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Notes and Comments

The exploitation of resources by *Trigona spinipes* bee (Hymenoptera: Apidae: Meliponinae) in *Eucalyptus cloeziana* (Myrtaceae) trees in an integrated crop-livestock-forest system

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The genus *Eucalyptus* is the most used in theo composition of agrosilvopastoral systems in Brazil. This is due to its high adaptation potential, its growth and development in different ecological and environmental conditions, in addition to the different uses of its wood (Torres et al., 2016). In order to obtain high productivity and quality wood, it is fundamental to choose selected genotypes adapted to the edaphoclimatic conditions of the planting region. For use in agrosilvopastoral systems, *Eucalyptus cloeziana* (F. Muell, 1878) (Myrtaceae) stands out because its wood has high density and is extremely durable (Alves et al., 2017).

Among the phytosanitary problems associated with *E. cloeziana* causing damage economic factors include lepidopteran defoliators (Ghiotto et al., 2023), termites, ants, bees (Barbosa et al., 2022) and sap-suckings insects (Menezes et al., 2012).

Our objective was to report the damage and injuries caused by the exploitation of resources by *Trigona spinipes* bee (Fabr., 1793) (Hymenoptera: Apidae: Meliponinae) on *E. cloeziana* trees in an integrated crop-livestocks-forest system in the North of Minas Gerais, Brazil.

The *T. spinipes* were visually observed under field conditions, in a plantation of *E. cloeziana* cultivated in a crop-livestock-forest integration system, at Fazenda da Barra, located in the municipality of Francisco Sá-MG (Figure 1). The experimental area is located at an altitude of 590 m, at geographic coordinates 16°38'44.02" S and 43°42'43.77" W.

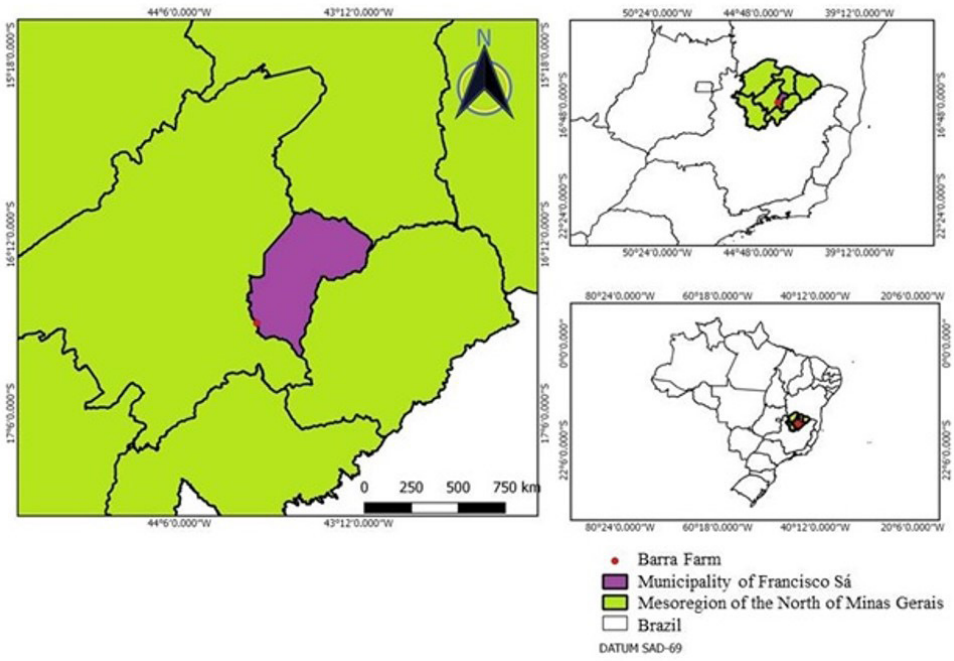

Figure 1. Location of Barra Farm in the municipality of Francisco Sá, Minas Gerais, Brazil. Source: Jaqueline C. Oliveira.

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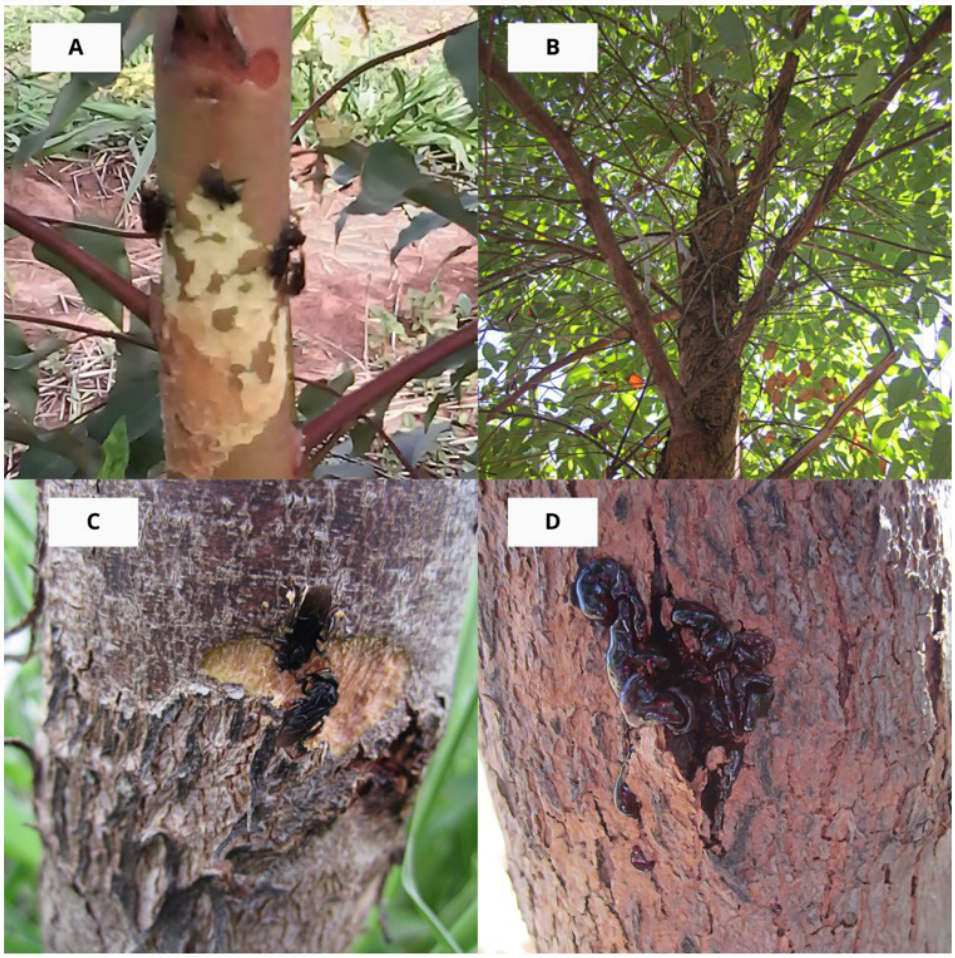

Figure 2. The exploitation of resources by *Trigona spinipes* in *Eucalyptus cloeziana* trees, in an Integrated Crop-Livestock-Forest System at Barra Farm, municipality of Francisco Sá, Minas Gerais, Brazil. (A) Damage by the *T. spinipes*, scraping the trunk in the middle third; (B) Lateral branching; (C) scars caused by the bee damage in the middle third of the tree; (D) release of resin in the tree trunk. Photos: Demerson Luiz de Almeida Barbosa, 2014.

The local climate, according to the Köppen classification, is Aw, Tropical Savannah, with a dry season in winter, and annual temperature varying between 20 and 28 °C (Alvares et al., 2013).

The *E. cloeziana* trees were planted in an East-West orientation in the Crop-Livestock-Forest (agrosilvipastoral) integration system, in an arrangement with double rows of eucalyptus using 2 x 3m spacing between rows, and 14-meter alleys between rows. The system was implemented in November 2012 and the initial attacks of the *T. spinipes* bees were observed 14 months after the system was implemented.

Insects were observed exploring the eucalyptus trunk and removing pieces of living tissue from the bark and resins (Shanahan; Spivak, 2021), generating branches (Moura et al., 2017). This damige on 2 and 3 year old plants can cause stunting and sprouting, causing between two and three lateral branches. As a consequence, it can depreciate the trunk, especially if the attack occurs below 4 m in height. *T. spinipes* bees forage the trunk of eucalyptus trees, removing resins and using this material for several purposes e.g. building nests to protect theirself against predators and pathogens (Leonhardt et al., 2010).

The bee *T. spinipes* can promote damage related to bark scraping in the youngest and suberized regions of the trunk, in the middle third (Figure 2A) and middle third of the trees (Figures 2C and D). As a consequence, it can affect the quality of the wood, by the emission of lateral branches (Figure 2B), as well as forming scars and promoting resin release (Figures 2C and D).

Study carried out by Barbosa et al. (2022) reported that biotic factors, including *T. spinipes* bee attack during initial growth, caused damage to the stem and branches in *E. cloeziana*. According to Boiça Junior et al. (2004), the *T. spinipes* bee is preferentially interested in species with a high concentration of resins, and its attack is concentrated on the apical bud, stem, trunks and branches, where the resin is extracted and used in construction of the nests.

In this report, the damage and injuries on the trunk of *E. cloeziana* trees by *T. spinipes* were observed, causing damage to the stem, increased branching and wood depreciation.

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