

STINGLESS BEEKEEPING FOR SUSTAINABLE AGRICULTURE: AN AREA TO PONDER

Article Id: AL202199

¹Subhajit Pal*, ¹Swarnali Bhattacharya and ²Shrawan Kumar Sahani

¹ Department of Agricultural Entomology, Institute of Agriculture, PSB, Visva Bharati University, Sriniketan-731236, WB, India

² Ph.D. Research Scholar, Department of Entomology, Bihar Agricultural College, Bihar Agricultural University, Sabour-813210. Bhagalpur, India

Email: subhajitpal23626@gmail.com

In tropics and subtropics, stingless bees are the principal pollinators of a diverse ecosystem. The foraging activity of these bees is influenced by biotic and abiotic factors all throughout the year. The raw stingless honey possesses distinct types of phenolic and flavonoid compounds of variable biological and clinical importance. Due to minute size they gather lower quantity but quality of honey. It can be effectively used for greenhouse pollination because of their limited foraging distance and foraging activity, at the peak time of 10.00 am to 12.00 noon. Natural wild colonies can be reared in artificial small hives for easy honey collection. Unlike, other bee families there are no such pest and disease associated except some predators or parasitoids. Due to their docile nature, they are the good components of apitourism. More scientific research needs to be carried out for the promotion of these bee flora and to prove a greater employment generation in rural sectors.

Thinking of bees strikes delicious honey and painful sting in our mind. But there are some traditional bee species which are devoid of a functional sting. They bite with mandibles, but the biting intensity is just like that of an ant. From centuries they are prevailing in various tropics and subtropics making horizontal combs inside tree branches, wooden dead logs, cracks in walls of houses, etc. The nest comprises brood cells, honey, and pollen cells. Brood and food chamber are made up of wax and propolis called as ‘involucrum’ gathered from various plants. Queen mates with only one male. There can be two or more queens laying eggs in the same nest. Production of new queens is regular, often they are killed and never endorsed to produce eggs. By mass-provisioning, they provide food to the broods. Flavonoid-rich honey fetches good market price because of its medicinal values. In Karnataka, Kerala, and North East some tribes are practicing traditionally.

Role of Stingless Bee

Pollination: Due to the polylectic nature, they play an ecological role by pollinating wild and cultivated plants through foraging.

Research: From the Cretaceous period stinglessbee species co-evolved along with the local vegetation. Also, the greater abundance in tropical forests and vivid diversity fetches fair research attention.

Aesthetic Value: Aesthetics is another area of the economic importance of stingless bees that involve the making of artifacts such as jewellery and souvenirs to bring happiness and relief to people.

Apitourism: As these eco-friendly bee species are stingless and not ferocious, therefore it provides a great opportunity for tourism. A natural forest environment with nests and different designs of beehives will attract people who would want to try out some of the bee products.

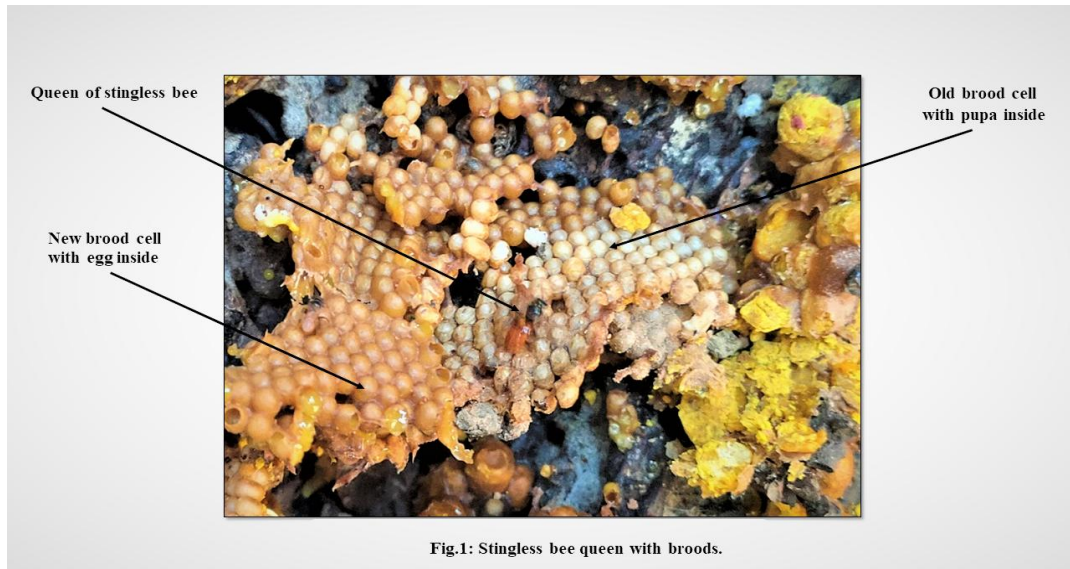
Nutritional and Medicinal Honey and Other Hive Products: Honey is mainly made up of glucose and fructose. It also contains minerals, vitamins, other nutrients, and is also popular for its exceptional medicinal (antioxidant and antibiotic) properties. They are the great gatherers of pollen and producer of beeswax, which is extensively used in cosmetic industries. The propolis are having antibiotic properties that are effective in healing wounds and infections in the body.

Foraging Activity and Crop Choice of Stingless Bee

Till date, there are more than 500 species that have been reported from various parts of the globe. Out of that 130 species are identified as potential pollinators of varied crop species. Stingless bees are the generalist flower visitors of broader range plant species viz. field crops, fruit and vegetable crops, weeds, medicinal-aromatic and ornamental plants throughout the twelve months. They prefer mainly small flowers, dense inflorescence, flowers with long corolla tubes that are wide enough for the bees to enter and white or yellow-coloured flowers. It is effectively used for greenhouse pollination because of their limited foraging distance and foraging activity at the peak time of 10.00 am to 12.00 noon.

Nesting Habitats and Rearing of Stingless Bee

Diversity in nesting habitats from varied climatic and geographic conditions are seen in these minute creatures. In South India, they are found prevalently in different ecological zones involving tropical evergreen, semi-evergreen, grassl and, moist deciduous, dry deciduous, shrublands, freshwater wetland, subtropical secondary scrub, grassy slopes and



thorny scrub type of forest vegetation. Stingless bee constructs their nests in old tree trunks or human dwelling places like cracks and crevasses of constructed walls, hollow iron pools, or bamboos. They can be reared in artificial wooden hives, bamboo hives, or PVC boxes of varied sizes.





Fig. 3 : Stingless bee colony with brood and bee bread.

Pests Association

There is no such important disease associated with this bee species. However, they do suffer from predation, parasitism like flies, ants, spiders, mites, wasps, birds, lizards, toads, and, of course, humans, which are common pests of social bees worldwide.

Syrphid fly: One of the most serious pests with bright orange-yellow and black markings and is frequently observed hovering near nests during summer. They are widely available in all regions where stingless bee colonies are present.

Phorid fly: Phorid fly are mostly associated with Australian stingless bee species. It hovers outside and hunts singly. Once a bee is out for foraging the wasp swoops from back in an unpredictable way and takes up to its nest.

Dry fruit mite: Dry fruit mites are the serious concern on *T. iridipennis* colonies in India. The infestation initiates from the pollen store and subsequently spreads over the brood cells. Later it declines the worker strength of the colony by carrying away all food store and young ones.

Advantages of Practicing Stingless Bee Colony

- As like, other honey bees they are environment and human-friendly domesticated bees. They are safe to keep near to a farmhouse and handled by people who are allergic to other traditional bees.

- Swarming is absent in stingless bees because the mature physogastric queen is unable to fly. However, they make a new colony with the newly emerged queen if the nest is full. So, there is no chance of completely losing the entire colony.
- Due to the small-sized body, their foraging range is also much narrower compared to the commercial one. Hence, they could be utilized effectively in homestead gardening or polyhouses.
- The small size of this kind gives access to forage in varieties of flowers, whose opening is too narrow to permit other bees. Thus, making a peaceful coexistence with other commercial bees.
- There are no such pests and diseases associated with them, unlike the commercial bee species. However, they have some natural enemies with less economic importance.

Conclusion and Future Prospects

It is fascinating to rear these wild bees in traditional domestic ways. On artificial rearing each colony produces 600-700 gm of honey per year, fetching a good market value of around Rs. 3000 to 5000 per kg. In Ayurveda, meliponid honey possesses a great demand due to its exceptional medicinal (antioxidant and antibiotic) properties. Recent adverse actions such as Deforestation or habitat degradation, Intensive applications of Agrochemicals, Lack of knowledge, Destructive harvesting, Climatic changes, etc. are forcing these eco-friendly bees under threat. With new scientific approaches, higher production can be achieved, which would prove to be an alternative employment generation for unemployed youths. Further research on the medicinal property of stingless honey, propolis, and other bee products will help to find a solution for many ailments.

References

Desalegn, B. (2020). Biology and Management of Stingless Bees. Oromia, Ethiopia. <https://www.researchgate.net/publication/340948872>

Karthick, K. S., Chinniah, C., Parthiban, P., and Ravikumar, A. (2018). Prospects and challenges in Meliponiculture in India. *International Journal of Research Studies in Zoology*, 4(1): 29-38.

Kumar, M. S., Singh, A. J. A., and Alagumuthu, G. (2012). Traditional beekeeping of stingless bee (*Trigona* sp) by Kani tribes of Western Ghats, Tamil Nadu, India. *Indian Journal of Traditional Knowledge*, 11 (2): 342-345.

Muthuraman, M., and Saravanan, P. A. (2004). Utilization of stingless bees for crop pollination. *Indian Bee Journal*, 66(1-2), 58-64.

Pashte, V., and Said, P.P. (2017). Stingless bees. [https:// www. researchgate. Net /publication/ 325334943](https://www.researchgate.net/publication/325334943).