

SPLITTING NESTS: WHAT DECIDES EDUCATION STINGLESS BEES

PREETI S. VIRKAR*, SHIVAM SHROTRIYA & V. P. UNIYAL

*email: preeti@wii.gov.in

Introduction

Beekeeping with stingless bees is promoted for small-scale economy among indigenous communities in central and south America, where it has a long cultural history. In India too, Meliponiculture is an age old practice, although least explored. Kani tribe in the Western Ghats is the only example keeping stingless bees (Kumar et al., 2012). In absence of knowledge base about meliponiculture, scientific research becomes an important initiative to understand its potential in Indian scenario.

Culturing stingless bees (*Trigona* spp.) poses a number of challenges. The very first step of acquiring their colonies from wild by EDUCATION, i.e., natural hive duplication by attaching bee-box, is quite a slow process. HIVING (Heard 1988) is an alternative, which is destructive and increases absconding of bees (Olivera et al. 2012).

Findings of the study will be helpful in encouraging beekeepers to take up these gentle indigenous bees.



Research Question

Why is the natural process of stingless bee colony division (education) slow, taking from about three to over a year?

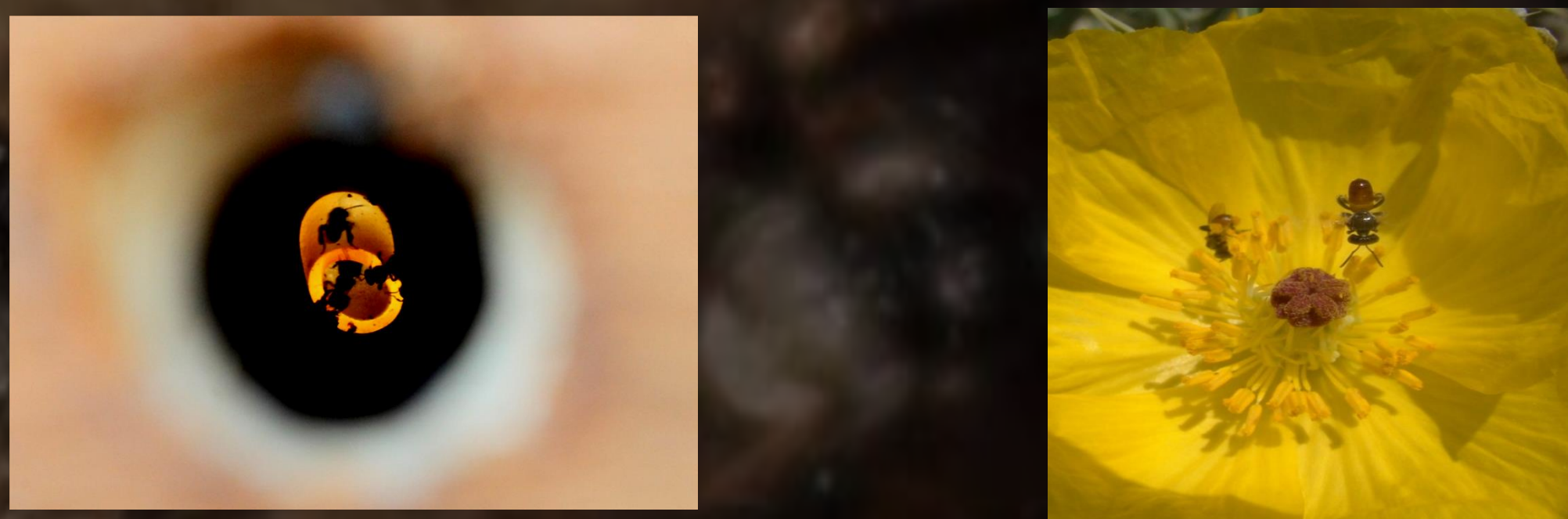
- ✓ What is the space requirement for successful education and which materials are preferred as bee boxes?



- ✓ How does the availability of nest building materials play role in decision to divide the nest?



- ✓ How do seasonal variations in nature affect the nest building process?



Methodology

Objective 1. Preference for nest box size & material

Following adaptive sampling, we are experimenting with different sizes, shapes and materials for nest boxes. The boxes are applied for education, and progress of the colony is observed with relation to the season.

Objective 2. Quantitative analysis of the materials used for nest building

Seasonal samples of nest material are collected. These samples will be analyzed quantitatively and qualitatively by standard lab techniques (Soares-Scott et al. 2013).

Objective 3. Seasonal availability of nesting material

Spatio-temporal nest building material availability will be quantified using GIS techniques.

Resources such as pollen, resin and other materials brought in by forager bee are directly observed and quantified seasonally.

Discussions

Possible reasons for extending entrances of the original nest to the new openings could be that:

1. Entrance extension was cost-effective/energy efficient compared to sealing of entire nest box, shifting or duplicating hive during low resource availability.
2. Small size of nest boxes was insufficient for splitting.

Nests were completely sealed off during peak winters from mid-December to mid-January, suggesting reduced activity during unfavorable cold weather. Observations in peak flowering season show that pollen requirement of the colonies is not changing while other materials (possibly resins, water and nectar) are consumed at higher rate. No statistical analysis is performed so far for the lack of sufficient sample size. As this study is still ongoing, we hope to gather more data.

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Result

1. Space Requirement & Material

Nest 4



Nest 5



Nest 1

| DATE | CAPACITY | MATERIAL | OBSERVATION |
|-------------|----------|-------------|---|
| 21 Jul 2013 | 0.9 L | earthen urn | Nest box attached |
| 8 Aug 2013 | | | <ul style="list-style-type: none"> • Extensions from entrance of original nest to opening of box |
| 15 Nov 2013 | 2 L | Wooden box | <ul style="list-style-type: none"> • Extension built at nest box entrance |

Nest 2

| | | | |
|-------------|-------|---------------------|---|
| 21 Jul 2013 | 0.9 L | earthen urn | Nest box attached |
| 8 Aug 2013 | | | <ul style="list-style-type: none"> • Extensions from entrance of original nest entrance to opening of box |
| 29 Dec 2013 | | | <ul style="list-style-type: none"> • Nest box entrance was sealed and no activity was observed |
| 20 Jan 2014 | | | <ul style="list-style-type: none"> • Bees resumed the activity |
| 28 May 2014 | | earthen urn removed | <ul style="list-style-type: none"> • Prominent structure of the extension was built, but no sign of nest-duplication |

Nest 3

| | | | |
|-------------|-----|------------|---|
| 15 Nov 2013 | 2 L | Wooden box | Nest box attached |
| 29 Dec 2013 | | | <ul style="list-style-type: none"> • Nest box entrance was sealed and no activity was observed |
| 20 Jan 2014 | | | <ul style="list-style-type: none"> • Bees resumed the activity |

Nest 4

| | | | |
|-------------|-------|-------------|---------------------|
| 20 Mar 2014 | 0.6 L | Bamboo node | Attached vertically |
|-------------|-------|-------------|---------------------|

Nest 5

| | | | |
|-------------|-------|-------------|-----------------------|
| 20 Mar 2014 | 0.6 L | Bamboo node | Attached horizontally |
|-------------|-------|-------------|-----------------------|

2. Nest Building Material

Nest 1



Nest 2



Nest 3



Nest materials retrieved from different nests. Nest 1 shows material used to seal entrance of original nest. Nest entrance extensions of Nest 2 were built to seal excess spaces. Nest 3 shows sealed entrance in peak winter.

3. Seasonal Resource Consumption

Daily forager bee returning with resources: Pollen, resin and other (neither pollen or resin)

