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Indian honey bees need some love

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Every year in August, the Kaas plateau (near Satara in Maharashtra) explodes into colour, with over 150 species of flowers blooming. As the tourists descend, so do hundreds of tiny visitors. The ‘buzz’ is loud, as all four of India’s indigenous honey bees — the *Apis cerana indica*, *Apis dorsata*, *Apis florea* and *Trigona* (stingless bee) — get to work collecting nectar and pollen. “Every few weeks, the colours change as new flowers bloom, but the pollinators remain the same,” says Vinita Gowda, assistant professor of Biological Sciences at IISER (Indian Institutes of Science Education and Research) Bhopal, who studies these industrious foragers as part of her research into pollination and plant biology. What she can’t understand, however, is why, just a few kilometres away, in the villages around Kaas, farmers ignore their small winged neighbours and, instead, rear a foreign bee, the *Apis Mellifera* (European honey bee). “I can’t believe the local bees won’t pollinate their farms [or produce honey],” she exclaims.



A bee hive at food journalist Vikram Doctor's home

Honey trap

The story of the Indian honey bee, as it turns out, is complicated. In 1976, when the first National Commission on Agriculture report came out, they were given their due. “A road map for beekeeping was laid out as an agricultural input [external sources that aid farming, such as fertiliser] because pollination is 40 times more important than honey. But with the focus shifting to large holder agriculture, these plans remained on paper,” says Sujana Krishnamoorthy, Executive Director of Under The Mango Tree (UTMT), a non-profit organisation that trains small farmers in beekeeping.

Attention was once again diverted from local bees when subsequent governments began to concentrate on just honey. India began to import the high-yield *Mellifera* in 1983, when beekeeping as a cottage industry was announced. In the last decade or so, honey production has reportedly grown by 200%, aided by initiatives like the Honey Mission — launched in 2017, in line with Prime Minister Narendra Modi's call for a Sweet Revolution.



The Khadi and Village Industries Commission is one of the key drivers of this — providing basic training, 10 bee colonies and tool kits to farmers — to bring up India's world ranking in honey production (currently eighth, with 64.9 thousand tonnes). This has yielded results: last year, the honey market was worth approximately ₹1,730 crore, according to market research company IMARC, and is estimated to double in the next five years. India also exported 61,333 metric tonnes in 2019.

Losing smell memory

- India has close to 800 bee species, but we hardly have any data on them. “Over 95% of research on bees is on the *Mellifera*,” says Axel Brockmann, who heads the Honey Bee Lab at the National Centre for Biological Sciences (NCBS), Bengaluru. “In India, when people talk about bee decline,

they are talking about the *Mellifera*. But is there a decline in the indigenous bees? We don't know. There has been no continuous, long-term research on our bees." This is bad news because, without such information, we can't keep track of how the different communities are faring, how they impact the eco-system, and so on. The only consensus: losing them will threaten food security and income. Over a decade ago, Parthiba Basu, Director, Centre for Pollination Studies, had assessed the economic value of pollination loss on six-seven crop productions — the annual loss could be around ₹5,400 crore. And this is only set to grow.

- The use of pesticides is one of the biggest dangers to bees. "Neonicotinoids, or neonics, has been outlawed by the European Union and a number of countries — purely because these were found to be harmful to the bee — but it is making a backdoor entry into India. Punjab is the only state that has banned it," says Krishnamoorthy. When Basu began looking into the impact of pesticides on the *Cerana* and *Dorsata*, he found that the bees were ageing faster because of oxidative stress. "They are also losing their ability to distinguish colour, smell and retain smell memory [pesticides create an aberration in the calcium channel in the brain, stopping memory formation]." So we are at a tipping point. "There is a need for sensitisation within policy makers, and for cross learning between the scientific community and agricultural establishments." Conservation is the need of the hour. Besides banning neonics, we must also restore natural vegetation in intensive agricultural areas can also bring back the bees. "We are suggesting that local governments take a proactive stand in re-vegetating parts of common areas in villages and encourage farmers to have inter rows in their fields or plant pollinator-attracting vegetation on the bunds," says Basu.

A sticky problem

However, making a case for the *Mellifera* is much like revisiting the jersey cow vs the Indian cow debate. Yes, the European honey bee can produce anywhere between 20 kg and 40 kg of honey per colony per year, as compared to the *Cerana*'s low output of 7 kg to 10 kg, but it has its drawbacks. It requires a lot of maintenance, carries pathogens, and is only suited to a few areas in India (it can't tolerate high temperatures or rain). "These bees require a lot of flora, so monoculture farming is preferred. They are good for commercial apiculture, which practises migratory beekeeping — where 700-800 boxes are moved from place to place. In India, typically, their journey would start in the litchi orchards of Muzaffarpur, then move to the mustard fields in western Madhya Pradesh and Uttar Pradesh, before going to the apple groves in Himachal and Jammu and Kashmir," explains Krishnamoorthy. "But the reality is that 86% of our farming community is made up of small farmers; the *Mellifera* is not the bee for them. We've seen countless examples where the government has brought in boxes and, within two months, these bees abscond because there isn't enough flora for them."

Interactions with organisations such as the National Bee Board haven't helped because "they don't think working with indigenous bees is a good proposition". "The government is looking at numbers and scale. But which farmer can spend ₹3 lakh to buy 50 boxes [a bee box costs ₹3,500 and the *Mellifera* costs another ₹3,000]. Instead, give a small farmer ₹2,000 of support for boxes [UTMT's cost ₹1,000] and training to transfer local bees from the wild and rear them, and you give them a low-cost way of adding to their yields through pollination and produce honey," she adds.

Sweetening the deal

Moving beyond the “productivist agenda” to concentrate on the bees’ most important function — maintaining ecological balance and helping agriculture through cross-pollination — is how we can bring the conversation back to our local foragers. “Indigenous bees have evolved in this region, they know the plants, the terrain, and are better able to adapt to the changes in the environment,” says Gowda, adding how, in the last couple of years, “many *Mellifera* colonies have absconded [reacting to the heat and rains]. But native bees don’t do this as much”.



App in the making

- Brockmann, who has been monitoring Dorsata bees in Bengaluru for the last couple of years (in a pilot study in a gated community — researching migratory patterns, etc), is also working on an app. “It will be a citizen science project. We need people who are interested in bees to download it because we want them to observe and monitor them — revisit the sites once a month, take a photo and count the colonies,” he says, adding that they are testing the first version now and will, hopefully, roll it out in a few months’ time.

India is a hotspot for bees [see ‘Rare sightings’ box]. And phenomena like colony collapse disorder — where worker bees disappear, leaving behind empty hives — isn’t as prevalent here (though data is still being gathered). Beekeeping, if employed smartly, can not only provide additional income for small farmers but also better their yields. A few studies have shown that farmers who use local bees had better fruit sets (the process in which flowers become fruit).

UTMT has been making inroads in popularising the *Cerana* and *Trigona* over the last decade.

Initiatives that were once met with scorn and disbelief — farmers thought they were crazy “because bees lived in forests and not boxes” — have now spread across Maharashtra, Gujarat and Madhya Pradesh, where they work with 67,000 farmers. “To date, we have the largest ecosystem [with an institution] of Cerana beekeepers — around 1,000, with over 3,000 bee boxes,” says Krishnamoorthy, adding that the recent HCL Foundation Grant of ₹5 crore that they received will be used to spread their work into newer districts.

Manilal Waghera from Dharampur, Gujarat, is a case in point. He remembers days when the villagers extracted honey by squeezing hives (thus killing bees) and using the combs to make nutritious *bhaji*. Now a master trainer, with 11 bee boxes of his own, he teaches others how to safely transfer wild bees into boxes and maintain them. “Ever since we started, 99% of the villagers have reported much better yields,” he says. His friend, and fellow beekeeper, Madhu Bhoya agrees, adding that his Trigona bees have helped his mango orchards thrive.



A farmer setting up an Apis Cerana Indica bee box

Rare sightings

- Besides the four main honey bees, India has two indigenous species that aren't seen too often. The *Apis laboriosa*, or the Himalayan giant honey bee, is primarily found in the upper reaches of Uttarakhand. Its red honey (from flowers found at high altitudes) is said to have a psychotropic effect, and honey hunters (especially the Kulung of Nepal) scale vertical cliffs to get this 'mad honey'. The other variety is the rare *Apis andreniformis*, or black dwarf honey bee, that is mostly found in the forests in the Northeast states.

The official move

The government is slowly taking note, too. Though the ratio is still 80:20 in favour of the *Mellifera*, they are looking at pollination as an equally important part of beekeeping. “In our

Mission for Integrated Development of Horticulture [a Centre-sponsored scheme], we have a component for beekeeping as a pollination support system. Several national-level agencies, including the National Bee Board, are working towards implementing this,” says BNS Murthy, Horticulture Commissioner of India, adding, “Going forward, we must balance both *Cerana* and *Mellifera*; we need to understand their individual advantages and for this we are doing research. Under the Indian Council of Agriculture Research, we have an all-India coordinated research project on honey bees, spread across 20 centres. Also, under our new National Beekeeping and Honey Mission, we are focussing on production, processing and research.”

The news is welcome, since local bee populations are coming under threat — because of excessive land clearing and use of pesticides. In Netrang *taluka* in Gujarat, a UTMT team that went to survey the area for bees found no indigenous species left. “Reintroduction of bees is tough, so we are concentrating on conservation, spreading awareness about unsustainable honey hunting practises to the bees’ impact on farming,” says Krishnamoorthy. “If we don’t protect our bees now, then in 10 years’ time we might have to buy them through mail order, like the US does.”

[“There are over 20,000 bee species in the world. Of these, around 200 are social \[live in colonies\] and 12 are honey bees. But the world is only talking about one honey bee, the *Apis Mellifera*! In India, we should not even be discussing it” Axel Brockmann, NCBS](#)

[“Studying the behaviour of bees is important. \[Did you know\] that the *Cerana* doesn’t travel more than 700 m, or that if there is paddy field in the way, they are unwilling to cross it? All this is important in terms of conservation of bees and addressing pollination as an ecosystem service” Hema Somanathan, IISER Thiruvananthapuram, group leader of Bee Lab](#)