



The Urban Buzz

Pollination in the City

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What is Urban Pollination?

To completely understand urban pollination there are a few key concepts that you have to know.

1) Urban spaces were not always urban.

Before there was Route 66, McDonalds, and concrete cities there were miles and miles of open landscape teeming with native plants and animals. Now that we have moved in, these native populations have to make life work in these new cities.

2) Pollination happens everywhere. The local park, your backyard, the flower pots on your front porch, the zoo, the little patch of flowers on the side of the road.



Anywhere there are pollen producing flowers, pollination is happening. Don't believe me? Take a look for yourself.



3) Pollination benefits everyone. Are you a fan of apples? Do you enjoy shady spots in the middle of summer? Are you a birder, backpacker, or camper? Do you count yourself lucky that rain does not wash away your yard? Are you glad that you have so many tasty food options at the grocery store? We owe much thanks to pollinators and their favorite plants for making our lives incredibly easy.



Ask a Scientist
Dr. Kathleen Prudic
University of Arizona
Assistant Professor
Research Interests:
Biodiversity,
Butterflies, and Citizen
Science

Do moths pollinate? Or is it just butterflies?

Both moths and butterflies pollinate plants. Pollen grains (also known as plant sperm) can be very sticky, attaching to the head and proboscis (drinking mouthparts) of any insect, including butterflies and moths.

Why are moths fuzzy? Is there a reason butterflies aren't fuzzy too?

Moths use their fuzziness in two ways. Fuzzy hairs help insects keep warm, and nights are chilly, which is why you might see more fuzzy moths. Butterflies can be fuzzy too, in colder places. If you are ectothermic (cold blooded) like an insect or lobster or fish, when you get cold, you cannot move around to eat and find mates. And you are an easy snack for a predator. Fuzzy hairs also help moths and butterflies communicate with each other with special perfumes they make. These perfumes stick to their bodies, concentrating the scent, and helping them to attract a mate.

What is a pollinator?

A pollinator is any animal that moves pollen (plant sperm) to an ovule (plant egg) where fertilization (merging of pollen and ovule) happens making a seed often within a fruit. These seeds will eventually germinate into a baby plant. Most plants that are pollinated by animals have flowers to attract pollinators to the plant for nectar, or sugar snacks.

What types of animals can be pollinators?

Pretty much any animal can be a pollinator as long as it moves pollen to ovule. However, due to the tiny size of pollen and ovules, smaller animals such as insects, bats, mice, shrews, hummingbirds, and sunbirds are the most common pollinators. But there are many animals and flowering plants so there are a few unexpected pollinators.

What can we do to protect pollinators?

The biggest threat to pollinators is a lack of suitable host plants. Plants are suffering the impacts of climate change. In the southwest deserts, it can just be too warm and too dry, especially in fall, for them to make it, let alone make flowers for pollinators. So it is important to plant native plants in gardens and wild places and make sure they are watered and happy, especially in the fall. You can do this in your garden, your community or school garden, your church garden, or help restore wild areas especially those with permanent water.

Can we live without pollinators?

Life without pollinators would be sad and expensive. About a third of the food you eat comes from the unpaid labor of pollinators. Not to mention, a single jar of honey would cost about \$300,000 if we paid the bees minimum wage. Many of the plants responsible for clean air and water need pollinators to make more plants. Farmers are developing new ways to move pollen to ovules in some crops, for example, by using bubbles. So far, no invention is as effective or inexpensive as our pollinator friends.

Can we create a pollination app?

There are a few apps that help us study pollinators. iNaturalist and eBird both help people report what pollinators they see, where and when they see them. Pollination itself, the successful transfer of pollen to ovule to make a seed, is actually pretty hard to record. There are lots of fun ways to try it, and new tiny camera technology might help us understand more about who and when pollen is successfully transferred by pollinators.

Which foods would we not be able to have without pollinators?

Any fruit is a result of pollinator expertise. This includes things that you probably don't think of as fruit such as pumpkins, tomatoes, peppers, zucchini, almonds, cashews, carrots, sugar, chocolate, and coffee. Our meals would be boring and less caffeinated without pollinators.

Do gross bugs like beetles pollinate?

Gross?! Humph, beetles are really cool. Flies are a bit gross eating, poop and all. Wait, some beetles also eat poop and dead stuff, never mind. Regardless, yes beetles, flies, true bugs, moths, butterflies, basically any insect that regularly eats nectar pollinates plants to make more plants.

How can a pollinator find a flower at night?

It turns out, it is just like in the day. Visual cues, such as the color of flowers are important. Night-pollinated flowers are generally white to be most easily seen in moonlight. Flower scents are also important, telling pollinators where flowers are from longer distances over the wind.

Southwestern Gardening for...

...Adults?

...Caterpillars?

Early Season



New Mexico Thistle



Parsely

Mid Season



Desert Honeysuckle



Twinseed

Late Season



Globemallow



Desert Senna

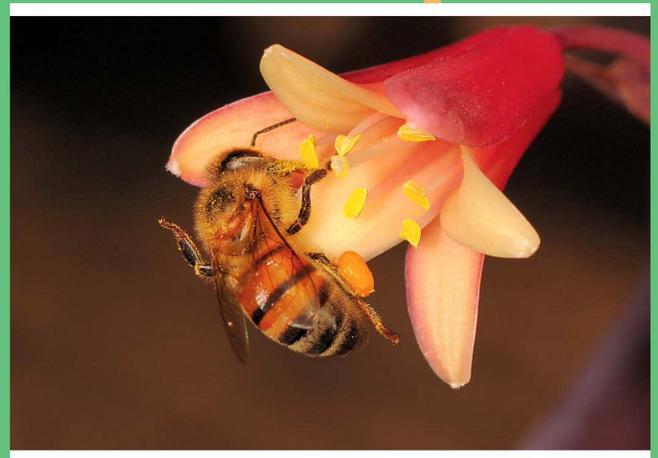
Pollination at Work!



The pollen travels from the stigma to the ovaries inside the flower where seeds are produced for the next generation of flowering plants



The pollinators deposit the pollen from their last meal onto the stigma (female flower part) of the next flower they visit



Pollinators, like bees and bats, collect pollen from the stamen (the male part of the flower) while they are sipping nectar or munching on pollen and petals



The pollinator goes to the next flower to find another tasty snack.

Pressing Flowers

101

1 Collect Your Flowers

- **Small, flat flowers work best**
- **For wide flowers, like roses, cut the bud in half vertically with a clean knife**
- **Collect your flowers in the early afternoon or late morning to aid in drying**
- **Cut stems at an angle**
- **Remove lower leaves from the stem**
- **Immediately place in a jar of water after cutting**

2 Prepare Your Press

- **Place flowers, stems, and leaves between two clean pieces of tissue paper or printer paper**
- **With the flowers between two sheets of paper, store in a cool dry place inside of a paperback book**
- **Place larger books on top of your paperback book to help weigh it down**

Quick Tips

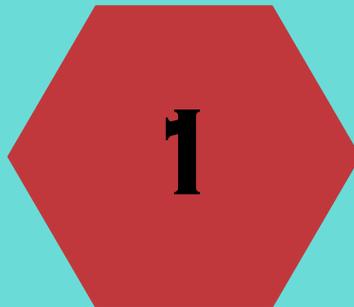
The goal of pressing flowers is to dehydrate them without destroying them so...

...place your flowers in sugar water after cutting them to prevent browning.

...remove as many leaves as possible to prevent bacteria from growing on your pressed flowers.

...cut your flowers a few days before they fully open to help maintain color.

POLLINATOR STARTS WITH B!



ANNA'S HUMMING- BIRD

DURING BREEDING
SEASON WHEN IT IS WARM,
THESE POLLINATORS
EAT NECTAR. BUT WHEN
FLOWERS DISAPPEAR IN
THE WINTER, THEY EAT
INSECTS!



LESSER LONG NOSED BATS

THESE ARE ONE OF THE
FEW MIGRATORY GROUPS
OF BATS IN THE UNITED
STATES. THEY FOLLOW A
PATH OF FLOWERING
AGAVE PLANTS FROM
ARIZONA TO SOUTHERN
MEXICO.





3

SUNFLOWER BEES
(ALSO KNOWN AS GLOBE
MALLOW BEES) THESE
BEES LIVE ALONE ALL YEAR
EXCEPT IN THE SPRING
TIME WHEN IT IS BREEDING
SEASON



5TTG45G4G

4

LONGHORN BEETLES
THE WORD BEETLE COMES
FROM THE LATIN WORD
FOR "FOUR EYES," THEIR
EYES TAKE UP SO MUCH OF
THEIR FACE THAT THEIR
ANTENNAE SIT RIGHT IN
THE CENTER OF THEM!





BUTTERFLIES

**THERE ARE
ALMOST 400
DIFFERENT
SPECIES OF
BUTTERFLY IN
ARIZONA!**

5

**BUTTERFLIES
HAVE...**

- **LONG
ANTENNAE**
- **CLOSED
WINGS WHEN
RESTING**
- **SHINY
CHRYSLIS**





BONUS: MOTHS

THERE ARE
OVER 4000
TYPES OF
MOTH IN
SOUTHERN
ARIZONA!

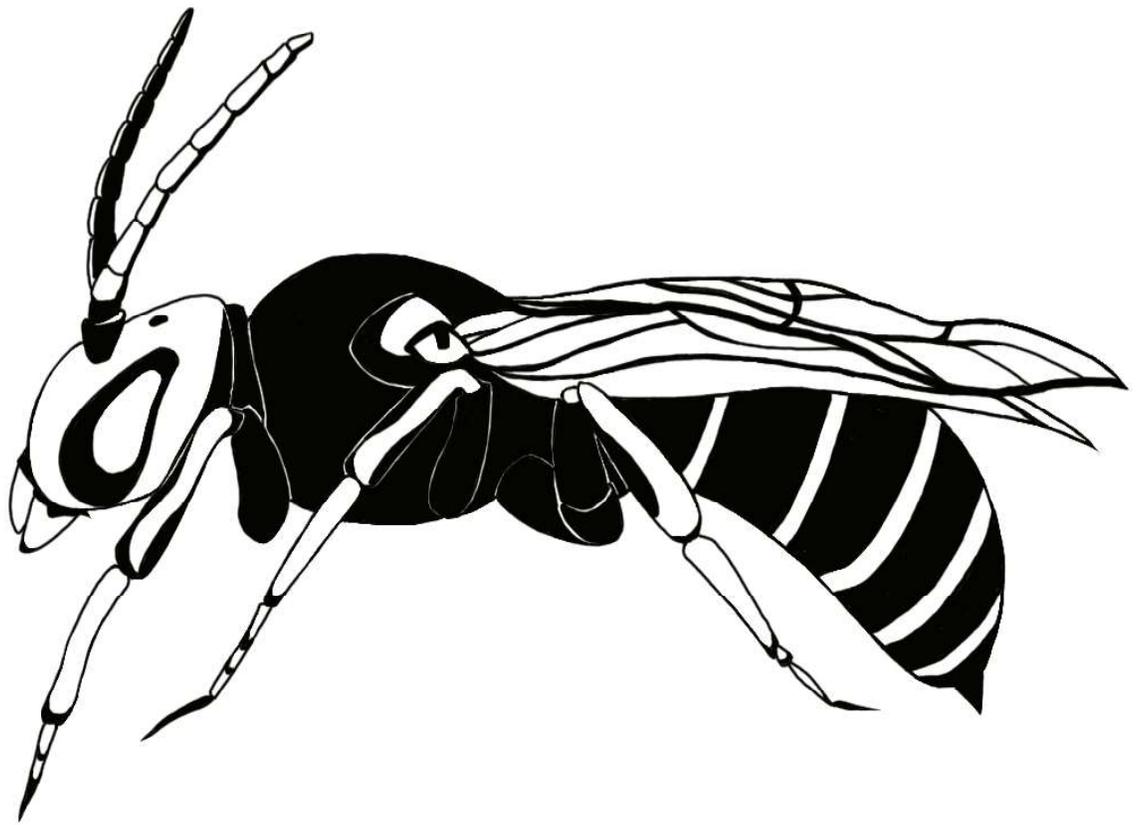
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MOTHS HAVE...

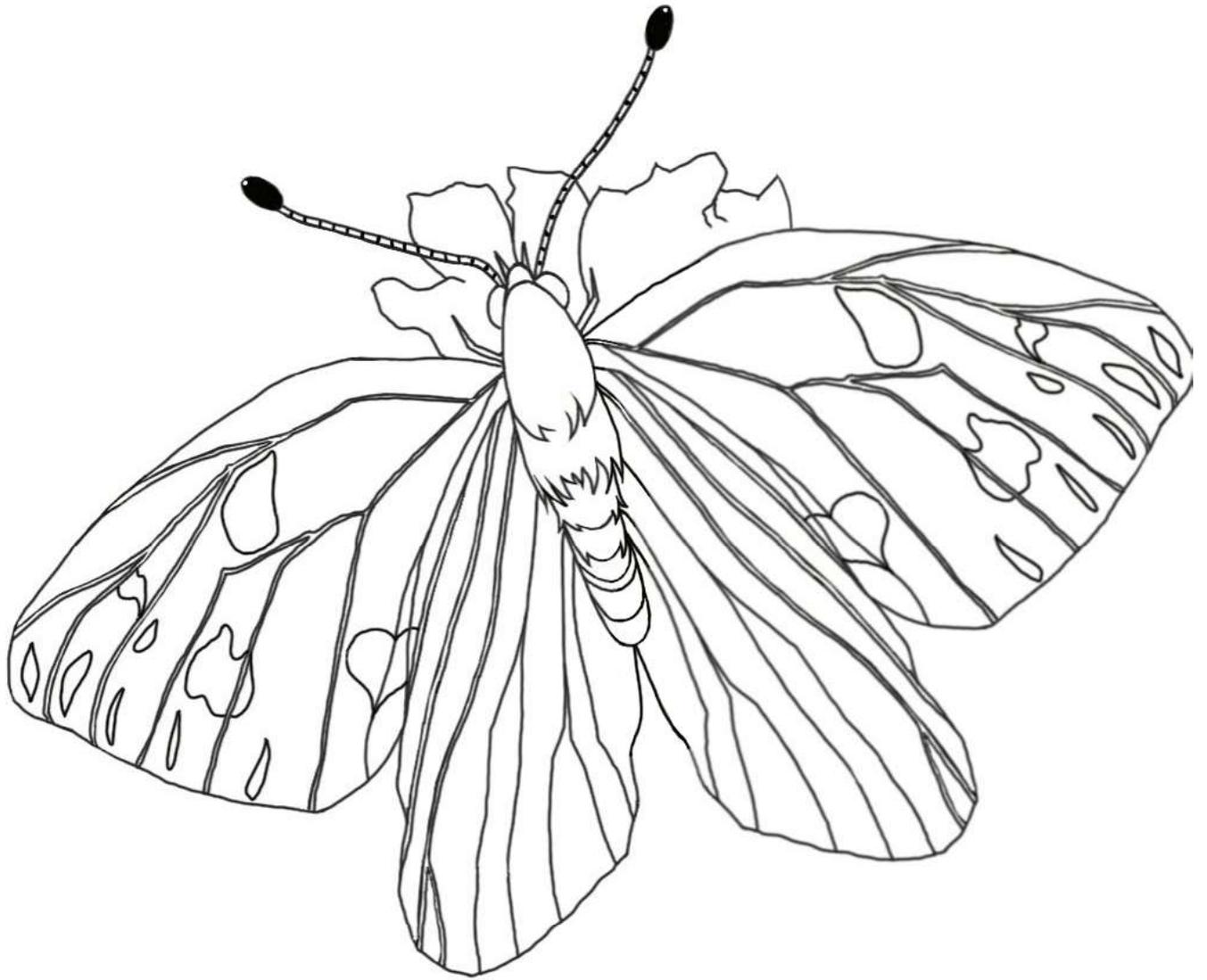
- CLUBBED,
SHORT
ANTENNAE
- OPEN WINGS
WHEN RESTING
- SILKY COCOONS
- FURRY BODIES



Halictus Ligatus



Checkered White



The **DO's** and **Don't's** of Raising Butterflies

Do collect a lot of native food plants for your caterpillars

Don't forget to mist your adult butterflies regularly

Do follow USDA rules for purchasing butterflies

Don't keep your butterflies in a cold room

Don't release butterflies that you have ordered online

Do feed your adult butterflies with a papertowel damp with sugar-water

Don't remove eggs from leaves if you find them outside

Do prepare an airy, gallon sized enclosure for your butterflies before you collect them

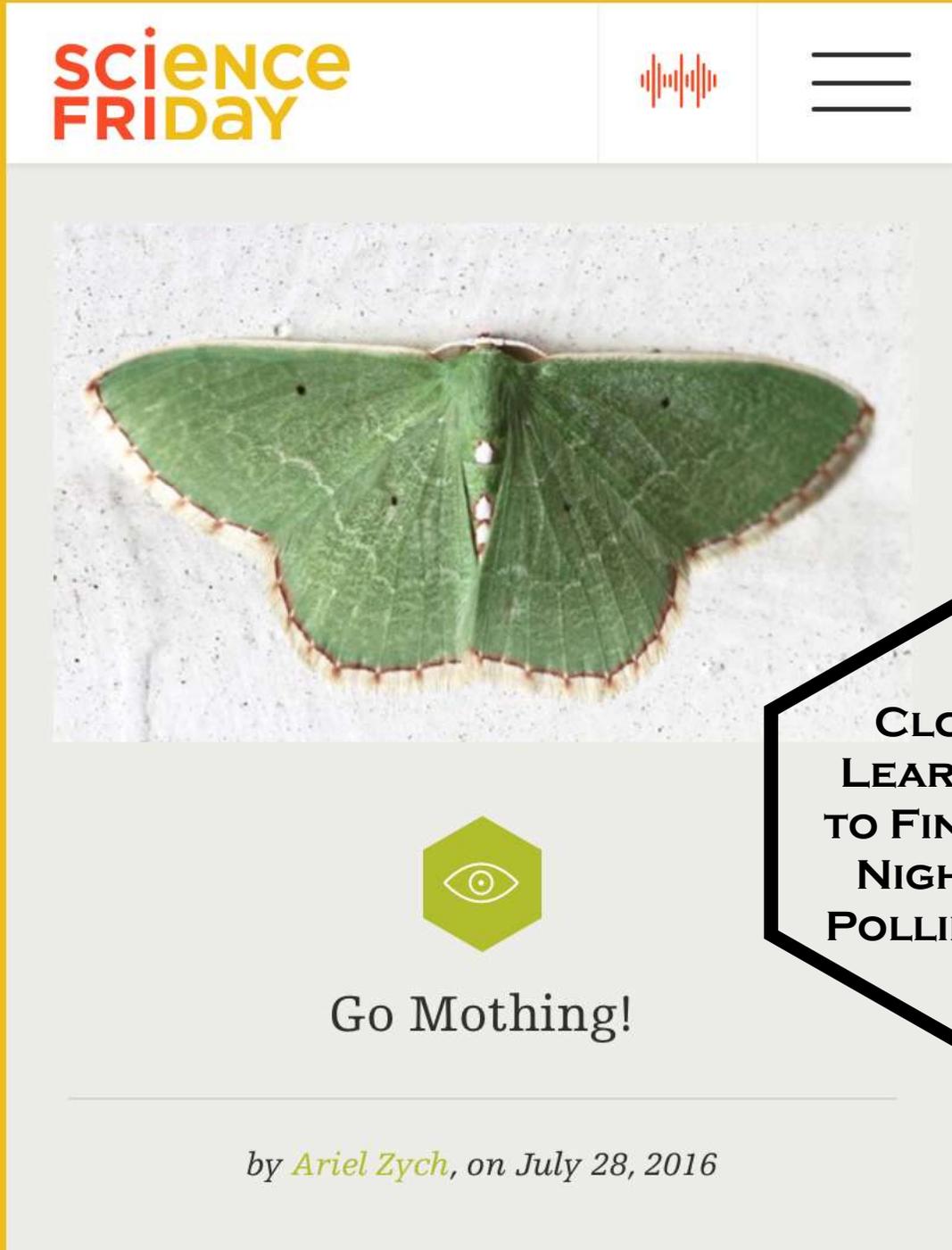
Long-Nosed Bat



Forsebia moth



BLACKLIGHTING



The screenshot shows the Science Friday website interface. At the top left is the "science FRIDAY" logo. To its right are a red audio waveform icon and a black hamburger menu icon. The main content area features a photograph of a vibrant green moth with a reddish-brown border on its wings, resting on a white surface. Below the photo is a green hexagonal icon containing a white eye symbol. The title "Go Mothing!" is centered below the icon. At the bottom of the article preview, it says "by Ariel Zych, on July 28, 2016".

**CLCIK TO
LEARN HOW
TO FIND YOUR
NIGHTTIME
POLLINATORS**

FOR BEGINNERS!

Pollinate



Forests



Zoos



Bacloneies

Everyv



flowers are



Roadsides



Lakes



Backyards



where!!



Ask a Scientist
Dr. Kristen Traynor
Arizona State
University PhD Graduate
Research Interest: Animal
behavior, Genetics and
Neuroscience

How efficient are wasps as pollinators?

Wasps are less efficient than bees as pollinators because they typically don't have hairy bodies, and do not feed pollen to their young. However, wasps are still very important. Figs, those wonderful juicy fruits, all have specialized fig wasps that pollinate them.

Bees collect pollen on their legs, but is it possible for them to collect seeds?

Bees can collect pollen in many different places, depending on the species. Honey bees and bumble bees collect pollen into little packets on their hind legs called corbicula or pollen baskets. Leaf cutter bees collect pollen on the thick hairs of their abdomen called scopa. Some even swallow the pollen and then regurgitate it. So bees help make seeds, but I've never heard of them moving seeds.

Do bees have tongues?

Yes, they have a tongue-like appendage called a proboscis that allows them to drink nectar.

Do pollinators eat pollen?

Not all pollinators eat pollen. But bees evolved from meat-eating wasps, becoming vegetarians. They either eat the pollen themselves (honey bees) to make food for their young. Or they create balls of pollen onto which they lay an egg. When the egg hatches into a larva, the larva consumes the pollen.

Why does the pollen not fall off the bee {pollinator} as it travels to the next flower?

Some of it does fall off and some of it clings to the bee. The bee picks up a positive electrostatic charge as it flies through the air. When a bee lands on a flower, the negatively charged pollen literally jumps onto its hairy coat. It's a bit like how styrofoam packing tends to stick to your sweater.

Can humans be pollinators?

Yes, humans have played the role of pollinator when breeding new plant varieties, for example purposefully crossing flowers of one color with another to create a new hybrid. In many greenhouse environments humans also act as pollinators, moving pollen from one flower to another. Now humans are even creating robots to pollinate flowers. Humans have also moved pollen across large distances for example, on their shoes and clothes, and so pollen has been used in criminal investigations to help link individuals to crime scenes.

What happens if all the pollinators disappear?

If all the pollinators disappear, we will have a much more limited diet. Many grains and crops like rice, wheat and corn, are wind-pollinated, so we wouldn't starve. But we would no longer have fruits, nuts, and many vegetables.

When I go shopping with my mom at the grocery store, how can we know we are buying foods that the farmers grew in a way that protects pollinators?

That's an excellent question and very difficult to answer. Organic helps minimize pesticide use, which can have detrimental impacts on pollinators, but it doesn't guarantee that it was grown in a landscape that lets pollinators thrive. Most organic lettuce is grown in vast monocultures, where pollinators would find nothing to eat. If you have access to a garden, the best way is to grow some of your own food or purchase from local farmers who tend diversified farms, growing a large variety of crops. Even a little herb garden or some potted plants in a window box can be perfect for attracting and feeding pollinators.

Why is pollination important?

Pollination allows flowering plants, trees, and shrubs to produce fruit and seeds. Pollinators provide a key ecosystem service, ensuring seed and fruit set in 87.5% of all flowering plants. Eighty seven of the leading global food crops depend upon animal pollination. Even crops that were traditionally believed not to need pollination -- coffee and cacao -- have better yields and produce more when pollinators are present.

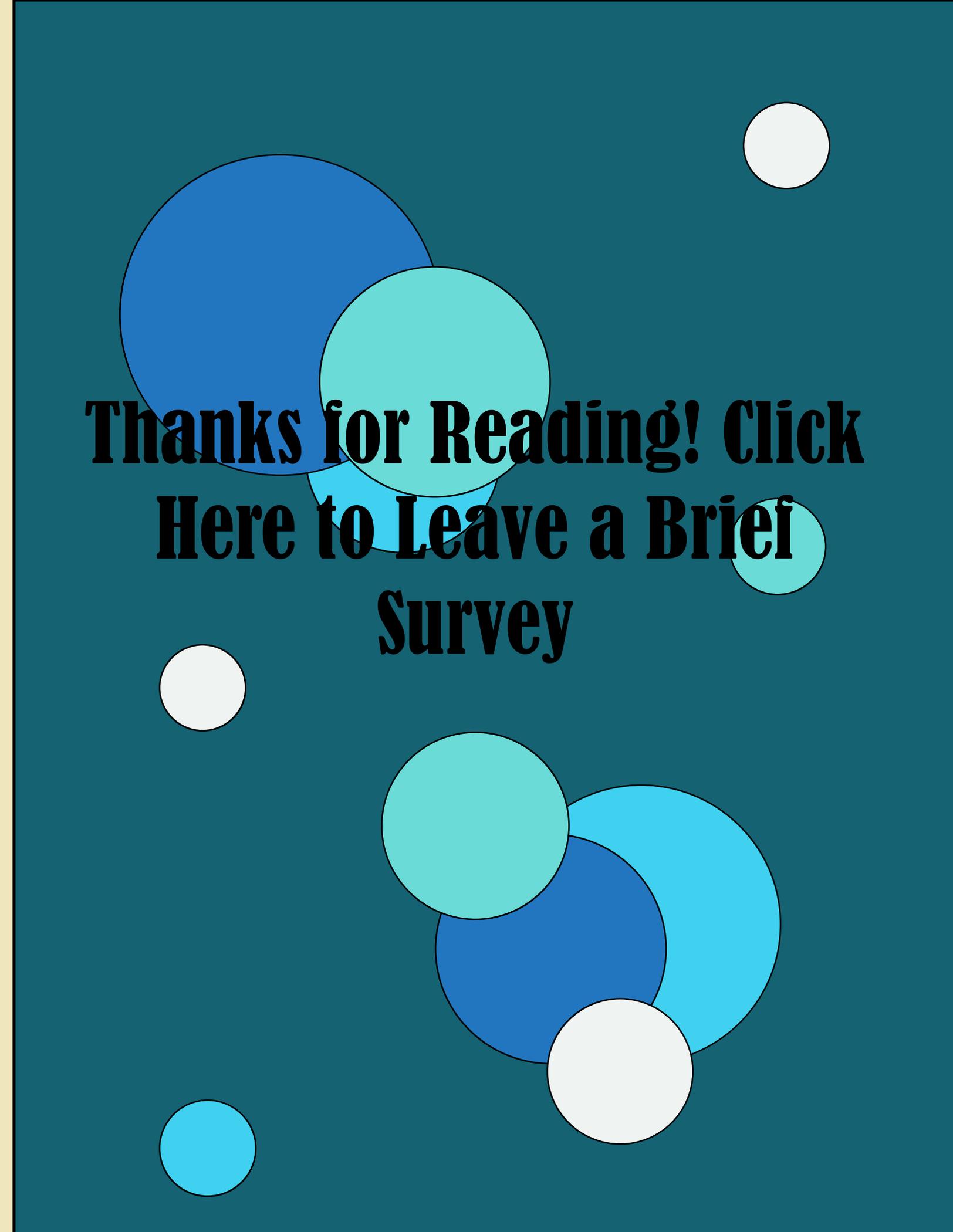
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Survey**