



Floral Diversity and Foraging Sources for Honeybees in Amritsar Region

*Harjap Singh, Kunal Bhatt, Amritpal Singh, Chirag Kumar, Mohit Kumar, Jashan Sharma, Sanchi Sharma and Simran Bhatia

Department of Agriculture, Guru Nanak Dev University, Amritsar, Punjab, India

*Corresponding Author's email: kunalbhatt10e@gmail.com

Honeybees are the one of the most beneficial insects found in our surroundings and natural environment. Honeybees are the one which are also associated with the human life agriculture and ecological stability for around thousands of years. Honeybees are the one of the major pollinators in pollination. They belong to the order Hymenoptera and the family Apidae. Honeybees are useful in producing many products of cosmetics industry and medicines also. They can produce honey, beeswax, royal jelly, and propolis has made very useful to human beings (Kebede et al. 2024). Honeybees products like honey which is full of natural sugars, vitamins, minerals and antioxidants which help in making the healthy food substance. Honeybees have many unique biological features like they have sense of smell which is very extremely strong which help them to identify flowers from long distances. Honeybees play major role in agriculture sector (Kewanit and Kidu, 2016). It extends beyond the ecology. Propolis help in healing wounds and have antibacterial properties. This proof that honeybees not only contribute to nature but to human also. Honeybees population is directly proportional to the environment. Their population declines in the pollution. It is noticed that honeybees population get decreased when usage of pesticides and deforestation occur. So, this threatens the food production and ecological balance of environment. Therefore, it is important to study about their behaviour, communication, consumption, flowers forage and ecological interactions.

Feeding and Flower Importance

Flowers have utmost importance for honeybees. Flowers are vital for the honeybee's life. Flowers provides the necessary or required nutrients for survival and reproduction through nectar and pollens.

❖ Nectar

Honeybees belong to animal kingdom so like other animal's honeybees need carbohydrates as energy source for the metabolic processes. As carbohydrates are converted to glucose or fructose so, carbohydrates are important for metabolic processes. Honeybees get their carbohydrates from the nectar. The amount of nectar needed depends on how concentrated the sugars are in the nectar. From various studies we came to know that worker honeybees need 11 milligrams of dry sugar each day (Tsuruda et al., 2021). So, for this sugar syrup should be given to the honeybees to complete their requirements. About 5ml of sugar syrup provide enough food for 227 bees for a day (Mashal et al., 2023)

❖ Pollen

Pollen is another feed for honeybees. Flowers provide pollens to honeybees. Pollen consists of protein, lipids, vitamins and minerals. So, bees like other animals also need essential amino acids which is taken from the pollens. Pollen can be collected by using pollen trap near beehive. Pollen can also be collected from flowers for feeding bees. Pollen should be feed to the bees in the month of February or march.

Amritsar Climate for Honeybees

Amritsar, located in Punjab faces very hot summers and very cold winters. Amritsar has continental type of climate. This region also gets average rainfall during the monsoon season. So, climate play very important role for honeybees. Amritsar is the area which have very large diversity of crops like mustard, sunflower, berseem and various fruit crops provides abundant or large floral resources all around the feeding period for honeybees. This increases the nectar and pollen availability. Amritsar receive good sunshine hours. Overall Amritsar provide good and sustainable climate for the successful beekeeping.

Methodology

The present study is conducted in the district Amritsar to know about the foraging behaviour of honeybees on different flowering crops during 2026. Various experimental fields of Guru Nanak dev University, Khalsa college and another local field were selected for observing honeybee behaviour. Special focuses given on the different plants, their flower structure and flower morphology and honeybee activity. Our group show much patience for capturing pictures of honeybees. The study includes all original photographs which are taken at real time field locations. Observation were taken from various angles which include

- How many flowers honeybees are visiting at one time.
- How much time they stay on one flower

It was observed that honeybees enter deep into crops like field pee to collect pollen on the other hand honeybees collect pollen from the central part of the flower of crops like mustard and holly hocks. Various locations among Amritsar are observed to analyse which flowers attract honeybees for pollen. All information which is written is observed carefully.

S. No.	Common Name	Botanical name	FAMILY
1.	Linseed	<i>Linum usitatissimum</i>	Linaceae
2.	Pot Marigold	<i>Calendula officinalis</i>	Asteraceae
3.	African Daisy	<i>Osteopermum spp.</i>	Asteraceae
4.	Mustard	<i>Brassica juncea</i>	Brassiaceae
5.	Apple	<i>Malus domestica</i>	Rosaceae
6.	Field Pea	<i>Pisum sativum</i>	Fabaceae
7.	Taramira	<i>Eruca sativa</i>	Brassiaceae
8.	Holly Hock	<i>Alcea rosea</i>	Malvaceae
9.	Fenugreek	<i>Trigonella foenum-graecum</i>	Fabaceae



Summary

Honeybees are one of the most beneficial insects. They are socially developed insects belongs to the order Hymenopter and family Apidae. Honeybees play major role in pollinating

various crops which have much agricultural and economic importance. Honeybees produce products of nutritional and medicinal uses. Flowers are very important for the honeybees as they provide sources of energy and carbohydrates. Area of Amritsar have many diverse cropping patterns which provide a suitable environment for the honeybees

Conclusion

Honeybees maintains the ecological balance. They are very essential for human well-being because honeybees are the major pollinators of many food crops. Their dependence on flowers for nectar and pollen show their importance in making floral diversity. The climate of Amritsar is well suited for honeybees. However, use of various pesticide and insecticide must be controlled to protect honeybee.

References

1. Alemeberhe, K., & Gebremeskel, K. (2016). A review on: Role of honey bee pollination in improving crop productivity and seed quality in Northern Ethiopia. *Food Science and Quality Management*, 47, 1–13.
2. Kebede, I. A., Gebremeskel, H. F., Ahmed, A. D., & Dule, G. (2024). Bee products and their processing: A review. *Pharmacology & Pharmacology International Journal*, 12(1), 5–12.
3. Mashal, F. T., Omar, R. E., Khattab, M. M., & Nowar, E. E. (2023). Determination of some effects of different feeding treatments on honeybee drones (*Apis mellifera* L.). *Annals of Agricultural Science, Moshtohor*, 61(2), 521–530. <https://doi.org/10.21608/ASSJM.2023.315274>
4. Tsuruda, J. M., Chakrabarti, P., & Sagili, R. R. (2021). Honey bee nutrition. *Veterinary Clinics of North America: Food Animal Practice*, 37(3), 505–519. <https://doi.org/10.1016/j.cvfa.2021.06.006>