

Buzy as a bee!

The world of bee..ZZZZ

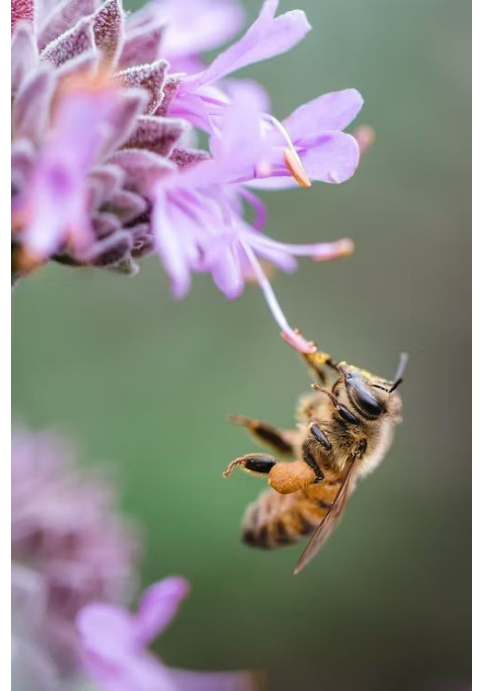
Warm up

Brainstorm in 1 minute, as many things as possible about bees.

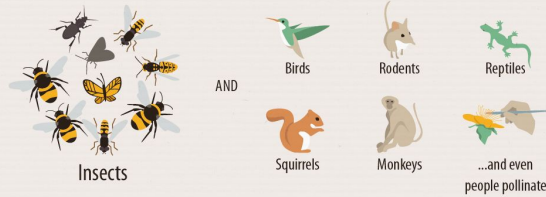


Why are bees important?

1. Biodiversity
2. Bees as pollinators
3. Medicinal properties of _____
4. Biomonitors of pollution and environmental contaminants
5. Bioindicators of climate change



WHO ARE POLLINATORS?



In Europe, pollinators are:



Bees, the greatest pollinators

2,000 wild species in Europe

Europe hosts **10%**
of the world's bees species



Apis mellifera (or western honeybee):

- The best-known bee species
- Managed by beekeepers for honey production and other beehive products

Pollination is the transfer of pollen (male gametes) between the male and female parts of flowers to enable plants to reproduce.

Other means of pollination:



Self-pollination



Wind-pollination

Sources:
European Commission
European Red List
United Nations



Who are pollinators,

https://www.europarl.europa.eu/resources/library/images/20191203PHT67952/20191203PHT67952_original.jpg

Bees as pollinators

1. Around ____ % of crops we grow as food depend on pollinator insects (e.g. bees, wasps, butterflies)
2. Bee pollination contributes to approx. ____% of world food crops.
3. Honey bees pollinate about ____ % of flowering plants and ____ types of fruit and vegetables
4. Economic contribution - cash crop such as c____, cacao, almonds, s____ depend on bee pollination.
5. More effective than hand-pollination.

Bees as pollinators

1. Around 75% of crops we grow as food depend on pollinator insects (e.g. bees, wasps, butterflies)
2. Bee pollination contributes to approx. 35% of world food crops.
3. Honey bees pollinate about 80% of flowering plants and 130 types of fruit and vegetables
4. Economic contribution - cash crop such as coffee, cacao, almonds, soybeans depend on bee pollination.
5. More effective than hand-pollination

Plants pollinated by bees

From sources across the web



Apple



Watermelon



Cucumber



Avocado



Coriander



Squash



Coconut



Cantaloupe



Strawberry



Sunflower



Tomato



Blueberries



Blackberry



Cranberries



Apricot



Coffee



Pear



Cherries



Almond



Pumpkin



Alfalfa



Raspberry



Buckwheat



Cashew



google search results

Medicinal Properties of Honey

1. healing of wounds: use of medical grade honey has been found to promote wound healing of burns (exception: people with diabetes).
2. fight infections : anti-bacterial properties such as hydrogen peroxide and defensin-1 proteins found in Manuka honey can fight infections
3. Relieving cold symptoms e.g coughs: reduced coughing among children at night
4. Treating skin ailments e.g. eczema, burns, cuts

Source: *Everything you need to know about honey*, <https://www.medicalnewstoday.com/articles/264667>

Biomonitoring of pollution and contaminants

1. Global population of bees and other pollinators are declining due to...
 - a) h____ loss
 - b) intensive f____ practices
 - c) increased use of agrochemicals, such as p_____
 - d) change in w_____ patterns
 - e) a____ pollution

Biomonitors of pollution and contaminants

Global population of bees and other pollinators are declining due to...

- a) habitat loss
- b) intensive farming practices
- c) increased use of agrochemicals, such as pesticides
- d) change in weather patterns
- e) air pollution → watch video : <https://youtu.be/BONmJ7b0x74>

Impacts on bees

Air pollutants interact with scent molecules sent out by plants which bees need to locate food. This means it takes bees longer to forage and become less effective at pollination

Pesticides, when applied to crops, can reach bees through the air, water and soil

Neonicotinoids can impact the reproductive success of wild pollinators such as bees

Pesticides, particularly insecticides, have been shown to have a broad range of lethal effects on pollinators, such as bees, under controlled experimental conditions

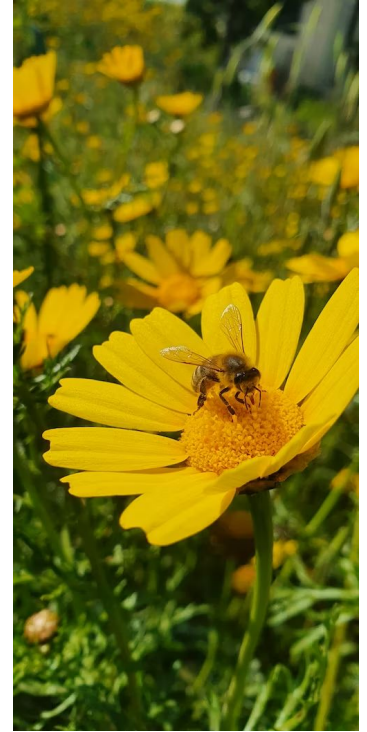
Pesticides can affect the navigation pattern as well as learning and feeding behavior of bees

Neurotoxic pesticides negatively affect bees' ability to recognise their nests

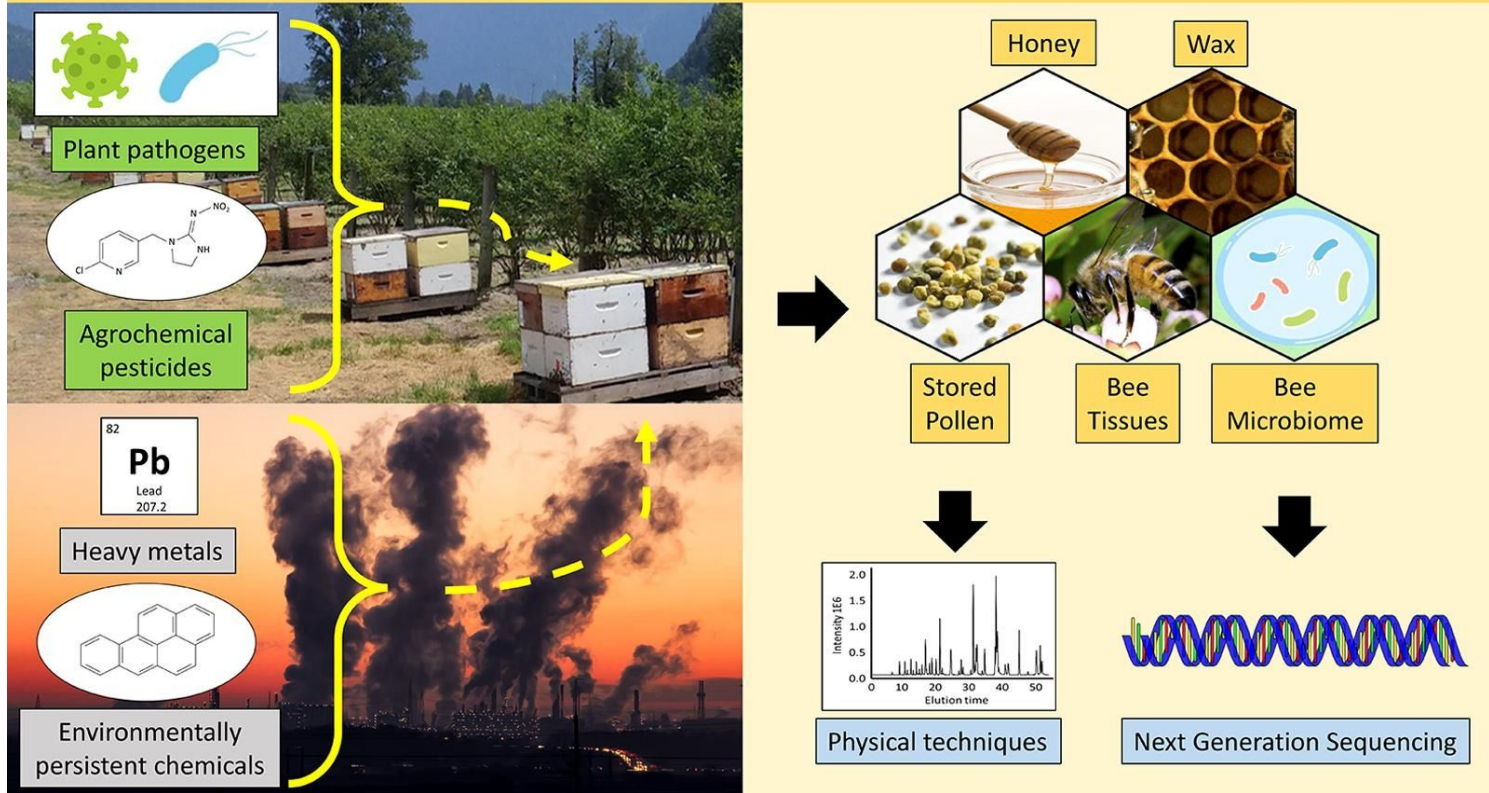


Biomonitors of pollution and contaminants

The study of bee colonies and hives help scientists identify the pathogens and contaminants that bees pick up during their forage and pollination



Environmental monitoring via Honey Bees



Environmental monitoring via honey bees,
https://ars.els-cdn.com/content/image/1-s2.0-S1470160X21011225-ga1_lrg.jpg

What can be done to prevent bees' extinction?

1. International effort....United Nations' declaration of World Bee Day (20th May), EU Pollinator Initiative, Farm to Fork Strategy (EU)
2. Business community
3. Agricultural sector & food producers
4. Social media influencers and celebrities...
5. Individual consumers...



Angelina Jolie embraces bees, National Geographic,
<https://www.nationalgeographic.com/environment/article/bee-conservation-women-entrepreneurs-angelina-jolie>

Suggestions from the UN....

Here are some actions you can take to help preserve bees and other pollinators:

- *Plant nectar-bearing flowers such as marigolds or sunflowers for decorative purposes on balconies, terraces, and gardens*
- *Buy honey and other hive products from your nearest local beekeeper*
- *Raise awareness among children and adolescents on the importance of bees and express your support for beekeepers*
- *Set up a pollinator farm on your balcony, terrace, or garden*
- *Preserve old meadows, which feature a more diverse array of flowers, and sow nectar-bearing plants*
- *Cut grass on meadows only after the nectar-bearing plants have finished blooming*
- *Use pesticides that do not harm bees, and spray them in windless weather, either early in the morning or late at night, when bees withdraw from blossoms*

Source: <https://www.unep.org/news-and-stories/story/why-bees-are-essential-people-and-planet>

References & Further Reading

1. *Declining bee populations pose threat to global food security and nutrition*, Food and Agricultural Organization of the United Nations, <https://www.fao.org/news/story/en/item/1194910/icode/>
2. *Why bees are essential to people and planet*, (2022), United Nations environmental programme, <https://www.unep.org/news-and-stories/story/why-bees-are-essential-people-and-planet>
3. Khalifa et al. (2021), *Overview of Bee Pollination and Its Economic Value for Crop Production*, Insects, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8396518/>
4. Cunningham et al., (2022), *Honey bees as biomonitors of environmental contaminants, pathogens, and climate change*, vol. 134, Ecological Indicators, <https://www.sciencedirect.com/science/article/pii/S1470160X21011225>
5. *What's behind the decline in bees and other pollinators?* (2021), Society, European Parliament, <https://www.europarl.europa.eu/news/en/headlines/society/20191129STO67758/what-s-behind-the-decline-in-bees-and-other-pollinators-infographic>