Role of Bees in Pollination

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Pollination plays a significant role in the agriculture sector and serves as a basic pillar for crop production. Plants depend on vectors to move pollen, which can include water, wind, and animal pollinators like bats, moths, hoverflies, birds, bees, butterflies, wasps, thrips, and beetles. Cultivated plants are typically pollinated by animals. Animal-based pollination contributes to 30% of global food production, and bee-pollinated crops contribute to approximately one-third of the total human dietary supply. Bees are considered significant pollinators due to their effectiveness and wide availability. Bee pollination provides excellent value to crop quality and quantity, improving global economic and dietary outcomes.

Plays role in food production

Bees pollinate more than 130 types of fruits and vegetables and are responsible for fertilizing at least 30% of the world's food. Without bees, many essential food crops would die off. Bees and butterflies hover over budding farm crops. Even beetles, ants and bats get in on the action, dining on a cornucopia of protein-rich pollen. In return for a delicious meal, these animals help the plants reproduce by moving pollen between the male (anther) and female (stigma) parts of a flower. This act of pollination is the first step in generating seeds, which create new plants. Flowering plants have co-evolved with pollinators to attract specific species. Butterflies are lured toward sweet-smelling red, orange and purple flowers, while flies and beetles are drawn to white or green flowers that smell slightly rotten.

Pollinators add value for people and wildlife

More than 80 percent of the world's flowering plants need a pollinator to reproduce and we need pollinators too, since most of our food comes from flowering plants. One out of every three bites of our food, including fruits, vegetables, chocolate, coffee, nuts and spices is created with the help of pollinators.

Biodiversity

Pollination helps plant species reproduce and can also lead to cross-pollination, where two different species create a new hybrid species.

Economic importance: Bees pollinate crops, which increases crop yields and food security. In fact, bees are responsible for pollinating over 70 of the 100 crop species that provide 90% of the world's food.

Honey production

India is the 8th largest producer of honey in the world. Beekeepers extract honey from bee colonies and sell it in the domestic and export markets. Beekeeping is a source of income for many rural communities. It requires minimal investment, can be done without land ownership and provides flexibility in timing and location. Beeswax is used in a variety of products, including candle-making, ointments, medicines, soaps, and polishes. It's also used as a waterproofing agent for wood and leather and to strengthen threads

Effectiveness and wide diffusion

Bees are considered significant pollinators due to their effectiveness and wide diffusion worldwide.

Bees at risk from pesticides and air pollution

Unfortunately, bees and other pollinators, such as butterflies, bats and hummingbirds, are increasingly under threat from human activities. Bee populations have been declining globally over recent decades due to habitat loss, intensive farming practices, changes in weather patterns and the excessive use of agrochemicals such as pesticides. This in turn poses a threat to a variety of plants critical to human well-being and livelihoods. Air pollution is also thought to be affecting bees. Preliminary research shows that air pollutants interact with scent molecules released by plants which bees need to locate food. The mixed signals interfere with the bees' ability to forage efficiently, making them slower and less effective at pollination.

Combating bee decline

Currently, 5–8% of all global crop production would be lost without the pollination services provided by bees, necessitating changes in the human diet and the expansion of agricultural lands to resolve shortfalls in crop production. Bees are faced with many challenges that can distort their lives, including shifts in land use, climate change, pesticides, genetics and cultivation management. Concerns regarding the decline of domestic and wild bees have intensified the need to encourage the usage of the wild pollinators on agricultural lands

- The lack of information and documentation on insects in India is hindering efforts to understand the extent of the decline of bees and their impact on crops and biodiversity and to formulate effective conservation plans and policies.
- The government can play a crucial role in funding research institutions and universities and collaborating with entomologists, ecologists and other scientists who can contribute to the study.
- Promoting organic farming represents a promising alternative to intensive agriculture and has the potential to address bee decline caused by pesticide use, monoculture and genetically modified crops.
- Organic farming prohibits the use of synthetic inputs and increases biodiversity both on-site and in adjacent fields, which will enhance bee species richness, boost the abundance of solitary bees and bumblebees, and improve pollination rates.
- Additionally, all highly toxic and lethal pesticides to bees should be banned as soon as possible. Incentives should be provided to foster cooperative behaviour among farmers to coordinate their plot-level decisions and foster landscape-level improvements in bee habitats.
- Moreover, India's Pesticide Management Bill, 2020 needs to be revamped for effective pesticide banning and management, as it lacks provisions for reducing and mitigating the risks of pesticide use.

Bee pollination remains a precious asset that should be protected. Bee pollination must be enhanced not only to improve environmental balance but also to maintain food security worldwide. The role played by bees is important for worldwide crops and certain medicinal plants, with significant effects on quantity and quality.

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