



## Food storage behaviour in stingless bee *Melipona quadrifasciata*

Gabriel Reginatto Silva<sup>1</sup>, Celso Barbiéri<sup>1</sup>, Michelle Manfrini<sup>2</sup>, Tiago Franco<sup>1</sup>

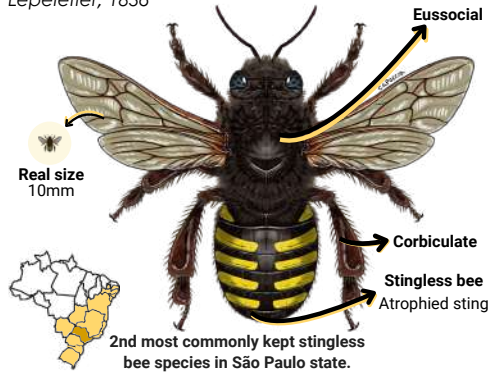
<sup>1</sup>University of São Paulo, São Paulo, Brazil

<sup>2</sup>Federal University of São Paulo, Diadema, Brazil  
gabrielreginatossilva@gmail.com

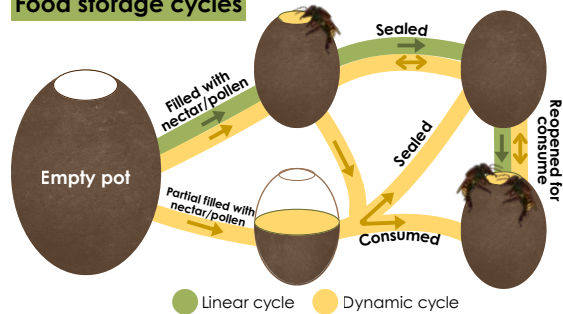


### Meliponini: *Melipona quadrifasciata*

Lepeletier, 1836



### Food storage cycles



Previous studies describe a **linear cycle** for food pots: construction, filling with pollen or nectar, sealing for weeks, and reopening for consumption<sup>1,2</sup>. However, a new research<sup>3</sup> using pollen pots, suggests this process is **dynamic** rather than strictly linear.

### Objectives

Analyze the **storage behaviour** of pollen and honey from a *Melipona quadrifasciata* nest. Furthermore, **compare** the dynamic of pots across time.

### Scientific and beekeeping applicability

Understanding food storage behavior of stingless bees is crucial both for **scientific research** (i.e fermentation of food, nutritional topics) and for the **development of products** for human consumption, such as samburá and honey.

### Data collected

A *Melipona quadrifasciata* hive was observed during 33 days. Initially, food pots were checked for honey or pollen. Data was collected twice a day, and pot status (whether opened or closed) was noted down as well as pot content (honey or pollen).

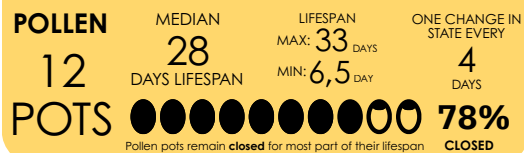
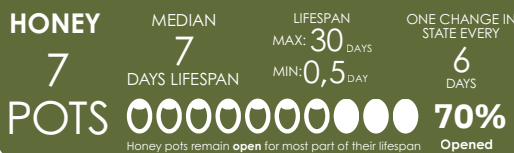
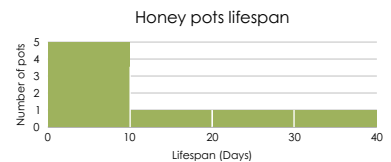
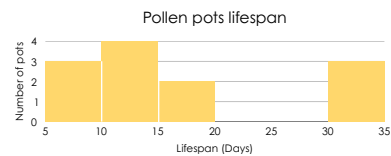
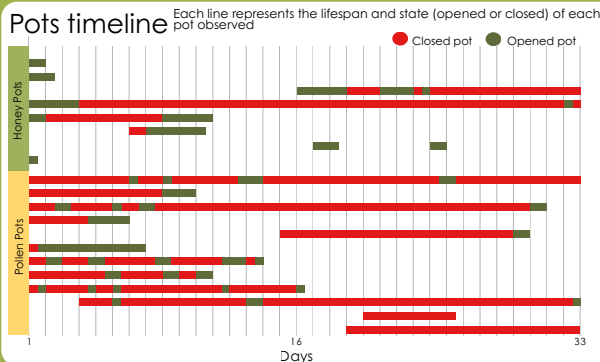
### 1st Observation



### Daily Observations 7am and 6pm



## HOW DO HONEY AND POLLEN POTS CHANGE OVER TIME?



### Conclusions

The dynamic processes in storage previously described for **pollen pots** was also observed for **honey pots**.

Storage of honey and pollen pots follow different patterns. Pollen pots are more **numerous** than honey pots, and they have a **longer lifespan**.

### Next Steps

- Build a **sensor** to measure stingless bees' internal activities
- Describe the composition of the pollen and honey **microbiota**
- Analyze content **movement** between pots

### References

- Menezes, C., et al. (2013). The Role of Useful Microorganisms to Stingless Bees and Stingless Beekeeping. In Pot-Honey. Springer New York.
- Nogueira-Neto, P. (1997). Vida e Criação de Abelhas Indígenas Sem Ferrão. Editora Nogueira.
- Miranda-Pinto, P., et al. (2024). Scientific note: behavioral dynamics of pollen storage in *Melipona quadrifasciata*. Insectes Sociaux, 70(4).
- Felipe Capocia (2024). *Melipona quadrifasciata*



More about  
LABBEES

**PP-424 [Bee Biology]**  
**Food storage behaviour in stingless bee *Melipona quadrifasciata***

Gabriel Reginatto Silva<sup>1</sup>, Celso Barbieri<sup>2</sup>, Michelle Manfrini Moraes<sup>3</sup>, Tiago Mauricio Franco<sup>2</sup>

<sup>1</sup>Institute of Biosciences, University of São Paulo, São Paulo, Brazil

<sup>2</sup>School of Arts, Sciences and Humanities, University of São Paulo, São Paulo, Brazil

<sup>3</sup>Department of Ecology and Evolutionary Biology, Universidade Federal de São Paulo, Diadema, Brazil

Stingless bees store nectar and pollen in food pots, where a fermentation process occurs, altering some characteristics of these products. Some previous descriptions suggest that the food pots of stingless bees follow a linear cycle: the pot is built, filled with nectar or pollen, sealed for several weeks, and then opened for consumption. However, a recent study indicated that multiple opening and closing events occur before consumption. A colony of *Melipona quadrifasciata* was observed from March 18 to April 20, 2024. Initially, food pots were opened to assess their contents and classified as honey (H), pollen (P), or empty (E). Data collection occurred twice daily (early morning and late afternoon). The opening status of each pot was recorded as Open (O) or Closed (C), along with its contents (H, P, or E).

Initially, 12 pots were identified, and during the experiment, this number increased to 21 (9 of honey and 12 of pollen), although not all coexisted simultaneously. Pollen pots generally had a longer lifespan than honey pots, with a median duration of 29 and 5 days, respectively. Pollen pots exhibit more frequent changes about its condition of opening, proportionally to their lifespan. Additionally, honey pots remained open longer on average (73% of the time) compared to pollen pots (25%). When observing the consecutive time each pot remained in a state, similar results were noted: on average, honey pots were open 64% of the time without closure, while they remained closed constantly 24% of the time. Pollen pots, on the other hand, remained closed for 53% of the time and were open continuously for only 19% of the time. These findings suggest that honey and pollen pots exhibit distinct properties, with pollen pots being more numerous and tending to remain closed for longer durations and altern between close and open conformation more times. Understanding the behavior of nectar and pollen storage by stingless bees is crucial for nutritional studies and development of products for human consumption, such as samburá and honey.