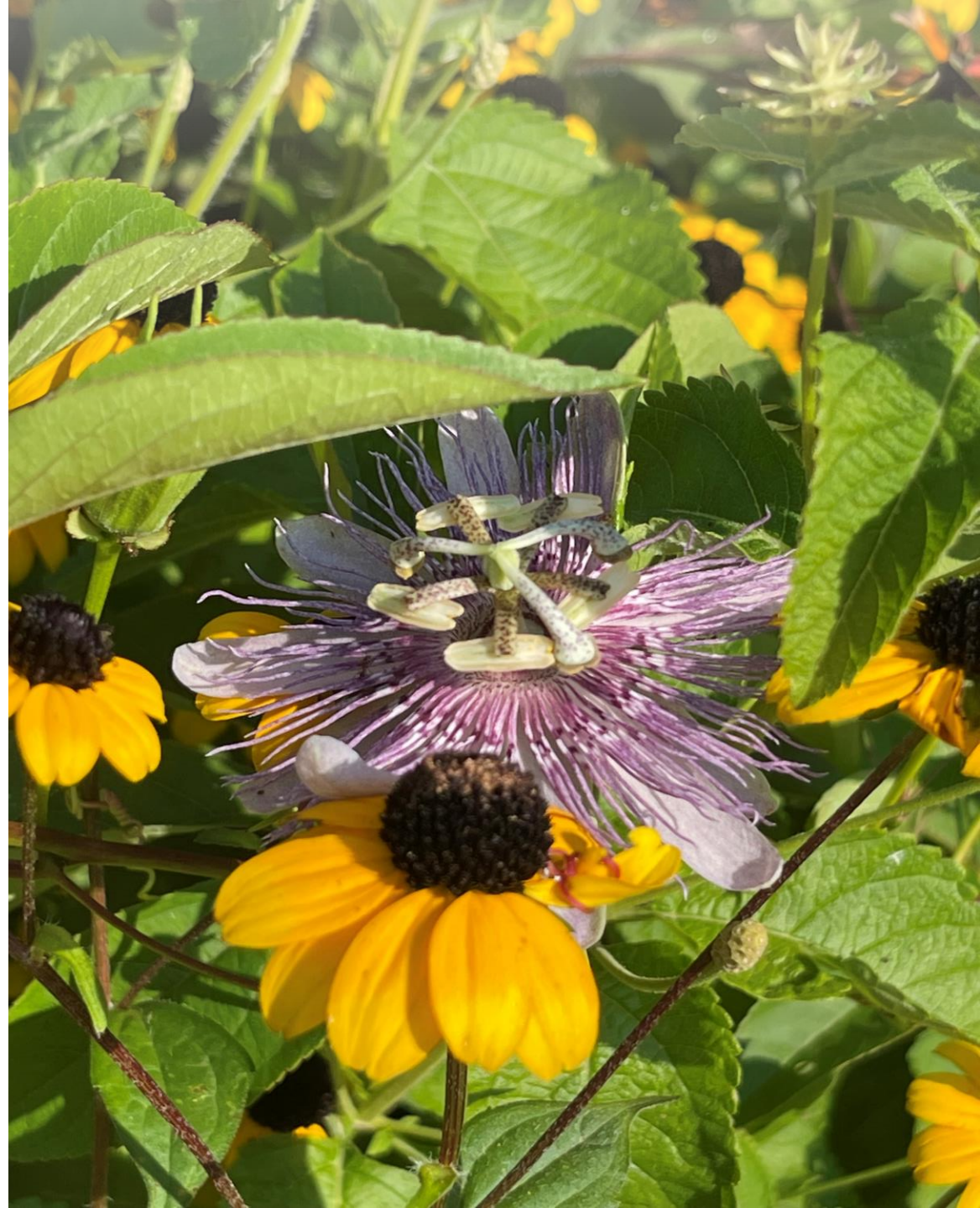
Cypermethrin – “RAID” neurotoxin

Permethrin – Flea collars and mosquito netting





QUESTIONS



TOOLS FOR CHANGE: HOW HOMEOWNERS CAN HELP



IN YOUR LANDSCAPE

Remove Turf and Replace with Native Plants

Identify and Remove Invasives

Skip Fall Clean Up

Leave the Leaves

Stumpery & Brush Piles

Plant an Oak Tree

Create Soft Landings

Mow Less Often

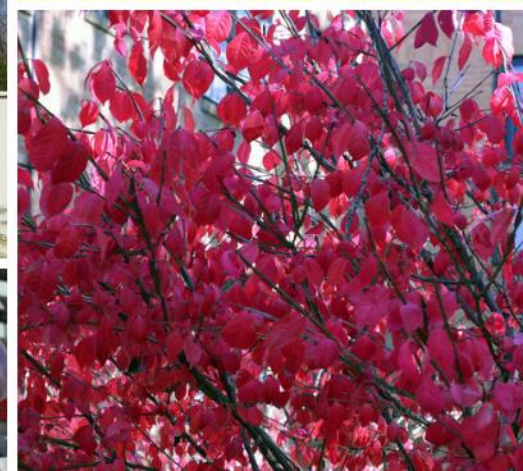
Create Grassland Meadow



NATIVE PLANTS BRING FOOD TO THE YARD

INVASIVE PLANT SPECIES OF NORTH CAROLINA

[ncnps-invasive-plant-list-20231120-1.pdf](#)



SKIP THE CLEAN UP

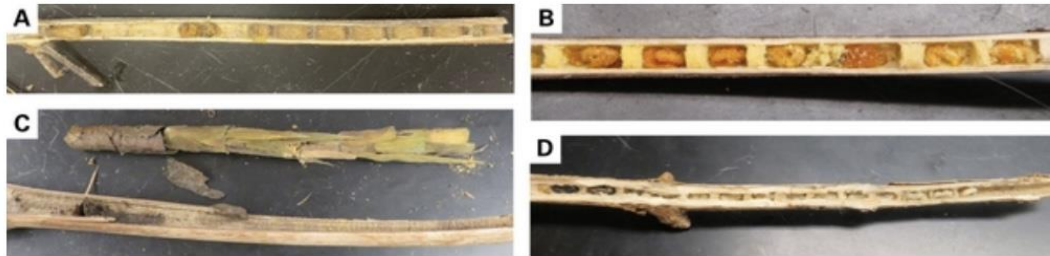
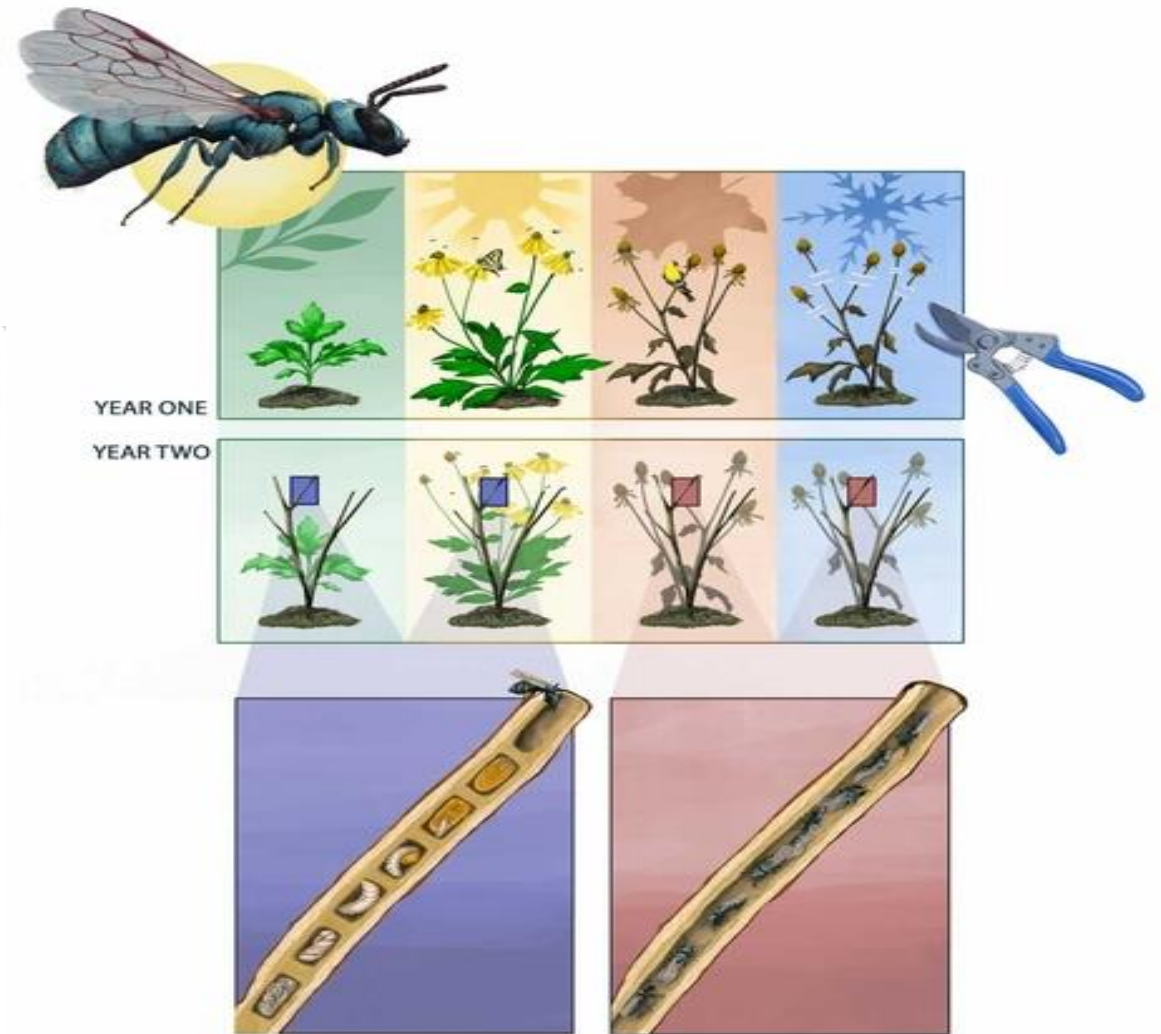


Figure 1. Bee nests inside perennial plant stems. A. Cocoons of leafcutting bee (*Hoplitis*) in lollipop verbena. B. Nest of small carpenter bee (*Ceratina mikmaqi*) in coneflower. C. Nest of leafcutting bee (*Megachile*) in Anemonella. D. Nest of small carpenter bee (*Ceratina calcarata*) in Hydrangea.

Photos by Youngsteadt
Urban Ecology Lab, CC BY-
NC-SA 4.0.



- [Garden Cleanup for Pollinators: Trim Perennial Stems in Their First Winter | NC State Extension Publications](#)
-

LEAVES ARE HABITAT

MOST BUMBLEBEE QUEENS NEST
JUST BELOW THE GROUND OR
UNDER PILES OF BRUSH IN WINTER



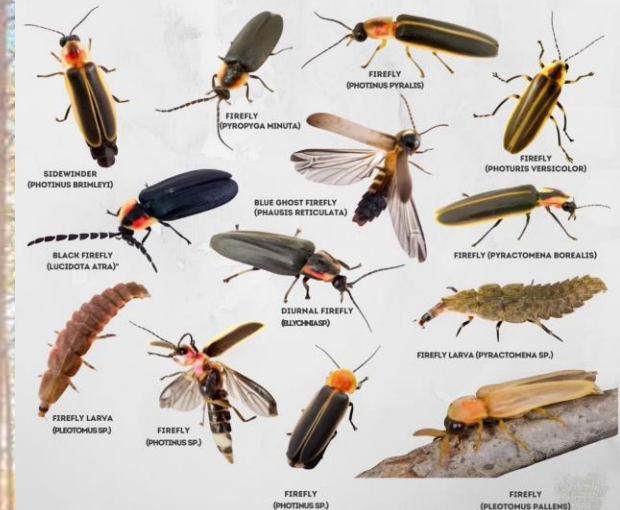
LEAVE THE LEAVES. BAN THE LEAF BLOWER.
IN THE SPRING, AVOID RAKING, TILLING AND
MOWING UNTIL THE QUEENS EMERGE FROM THEIR
WINTER NESTS IN MAY.



A pile of leaves can house over 100 species,
including moths, beetles, salamanders, and
beneficial insects, which are essential for
your garden's pest control. By bagging
them, you're not just cleaning up
**but evicting an entire ecosystem that has
thrived all summer.**

TYPES OF FIREFLIES

Fireflies, with their enchanting glow, are more than just beautiful creatures; they are vital to ecosystems and indicators of environmental health. Studying firefly populations can reveal the impacts of human activities, habitat degradation, and pollution. Understanding these insects offers insights into the web of life and informs actions for preserving our natural world.



STUMPERY AND BRUSH PILE HABITATS

Stumpery

What is a stumpery?

It's an arrangement of logs and stumps created in a damp, shady spot, then planted with ferns and other shade plants.



A stumpery adds interest to your yard and can be habitat for forest-dwelling creatures like toads, turtles, salamanders and stag beetles.
(Choose plants that are native to your area.)

Brush Pile

Create a Brush & Log Pile Habitat

(U.S. Native Edition)

Goldenrod
(Solidago spp.) –
late-season nectar
for bees &
butterflies.

Joe-Pye Weed
tall blooms
for Monarchs &
pollinators.

Hollow gaps –
safe havens
for
overwintering
insects.

Native Ferns –
ground cover for
toads, turtles,
and shade
insects.

Decaying wood –
attracts beetles,
fungi, and grubs
(food for birds).

Stacked logs &
branches –
shelter for
amphibians,
reptiles, and
small mammals.

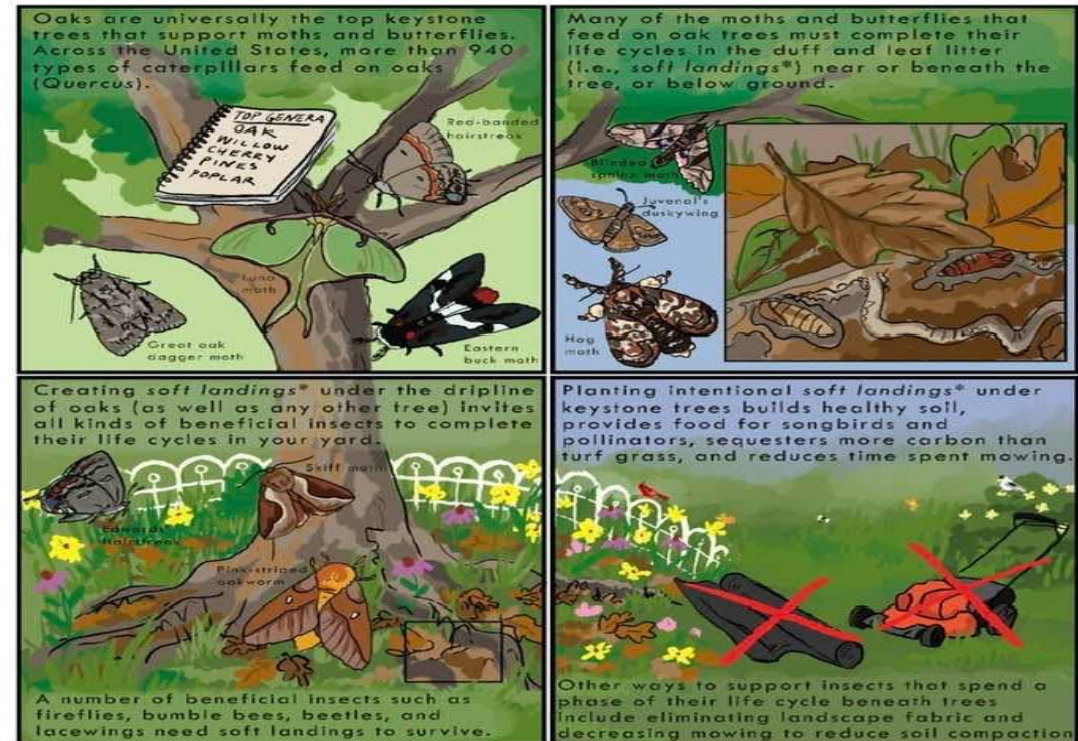


OAKS & SOFT LANDINGS

Oak trees host 940 species of caterpillars in the US. Seventy-five percent of the insects required by birds and other animals are produced by only a few plant genera with oaks playing the biggest role.

SOFT LANDINGS

Soft landings are diverse native plantings under keystone trees (or any other regionally appropriate native tree). These plantings provide critical shelter and habitat for one or more life cycle stages of moths, butterflies, and beneficial insects such as bumble bees, fireflies, lacewings, and beetles. In addition to plants, **soft landings** also include leaf litter, duff, and plant debris.



Funded by a grant from Wild Ones Minnesota. ©2021 Heather Holm and Neighborhood Greening.
Developed in consultation with Desiree Narango, Ph.D.; artwork by Elsa Cousins.
* For more on creating soft landings under trees, visit: www.PollinatorsNativePlants.com/softlandings.html





A dirt path winds through a lush green landscape. The path is light brown and curves from the bottom left towards the center. It is flanked by vibrant green grass. In the background, there are dense trees with various shades of green foliage. The word "QUESTIONS" is written in large, white, sans-serif capital letters across the middle of the image.

QUESTIONS



IN YOUR GARDEN

Crop Rotation

Companion Planting

Barrier Planting

Attracting Beneficial Insects

Compost as Fertilizer

Leaves As Mulch

CROP ROTATION

Crop rotation is a technique in which crops are grown in a specific sequence in a particular planting bed. The goal of crop rotation is to maintain soil fertility, reduce pest and disease problems, and promote soil health. By rotating crops, gardeners avoid planting the same crops in the same place year after year, which can deplete the soil of nutrients and lead to a build-up of harmful pests and diseases. Instead, gardeners can alternate between crops that have different nutrient requirements and can help to improve soil fertility over time.



CC BY-NC-SA 4.0 www.gwenfarsgarden.info

PLANTING CHART

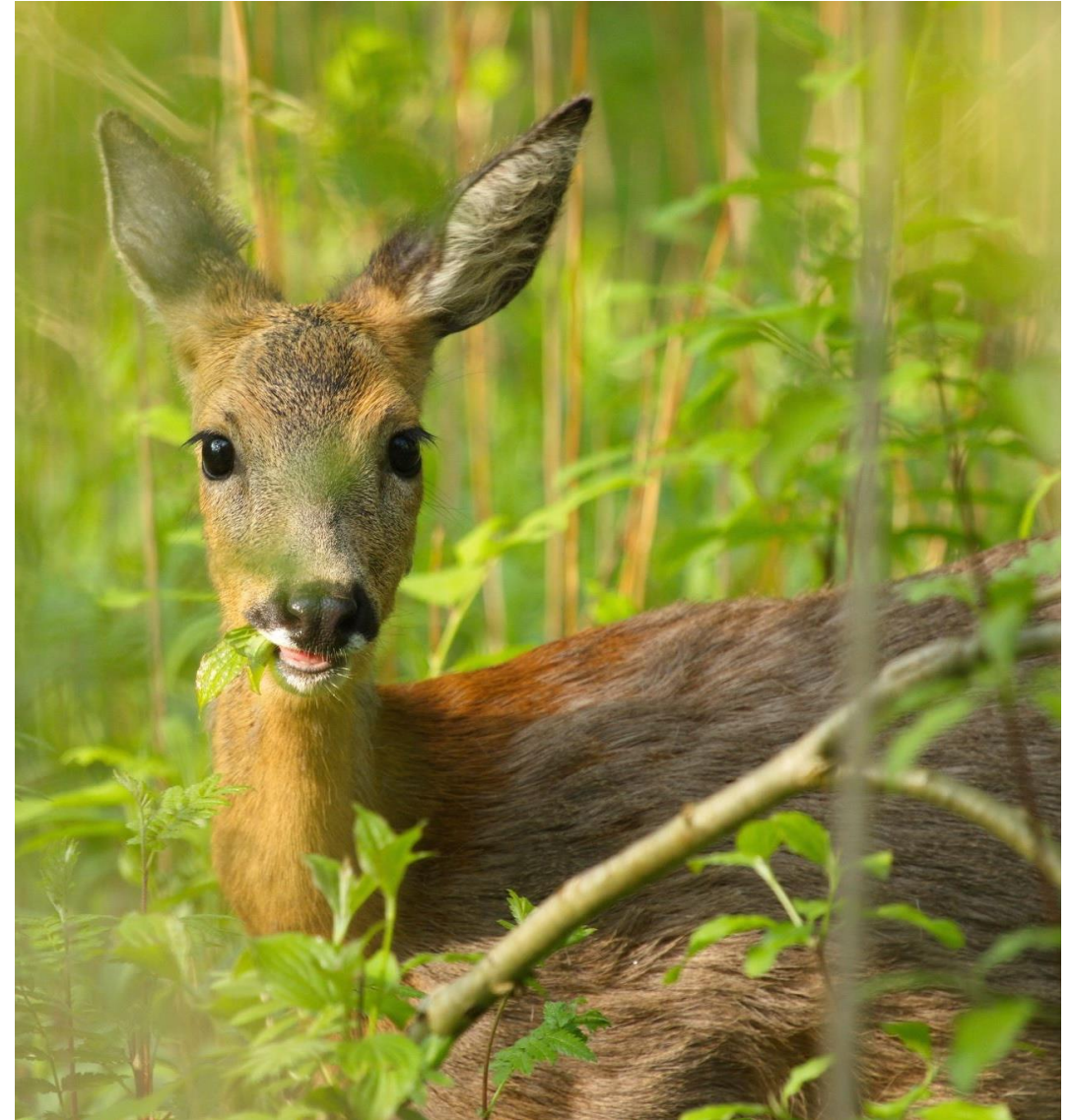
PLANT	PARTNERS
 Tomatoes	       Basil Asparagus Broccoli Garlic Carrots Celery Onions
 Beans	       Corn Squash Radish Beets Spinach Cucumber Potato
 Peppers	     Basil Onion Garlic Spinach Tomatoes
 Carrot	        Chives Onion Leeks Tomato Rosemary Coriander Lettuce Radish
 Lettuce	       Mint Chives Dill Beans Beets Onion Broccoli
 Potatoes	     Corn Cabbages Peas Squash Beans
 Onions	       Carrots Parsnips Lettuce Cabbage Beets Tomatoes Rosemary
 Cucumber	      Corn Cabbage Beans Radish Celery Lettuce
 Squash	     Corn Peas Radish Dill Beans
 Corn	    Beans Cucumbers Pumpkins Melons
 Peas	        Cauliflower Garlic Turnip Radish Potato Cucumber Corn Beans

COMPANION PLANTING

- **Pest Control:** Certain plants naturally repel pests or attract beneficial insects that prey on them.
- **Pollination:** Some flowers attract pollinators that can enhance the fruiting of nearby crops.
- **Soil Improvement:** Nitrogen-fixing plants, like legumes, can enrich the soil for neighboring crops.
- **Space Maximization:** Different growth habits can allow for more efficient use of garden space.

BARRIER PLANTING

Barrier planting, also referred to as environmental security, is a term used to describe selective planting made up of species that would create a blockade to deter unwanted visitors. The technique of barrier planting is much more appealing and environmentally friendly as opposed to fencing and barbed wire and may also be used to reinforce and disguise and existing boundary fence.



NATURE IS BENEFICIAL



COMPOST AS FERTILIZER

FACTSHEET

www.SGAonline.org.au

Compost

Compost is the result of organic material that has been broken down in a controlled environment eg a Compost Bin. Composting your food scraps, grass and garden clippings (organics) can provide you with an excellent source of free garden food and soil improver. Compost can be made at home or is readily available commercially.

Aged animal manures and vermicompost (worm castings) are rich in nutrients and are excellent for use in the home vegetable garden. Compost does not have to be dug into the soil. Unless the soil needs to be improved, the compost can be laid on top. Layers of garden mulch will also break down over time to add nutrients to the soil.

Composting organics is one of the best things you can do in your garden. As well as creating a great fertiliser, it reduces greenhouse gases, saves water and reduces waste.

Add to your compost

- Fruit and vegie scraps
- Coffee grounds
- Tea bags
- Herbs - particularly Tansy, Comfrey and Chamomile
- Autumn leaves
- Egg shells - crushed
- Pizza containers
- Egg cartons
- Aged animal manure
- Hair clippings
- Onion-outer skin
- Finely chopped citrus peel
- Grass clippings (thin layers 3-4cm)
- Chopped prunings
- Weeds - but not weed seed or weeds with bolls attached
- Shredded newspapers



Keep out of your compost

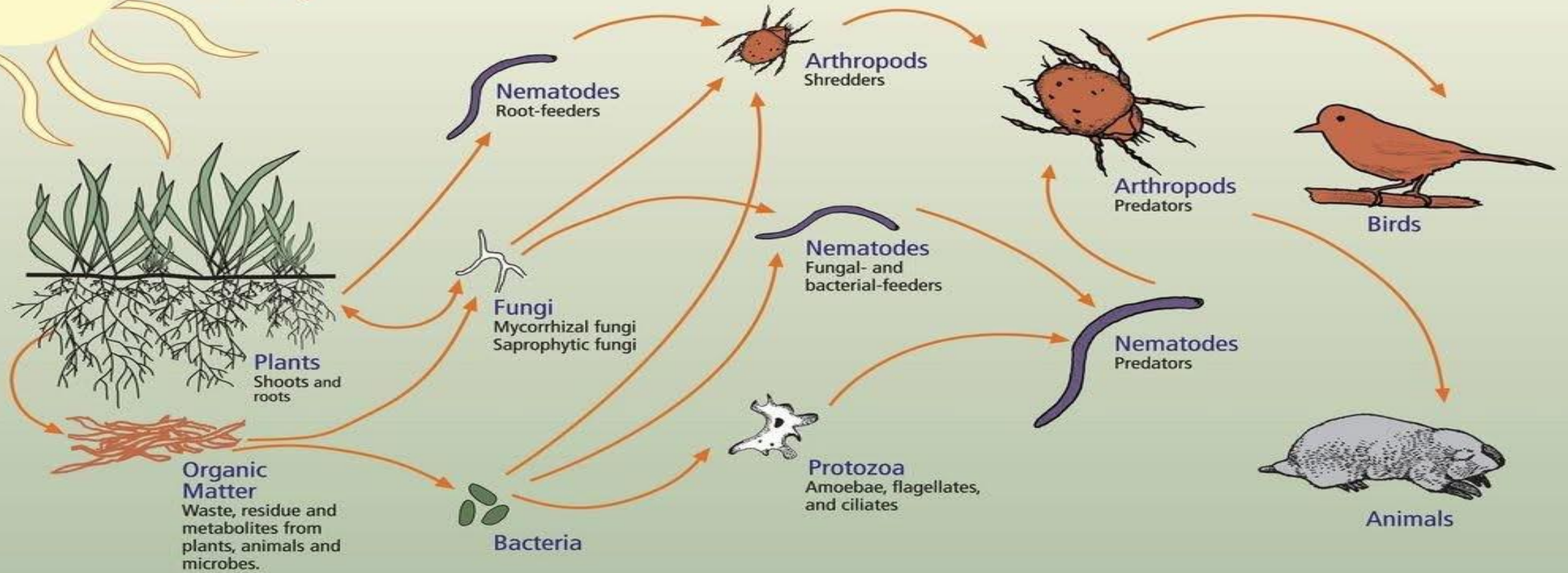
- Meat
- Cat and Dog droppings
- Large amounts of citrus peel
- Onion
- Bleached or glossy office paper
- Dairy Products
- Diseased plants

BUILDING A LAYERED COMPOST HEAP

1. Build your compost in thin layers (3-10cm).
2. Alternate high nitrogen (food scraps, manure, grass clippings, soft prunings) and low nitrogen (dry leaves, coarse prunings) layers.
Three buckets low nitrogen to one bucket high nitrogen.
3. Use a diversity of materials.



The Soil Food Web



First
trophic level:
Photosynthesizers

Second
trophic level:
Decomposers
Mutualists
Pathogens, Parasites
Root-feeders

Third
trophic level:
Shredders
Predators
Grazers

Fourth
trophic level:
Higher level
predators

Fifth and higher
trophic levels:
Higher level
predators



SUCCESS STORIES

TROUBLESHOOTING

INTEGRATED PEST MANAGEMENT



Identify

Using reference materials, apps on your smartphone or by pulling from your memory, the first step in IPM is identifying the plant. Next you should research common issues with the plant to determine whether it's insect, fungal or chemical damage.



Mechanical Removal

Remove the problem by hand or with hand tools. Most management should be done by hand. Use of fire or boiling water is less harmful for the environment.



Chemical Management

Only when necessary or in extreme cases like with difficult to manage invasives should you ever use chemicals.

Make sure you follow label instructions!



HOA'S

- Understand Guidelines
 - Create Intentional Designs
 - Educate and Inform using Signage
 - Start Small and Expand
 - Add Cues to Care
 - Grow Community Support
 - Join the Board to Affect Change from Within
-

MOSQUITOS

Natural Repellants

Use natural mosquito and tick repellants like Murphy's Naturals. Can be applied directly to the skin or candles burned

Use Wind and Clothing

For events or outdoor get-togethers, set up fans to keep a constant flow of air. Biting insects have a more difficulty flying in wind. Wear loose fitting protective clothing like linen.

Mosquito Buckets

A natural soil bacterium called Bti (found in mosquito dunks) kills the larvae before they grow up and bite. This method, sometimes called a "bucket of doom" or "mosquito tea," creates an irresistible breeding site and then shuts it down—without harming pollinators, pets, or people.

Bats and Dragonflies

Bats and dragonflies are mosquitoes' natural predators. Ponds and other water features encourage dragonflies and bats to make your home their favorite habitat





Making a mosquito kill bucket is simple. Images: Debbie Wolfe/Popular Science

Materials

- Container: A five-gallon bucket or a similar-sized container
- Water: Preferably from a rain barrel to avoid chlorinated water
- Organic Material: Straw, hay, or even grass clippings to attract mosquitoes
- Mosquito Dunk: Contains *Bacillus thuringiensis israelensis* (Bt-i), a bacterium harmful only to mosquito larvae

MOSQUITO DUNK BUCKET

**EVERY MIGRATING
DRAGONFLY IS A
FLYING MOSQUITO
EATER.**



**PESTICIDE RUNOFF AND CHEMICAL
SPRAYS WIPE THEM OUT, LEAVING
US SWATTING AND SCRATCHING
NEXT SUMMER.**



CONCLUSION: CULTIVATING A HEALTHIER GARDEN AND PLANET

Eliminate Harmful Chemicals

Minimizing toxic chemicals in gardens safeguards soil health and protects plants and wildlife.

Promote Sustainable Practices

Adopting eco-friendly gardening methods fosters thriving ecosystems and sustainable growth.

Benefit Ecosystems and Communities

Healthy gardens contribute to biodiversity and support community wellbeing and environmental health.



QUESTIONS

RESOURCES

- [HNP - Homegrown National Park - Regenerate Biodiversity](#)
- [Rethink Pretty in Suburbia with Natural Garden Design](#)
- [Golf Course Concerns: New Research Shows Link to Parkinson's | American Parkinson Disease Association](#)
- [North American bird populations suffering severe decline | Cornell Chronicle](#)
- [Lawn Maintenance and Climate Change — PSCI](#)
- [Pesticides • Monarch Joint Venture](#)



A close-up photograph of several red cardinal flowers (Lobelia cardinalis) with green stems and leaves. The flowers are in various stages of bloom, with some fully open and others as buds. The background is a soft, out-of-focus mix of warm colors like orange and yellow.

THANK YOU!

October 2, 2025