

“Remove the bee from the earth and at the same stroke you remove at least one hundred thousand plants that will not survive”

- Maurice Maeterlinck, 1904

What are bees and what are they up to?



A bee is a winged insect known for its role in pollination and, in some species, honey production, with **over 20,000 species worldwide**.

Some bees, like **honey bees, bumblebees, and stingless bees**, are **social and live in hierarchical** colonies with specialized roles, while **over 90% of species**, including mason bees, carpenter bees, and sweat bees, **are solitary**.

1 FORAGING

Honeybees extract nectar from flowers using their long tongues and store it in their extra stomach. They then carry it with them back to their hives

2 DIGESTING

The bee then passes the nectar to another bee, which is then passed along as enzymes are added to it and is deposited into the honeycomb.

3 DEHYDRATING

Exposed to the warm, dry air inside the hive, the moisture content begins to drop and the nectar hardens.

4 STORING

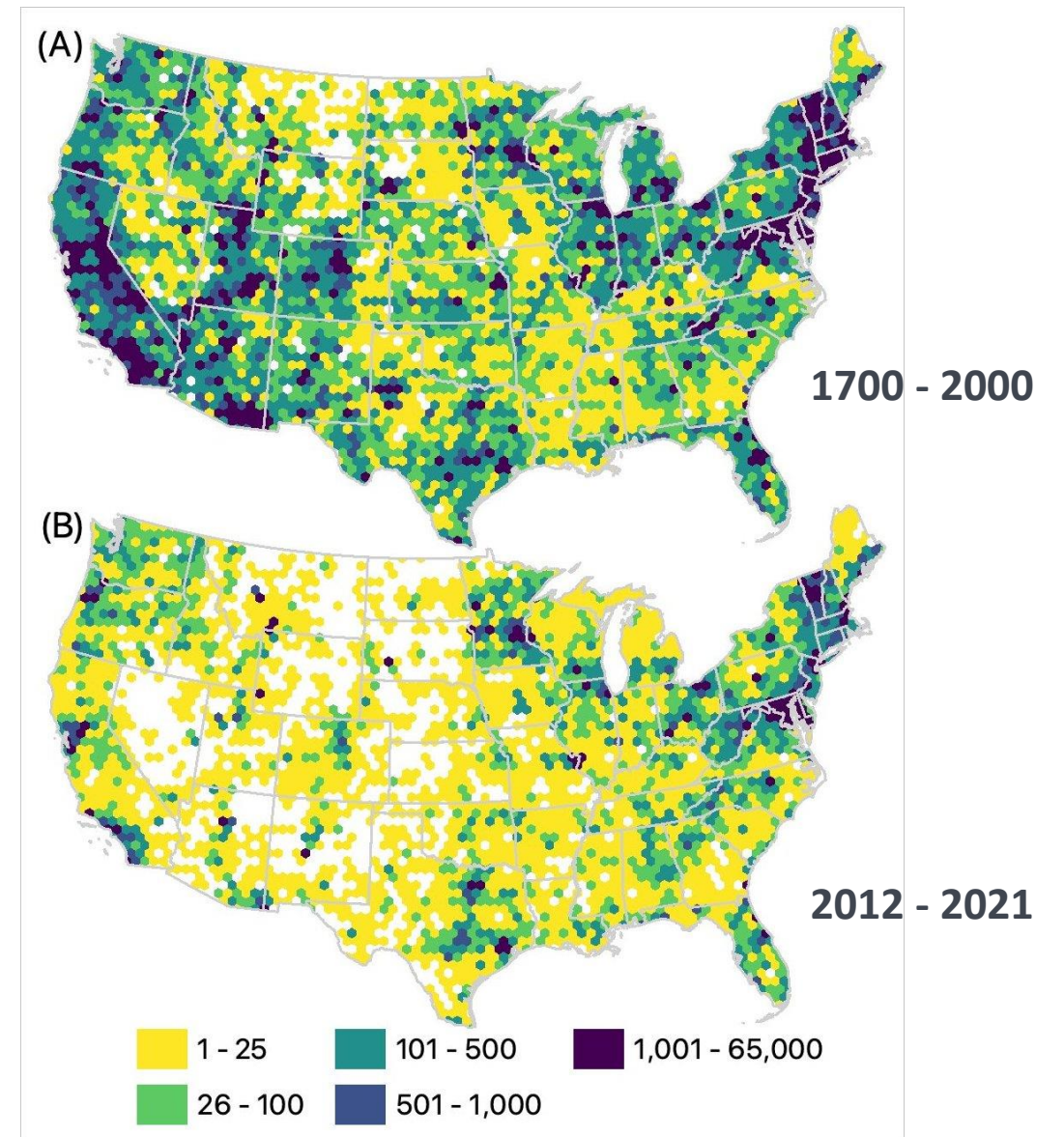
When most of the water is evaporated, the bee seals the honeycomb with what becomes beeswax. The beeswax protects the honey and stores it safely.



Bees, people, planet

- 20,000 species of bees globally across 7 families
 - The dominant group among pollinators across continents (except in the arctic)
 - Bees and flowering plants have co-evolved over millions of years making them extra effective for large proportion of plant species
- Bees are the most effective and important pollinators:
- Bees are responsible for pollinating 75% of the worlds flower population
 - 90% of the worlds top 107 crops are visited by bees

Available Bee Records in the U.S.



Long-standing associations exist across multiple bee species and human societies

- Documented interactions like honey hunting date back to the Stone Ages
 - Asia has more than 2000 years of beekeeping history
 - Beekeeping also reaches back to at least pre-Columbian times for stingless bees in Mayan Mexico
 - Beeswax has been used in the production of rock art by Aboriginal peoples in Australia for at least 4000 years
- These reciprocal bee–human relationships have historic legacy and are important for informing current practices around bee management



Part of a beekeeping relief at Pabasa's tomb.

The oldest honeybee hieroglyph goes back to just before 3000 BCE, Kritsky says. “It was a very ancient symbol in the Egyptian writings. But even in the Old Kingdom (2600-2160 BCE), beekeeping was an important activity organized by the state.”

Decline in bee populations

U.S. Honeybees Suffer Second Deadliest Season on Record

Estimated share of bee keepers' colonies lost in the United States from 2016-17 to 2022-23*



* Years ending April 1

Source: Bee Informed Partnership



Habitat Loss: Changes in land use, urban development and intensive farming, have caused significant losses and fragmentation of bee habitats. Since 1945 we have lost 97% of our wildflower meadows, leaving our bees with little natural habitat.



Pesticide use: Exposure to pesticides can impair honeybees' ability to navigate, bees' ability to reproduce and solitary bees' ability to reproduce any young at all. The toxic properties are also harming other beneficial insects.



Climate Change: Changes in climate may be disrupting bee nesting behavior and their emergence after winter. Climate change may also be affecting the timing of the flowering of plants that bees rely on for food.



Diseases and invasive species: Bees are increasingly affected by various diseases and parasites while invasive species are pushing them out of their native habitats





What if bees disappear?

The mutualistic relationship between bees and people **is jeopardized by recent reported declines in bee populations**. The loss of managed honey bee colonies and declines in wild bee pollinators have been scientifically observed, particularly in Europe and North America.

The European Red List assessment of **1965 species of European bees found that 9.2% were threatened**; many of these may also be threatened reason that declines in wild bees definitively noted for Europe and North America are likely to have occurred elsewhere.

Ecological Impact



- Plants relying on bees would become extinct
- Diminished global biodiversity
- Other plants would also experience reduced reproduction

Agricultural Consequences



- Crop yields would drop significantly
- This would make food items more scarce and more expensive

Human Consumption



- Reduce dietary diversity and human nutrition
- Higher risk of malnutrition and food insecurity

Economic effects



- Farmers who rely on bees would lose revenue
- Affect livestock feed availability, impact dairy and meat production



Framing the broader importance of bees to sustainable development



Keeping bees provides opportunities for income diversity with low start-up costs, through diverse products and services

In relation to health, honey, bee pollen, propolis, royal jelly, beeswax and bee venom have all been used in traditional and modern medicine

Vocational education in beekeeping could promote economic opportunities for employment and entrepreneurial enterprise

The biodiversity found within forests provides a critical range of ecosystem services including water cycle regulation and carbon sequestration

The contribution of wild and managed bees in pollinating wild plants in natural ecosystems and managed forests

Planting flowering species in landscape planning can provide forage for bees may result in pollination rewards for species in public green spaces

Moving towards sustainable bee systems



Public Awareness for the cause

The increasingly positive attitude of the public towards bees, and insect pollinators more broadly, provides opportunities for efforts to conserve bee habitat and support pro-pollinator initiatives in land management, agricultural diversification and urban greening.



Holistic view of ecosystems

- Include wild and managed bees and humans is necessary to address sustainability challenges
- Improve the interconnections between elements within coupled human–environment systems
- Natural resource management approaches for maintaining sustainable systems

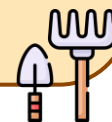
Regenerative Farming

1. Eliminate synthetic pesticides
2. Create pollinator-friendly landscapes
3. Enhance soil health



Pollinator Landscaping

1. Encourage planting native flowers
2. Reduce pesticide use
3. Create urban green spaces that support pollinators



Economic Choices

1. Support eco-friendly companies
2. Make sustainability an integral part of economic growth rather than an afterthought



Agricultural change

1. Incorporate crop diversity
2. Use cover cropping
3. Promote organic farming
4. Practice agroforestry



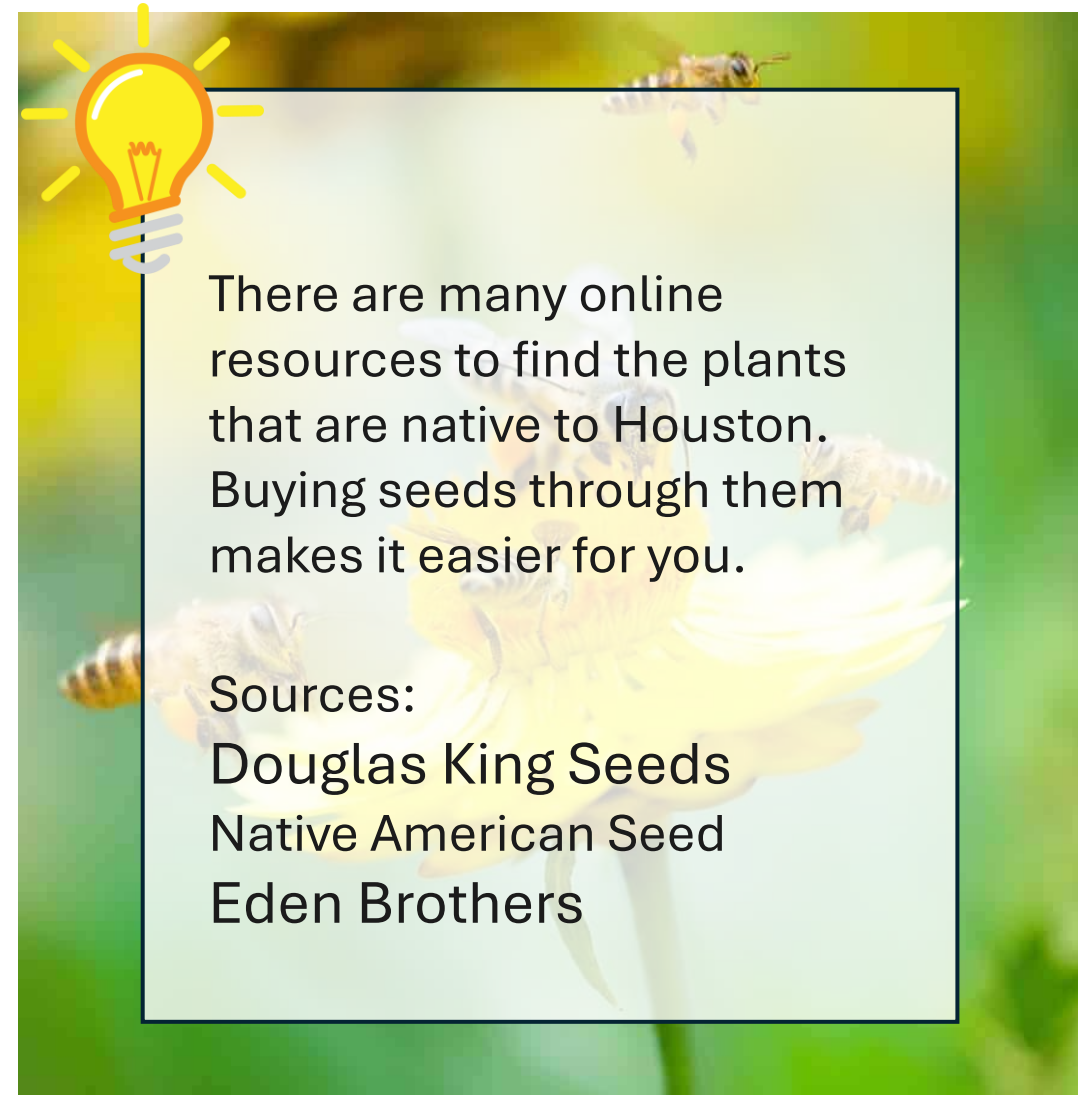
What can we do?

Eco-friendly gardening

- Plant native flowers rich in nectar and pollen
- Avoid chemical pesticides
- Provide habitats such as bee hotels for solitary pollinators
- Use rooftop gardens and community green spaces in urban areas to offset habitat loss

Contribute your time and brain power

- Volunteer at local community gardens or with Buffalo Bayou
- Support local beekeepers at Farmers Markets
- Contribute to conservation initiatives
- Educate yourself by studying native bee species



***Thank you so much for your
attention.***

***Let's build a bee-friendly world
together!*** 