On World Bee Day, A Look At What Makes The Insect So Sought-After On Farms And Orchards And How The Job Is Not Without Risks

Why Renting Bees Is New Agri Buzzword

Mohita.Tewari@timesofindia.com

If the bee disappeared off the surface of the globe, then man would only have four years of life left." Often attributed to Albert Einstein but probably apocryphal, this quote is a reminder of the critical importance of bees as pollinators. And now that there's been a significant decline in the population of honeybees because of various factors — habitat loss, pesticide use, climate change, disease and parasites — bad fruiting in orchards has become a more frequent phenomenon.

"How to pollinate?" For an increasing number of farmers, that's the biggest question.

If you don't have them, hire them. It was this answer to the farmers' big question that turned scientist-turned-apiarist Nitin Kumar Singh of Barabanki, Uttar Pradesh, into a bee-entrepreneur. Now, Nitin's stash of 600 boxes — each containing over 1,25,000 bees — travels across the country to help out whoever needs them. From litchi growers in Bihar's Muzaffarpur to sun-kissed apple orchards in Himachal Pradesh's Kinnaur, Nitin's bees bring a promise of good harvest wherever they go.

For, these bees help out with pollination, which can boost crop yields. The practice, known as 'rent-a-bee' or 'pollinator rental', is a godsend in areas where natural bee populations are insufficient to pollinate crops effectively. And it's not just about the money. Nitin, who has published over 30 peer-reviewed research papers in international journals such as Nature, Elsevier and PLOS One, says his main motivation is to save the environment.

Bees are unmatched as pollinators, but a general decline in their population means farmers are increasingly turning to apiarists with an eye on landing a good harvest

The 42-year-old PhD in environmental biotechnology used to work as a research fellow at Integrated Functional Genomics at University of Munster in Germany, and as a postdoctoral researcher at the Agricultural Research Organisation in Israel, before he moved to India and began renting out his bees.

"Bees are our allies," he says. "Without them, there will be no us. We just have to understand them better and let them do their job."

Geetanjali Misra, a zoology professor at Lucknow University, says India has seen a 20% decline in bee population in recent years. In some regions, such as Odisha, the drop is by nearly 80%. This, she says, can be attributed to factors like lack of pollen and nectar sources, pesticides and climate change.

Lack of pollen and nectar sources have affected bee health and survival while fluctuations in temperature and rainfall patterns have also disrupted their foraging and nesting behaviour, she explains.

Misra says that given their role in pollination, a decline in the bee population can lead to reduced crop yields and potential food security issues along with a reduction in plant biodiversity since many species depend on bees for pollination.

Nitin's apiary in Barabanki's Damaura village, nearly 27km from Lucknow, is a riot of colour: bright sunflowers, ripe red tomatoes, a crop of millets, patches of mustard and mint, a distant treeline of tall mango trees. The soundtrack to this vista is provided by the constant hum of bees.

Bees, says Nitin, need fresh nectar to stay healthy. There are no high-tension cables or phone towers nearby, nor is any pesticide used in the apiary, he adds.

Nitin's bees have travelled to almost every part of the country, from Manipur to Maharashtra, on mission pollination. "My bees are basically tourists," Nitin says. "Depending on the month and cropping season, they have to travel as and when they are hired. There's little demand among locals, but there's a huge demand of bees from apple orchards in Himachal. Similarly, we also rent bees to orange growers in Nagpur."

Most of the bees are of Italian origin, Apis mellifera ligustica. "When we give bees on rent to other states, we make sure that they travel only between sunset and sunrise because bees have their own inviolable routine," Nitin says.

Bees leave their boxes — also called moveable-comb hive or Newton hive — at sunrise to collect nectar from surrounding areas and return to it at sunset. Farmers who hire the bees don't need to do anything special. They just place the boxes in their farms or orchards; the bees go out when the sun rises and return to their boxes by sunset, after collecting nectar and performing pollination.

One bee box costs Rs 2,500 a month. "An area of 15,000 sqft requires around 10-20 boxes for pollination," says Nitin. "The price of these boxes depends on the time of the year. For example, Oct to May is the season for beekeepers to harvest a hive. During this period, the price of bee boxes is higher, compared with the June-Sept period."

The bee-renting business, however, is far from easy. Akhilesh Kumar from Lucknow's Gomtinagar, who runs Bhavana Agrotech, told TOI that he had to eventually discontinue his business, thanks to the many challenges that kept cropping up.

"There are only a few players in this business due to a lack of awareness about its benefits," says Rajasthan-based apiarist Ram Kishor Yadav, who runs his venture, 'Shahadwale', from Behror district. "Bees are usually hired by companies that are into seed production, or by advanced farmers." Yadav says seed-production firms rely on honeybees primarily for pollination as bee pollination can improve the quality of seeds and the overall yield of some crops. "Bees are also used by advanced farmers, who take help from scientists — especially apple and pomegranate growers. Bee pollination can increase crop yields by 20% to 35%," he explains.

Nitin Kumar Singh

A LOT GOING ON IN THAT BOX

A 'bee box', also called a hive, has around 10 frames hung parallel to each other. These are made of wood with a wax foundation on which bees draw out the comb

Each box has around **1,25,000 bees** and one queen bee

Each box costs a farmer **₹2,500** a month to rent

An area of **15,000 sqft** needs 10-20 boxes for pollination

Photos: Ajay Kumar

But it's not always good for bees

Joeanna Rebello Fernandes

Ashuram Godara, a pomegranate farmer from Palana in Bikaner, Rajasthan, spends up to Rs 50,000 a year on rented bees. Fifteen to 20 hives truck into his 22-acre farm when the crop flowers, and return to Kalki Agro Foods, the bee rental company in Behror, when the fruits appear. Despite the cost incurred, the farmer prefers to rent rather than maintain hives of his own because the pesticides he sprays on his fruit can harm resident bees, while itinerant bees can be dispatched to the safety of their home base.

In fact, bee rental companies cite exposure to pesticides as one of the chief reasons for bee deaths on farms. They penalise farmers for colony losses, with some like Kalki Agro Foods charging them for every compromised frame, while others, like Sridhar Industries in Bengaluru, withholding the deposit on the beehive unit itself. Before renting out their hives, pollination rentals caution farmers against using pesticides on their crops — particularly the neonicotinoid class of pesticides — when bees are in residence. Neonicotinoids impair the nervous system of insects and can cause a range of negative impacts, from weakened immunity, loss of navigational abilities to death.

However, renter-farmers and agri-businesses can't always prevent bee deaths even if they themselves practise organic agriculture, because toxic chemicals can arrive downwind from surrounding farms.

"The govt can help mitigate this problem by listing all the molecules used in pesticide formulae. It doesn't do this because all the new and old molecules used in pesticides are all bee-killing chemicals," says Apoorva BV, owner of Shridhar Industries, a beekeeping business that offers hive rental services as a small part of its portfolio. Apoorva is also the co-founder of The Hive, a trust dedicated to bee education and conservation. "You can't promote natural pollination without first addressing this issue. The growth of insect pollination services is directly proportional to farmer awareness," he says. At the same time, pollination services can help farmers appreciate the role that insects play in agro-ecosystems. When farmers understand insects, they'll avoid pesticide overuse and adopt natural approaches to biocontrol balance, which is essentially the predator-prey balance. "Pesticides will ruin this dynamic," warns Apoorva. "They will kill both pests and biocontrol agents indiscriminately. If the govt ignores this risk, we stand to lose all insect biomass in India." He believes that the economic value of pollination also needs to be surveyed by state and crop. Accurate projections can help farmers assess future earnings from bee colonies and seek them out proactively.

Even as some farmers have been making a beeline for pollination services, conservationists warn of the risks posed by this growing market. One of these is the consequence of exposing bees consistently to a limited range of crops.

"Pollen provides bees with proteins, minerals, and other nutrients. Just like humans need a varied diet, so do bees," says Shiny Mariam Rehel, senior programme coordinator for biodiversity conservation at Keystone Foundation, which supports conservation and community development in the Nilgiri Biosphere Reserve. The nonprofit is also a member of the Indian Pollinator Initiative, a consortium of conservationists and academics dedicated to developing research and guiding policy.

"Exposure to only one or two kinds of pollen may impact the insects' immunity and egg-laying pattern," says Rehel. There are other concerns. Contract bees, airdropped from other areas, may deprive local bee species of available food resources and eventually displace the few that are left.

Apiarists say pesticides are among the chief hazards facing bees on farms.

The absence of local pollinators could further imperil the area's biodiversity.

It's a concern shared by Narsanna Koppula, co-founder of Aranya Agricultural Alternatives, which endorses permaculture and sustainable agriculture. Kopulla worries that changes in temperature, climate, and humidity that bees experience when they're taken to new and unfamiliar places can affect their survival rate.

"By making honey-producing bee species the mainstay of their pollination rental services, companies may end up driving non-honey producing bees, such as carpenter, blue orchard, and bumblebees, to the sidelines. If we focus on the commercial aspect alone, biodiversity will take a backseat," he says. "We need to think of bees not only for furthering business, but also for strengthening ecosystems."