



BEE HOTELS

A SUSTAINABLE SOLUTION FOR POLLINATOR CONSERVATION

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Received: August, 2023; Accepted: September, 2023; Published: October, 2023

Introduction

Approximately 75% of the global agricultural production are highly dependent on pollinating insects. Eusocial bees & solitary bees, most butterflies, moths, ants, flies, beetles, and some thrips are the important pollinators. Bees have a significant impact on both the environment and agriculture. Bees are important pollinators that contribute significantly to the cultivation of food, including oilseeds, fruits, vegetables, and nuts. All bees are known pollinators, but the solitary bee is a proficient pollinator and is typically more effective than honeybees. Any of species, that do not live in a community are known as solitary bee. It includes leaf cutter bee, mason bee, carpenter bee, bumble bee, halictid bee etc.

Unfortunately, bee populations have been declining worldwide due to factors such as habitat loss, indiscriminate pesticide use, and global climate change. Bees require two basic resources: food and nesting habitat. The diversity of pollinators and consequently, the rate of pollination are increased by a close vicinity of floral resources and nesting habitat. Making artificial nests is a possible strategy for conserving pollinators in rural as well as urban environments. They can protect bees from various threats and aid in boosting bee populations. Bee hotels have emerged as a valuable tool for bee conservation, by providing a safe habitat for bees.

Bee hotel

Bee hotels are artificial nesting structures designed to provide shelter and breeding sites for solitary bees. Unlike honeybees, which live in hives, solitary bees nest alone and do not produce honey. Various bee species may build their nests in the ground, in plant components like hollow stems or wood, or in a variety of other voids and cavities, such as rodent tunnels or stone walls.

Construction of bee hotel

A bee hotel is often made up of several sets of small tubes or holes that imitate natural nesting locations for solitary bees. The tubes might be made of bamboo, drilled wood, or paper straws. Bee hotels exhibit a range of sizes, shapes, building materials, and functions. Bamboo stems of varying diameters can be linked together to form a simple bee hotel, or these stems can be put into the wood frame of an individual bee



These insects may actively create their own nesting tunnels, occupy pre-existing structures, or lay their eggs in the nests of other bees. At most 100 species, or 18% of the total, may be considered potential residents of the bee hotel. Bee hotels are not appealing to honey bees or bumble bees because they prefer larger cavities.

hotel. A frame or a wooden box can be utilised to attract bigger solitary bees. The box should be at least 20 cm deep and open only from the front (Fig.1). To deflect rain, build a single or double pitch roof. The outside construction and nesting blocks are composed of commonly used woods such as pine, spruce, and oak. Mud brick walls, especially those that attract blue banded bees, are another choice for attracting bees.



Fig.1 Bee hotel model for solitary bee

Nesting blocks are designed to resemble like the holes in trees that cavity-nesting bees utilise in the wild. Drill holes of differing sizes into the wooden blocks to attract as many different species of bees as possible. In general, a bee hotel frame should be at least 6 inches deep and 10 inches broad (Fig.2). Nests with several openings or tubes are a few examples of bee

hotels. The effectiveness of bee hotels in attracting bees is determined by the width of the holes and the length of the tubes, which cannot be varied. The tubes range in length from 1.4 to 28 cm, with an average of 11.3 cm. These tubes range in diameter from 2 to 25 mm, with an average of 7.2 mm of these nests for attracting bees.

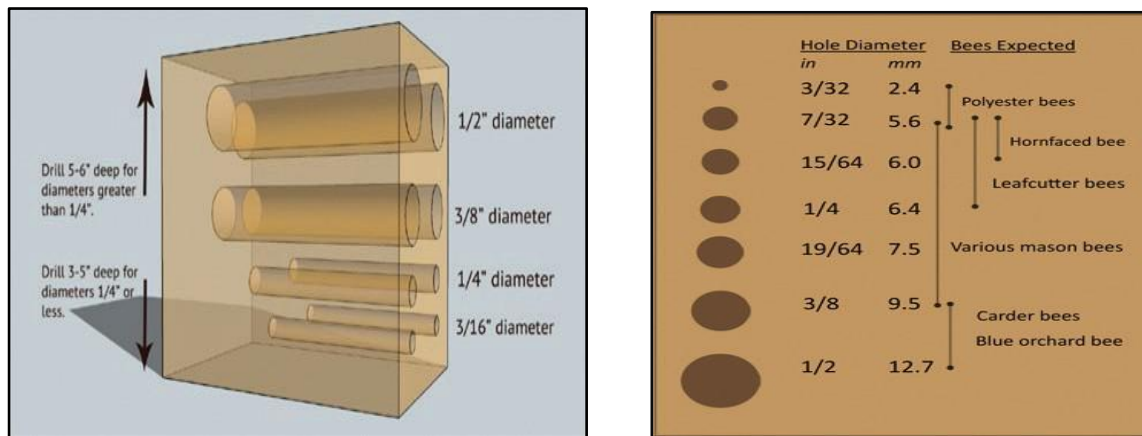


Fig. 2. Dimensions followed in Bee hotel

Installation of bee hotel

The hotel is typically installed in a sunny location, such as a garden, wall, fence, or post, and is at least 3 to 5 feet off the ground. The front of the bee motel should receive direct sunshine for the majority of the day. The environment around the nests, as well as climatic conditions, have an impact on efficiency. A bee residence must

Utilization of bee hotel by solitary bees

As the inhabitants of bee hotels are entirely solitary, each nest is “owned” by a single female, who lays her own eggs and gathers all the food needed for each offspring. A bee or wasp will modify the interior of a nesting area by lining it with leaf fragments or glandular secretions and constructs a distinct chamber for each egg. It provides adequate nectar and pollen in each isolated chamber to grow into a full larva and then a pupa, where the oldest offspring are located towards the back (Fig. 3). One egg and enough pollen and nectar for the embryo to

be securely fastened so that it does not sway or swing in the wind. One of the most significant factors to consider is the type of vegetation near the bee hotel. Keep the bee hotel near nectar and pollen-rich plants such as sun hemp or *Crotalaria sp.*, wing beans, long bean, *Tephrosia sp.*

grow into an adult are present in each chamber. The queen bee frequently uses more than one nest tube during the course of her life as she continues to construct new chambers and lay fresh eggs. Female eggs actually are laid in the back of the nest by the mother bee, whereas male eggs are laid in the front. Even though their eggs were laid last, males emerge first because they are smaller, shorter growth period. This makes enough space for their older siblings to emerge a few days later.



Fig. 3. Cross-section of solitary bee nest cavity

Conclusion

Solitary bees are extremely helpful in pollinating crops and floral plants. Solitary bee populations can be increased by creating artificial nesting habitat. Creating bee hotels is an easy way to participate in meaningful environmental stewardship and

help native and non-native pollinators. Bee hotels is an ideal method to aid in bee conservation efforts and develop resilient habitats in urban environments that promote the health of ecosystems as a whole.

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