

# Behavioral notes on native bee species

## Notas comportamentais sobre espécies de abelhas nativas

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### ABSTRACT

The behavior of the native bees *in situ* is poorly documented or rarely observed, but it is highly relevant for the phylogeny and understanding of the ethology of different species. In a shrubby-arboreal *restinga* environment, the behavior of three different bee species was observed. Such actions include individuals hanging on plant branches, males sheltering under leaves, and attraction to the color on clothing. The different behaviors involving some interaction with other organisms in the environment help shape the scope of the ethology studies of these insects. Furthermore, the knowledge of attraction to colored fabrics can be used in differentiated collection methods.

**Keywords:** *Bombus morio*, colors, ethology, *Eufriesea mussitans*, leaves, Santa Catarina state, *Thectochlora hamata*, wild bees.

### RESUMO

O comportamento de abelhas nativas *in situ*, ainda que pouco documentado ou pouco observado, é de grande relevância para a filogenia e compreensão da etologia de diferentes espécies. Em um ambiente de restinga arbustiva-arbórea, observou-se o comportamento de três espécies de abelhas. Tais ações envolvem o ato de indivíduos dependurarem-se sobre ramos de plantas, machos abrigarem-se sob folhas e atração de cores por tecidos de roupa. Os vários comportamentos que envolvem alguma interação com diferentes organismos no meio ambiente ajudam a compor o escopo do estudo etológico desses insetos. Além disso, o conhecimento atrativo por tecidos coloridos pode ser usado em métodos de coleta diferenciados.

**Palavras-chave:** abelhas silvestres, *Bombus morio*, cores, etologia, *Eufriesea mussitans*, folhas, Santa Catarina, *Thectochlora hamata*.

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## INTRODUCTION

Due to the economic importance of bees for the pollination of different plant crops (MOREIRA, 2024), or their ability to maintain ecosystems by influencing the reproduction of many plant species (GARÓFALO *et al.*, 2012), studies in different areas on these insects are useful to aid both in conservation (PATRÍCIO-ROBERTO & CAMPOS, 2014) and in management, which can provide greater productivity in agricultural settings (EVANS *et al.*, 2018).

Much about the life cycle and nesting of different bee species has been studied (SABINO & ANTONINI, 2017; ANTONINE & FORREST, 2021; HOUSTON *et al.*, 2023; CANE, 2024; TORRETTA *et al.*, 2024), making the understanding of the life of these insects better known. However, given the difficulty and limitations of following free adults in the environment, behavioral observations throughout the life of bees are still underexplored (MOLA & WILLIAMS, 2019).

Behaviors observed in the field can be useful to shape the scope of ethological studies of different species, which may not be observable in a controlled environment. Information of this nature is useful for establishing phylogenetic approximations, in view of gaps in evolutionary history (ORD & MARTINS, 2010).

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## MATERIAL AND METHODS

During a bee diversity survey carried out in a shrubby-arboreal restinga in Laguna (Santa Catarina State, Brazil) (TIETZ & MOUGA, 2025), behaviors that are poorly documented or not documented at all were observed in bees of the species *Eufriesea mussitans* (Fabricius, 1787), *Thectochlora hamata* Gonçalves & Melo, 2006 and *Bombus* (*Fervidobombus*) *morio* (Swederus, 1787), natives in Santa Catarina State.

## RESULTS AND DISCUSSION

### COLORS

Bees of *E. mussitans* were attracted by the color of the collector's clothing color (blue), subsequently collected with an entomological net; likewise, bees of *T. hamata* were also collected, but attracted by white clothing.

Clothing with ultraviolet (UV) blockers (used during the sampling conducted here) employ different mechanisms for the blocking function, which can occur through either reflection or absorption of ultraviolet rays (GHIRALDI, 2016). Bees, in general, perceive colors differently from humans, being able to visualize UV rays as well; thus, they observe specific color patterns on flowers, mixing UV rays with colors that are observable by humans (such as yellow, blue, white, etc.) (LUNAU *et al.*, 2025).

It is worth noting that, during the sampling, the species *E. mussitans* was associated with the plant *Pleroma urvilleanum* (DC.) P.J.F.Guim. & Michelang, which produces violet-colored flowers (TIETZ & MOUGA, 2025); the fact that the wavelength of the color blue is relatively close to that of the color violet (blue: 440-485 nm, violet: 380-440 nm) (MARTINS *et al.*, 2015) could explain the attraction of the bee *E. mussitans* to the blue clothing, due to the UV protection that the clothing offers (reflection or absorption).

Additionally, it was observed by Tietz & Mouga (2025) that *T. hamata* was collected on flowers that display white petals (e.g., *Baccharis trimera* (Less.) DC, *Eryngium horridum* Malme, *Myrcia palustris* DC, *Schinus terebinthifolia* Raddi etc.), which would explain this bee's interest in white color.

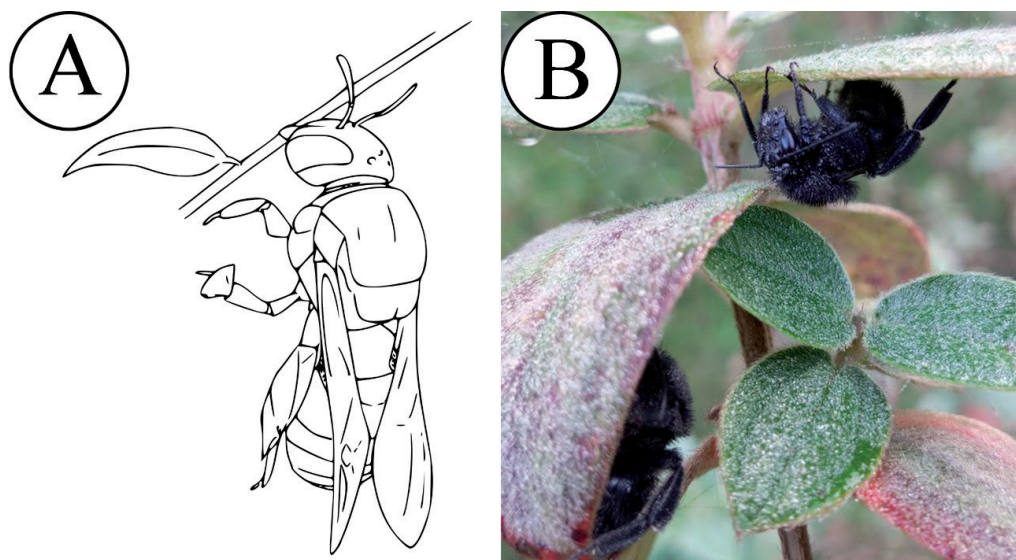
Considering the behavior demonstrated here, of attraction of *E. mussitans* and *T. hamata* to colored fabrics, a differentiated type of sampling could be employed in inventories.

### DIURNAL RESTING

Individuals of *E. mussitans* were observed hanging from vegetation by their mandibles (figure 1A). This behavior is known for species of the tribe Euglossini, where males do so to spend the night suspended (DODSON, 1966), and may even occur in aggregation (SILVA *et al.*, 2011), but it is poorly described or observable. Here, this behavior was observed during the day and the individuals were alone.

### NOCTURNAL RESTING

During the early morning hours, male specimens of *B. morio* were found under leaves of *P. urvilleanum* (Melastomataceae) (figure 1B), a behavior already known in the literature for other *Bombus* species on various plants (ALCOCK & ALCOCK, 1983; HSIEH *et al.*, 2023). It was observed that the individuals specifically showed interest in this plant species, between March and April (late summer and early autumn), during the day, suggesting that they spend the night on these plants.



**Figure 1** – Observed behaviors: A) representative scheme of *Eufriesea mussitans* hanging from vegetation; B) males of *Bombus morio* under leaves of *Pleroma urvilleanum*. Source: primary.

On the other hand, the behavior of male *B. morio* sheltering under leaves of *P. urvilleanum* and their preference for this particular botanical species suggests that the leaves are wide enough to keep the individuals out of sight of predators; furthermore, the fact that they contain trichomes may help them to grasp the leaves. However, these characteristics may not be the only advantages, as there are other plants in the environment with leaves that are equally wide or wider.

In Melastomataceae, considering the aspect of the external parts, especially the leaves, several species are silky, as their surfaces may include a strong presence of indumentum (hairs), including sericeous (silky) trichomes and also glandular trichomes, which leads to the presence of waxes and glandular secretions (MILANEZ & MACHADO, 2011).

The presence of phenolic substances and calcium oxalate crystals in the epidermal cells of *Microlicia hatschbachii* Wurdack (Melastomataceae) was evidenced by Cassiano (2010), in addition to diterpenes, labdanes, aliphatic alkanes, long-chain fatty acid methyl esters, carboxylic acids, a flavonoid, and benzene derivatives – thus, a complex chemical composition.

Many male bees have as a behavioral strategy to aggregate or use exposed floral or vegetative perches to sleep, with the understanding that in this way, predation risk may be reduced, or energy conservation may be improved (HARMS & OWENS, 2025).

The thickness of *P. urvilleanum* leaves is greater due to the trichomes, which in itself provides greater protection like shelter. Thus, given the complex chemical structure of the constituent parts of melastome leaves, it is possible that there is some selection factor by *Bombus* males for the botanical species in focus (*Pleroma urvilleanum*), which leads to the suggestion of further investigation.

## CONCLUSION

The site, important for conservation, proves to be suitable for behavioral studies of the species described herein.

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