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Notes and Comments

First of report of occurrence and damage of *Synoeca cyanea* (Hymenoptera: Vespidae) on *Mangifera indica* L. in Brazil

E. A. A. Rocha[a], L. F. Silva[a], M. E. S. Fernandes[a], A. F. Macedo[a], C. S. Soares[a], R. C. Pereira[a] and F. L. Fernandes[a]*

[a]Universidade Federal de Viçosa – UFV, Instituto de Ciências Agrárias, *Campus* Rio Paranaíba, Rio Paranaíba, MG, Brasil

Social wasps can feeding of fruits to acquire carbohydrates and/or protein from immature insects in fruits (Prezoto et al., 2008). Social wasps are important biological pest control agents (Southon et al., 2019). Members of the families Vespidae, Pompilidae, Sphecidae, Crabronidae, use territorial arthropod as food supply for their offspring (Coville, 1987). Social wasps from the Vespidae family can feed on pests, such us, tomato pinworm, *Tuta absoluta* Meyrick (Lepidoptera: Gelechiidae), great southern white, *Ascia monuste orseis* Latreille (Lepidoptera: Pieridae), coffee leaf miner *Leucoptera coffeella* Guérin-Méneville (Lepidoptera: Lyonetiidae) and fruit fly *Zaprinus indianus* (Diptera: Drosophilidae) (Fernandes et al., 2009; Picanço et al., 2010, 2011; Prezoto and Braga, 2013; Southon et al., 2019).

We observed *Synoeca cyanea* (Fabricius, 1775) (Hymenoptera: Vespidae), breaking the skin of fruits of mango *Mangifera indica* L and causing severe loss. This behavior suggests that this species may become a pest in some environments due to its potential to damage fruits. Investments in mango crop with fertilization for greater field and quality (Azam et al., 2021) cannot neglect agents that cause losses. Thus, it is necessary to better understand the damage and economic injury (EI) to verified the best control method. EI is the lowest population density that causes economic losses. The EI has been used to control pests while maintaining environmental quality and net profits for the farmer (Pedigo and Rice, 2014). Therefore, the aim of this study was to report, for the first time, social wasps attacking mango and causing losses in Brazil.

Specimens' adult of *S. cyanea* were collected in the mango fields in Minas Gerais State, Brazil (Table 1), and identified using dichotomous keys (Richards, 1978; Carpenter and Marques, 2001). The insect was identified as *S. cyanea* by (Figure 1). The fields are located in the Atlantic Forest and Cerrado biomes. The collect was in the Viçosa (20°45'22.8" S and 42°53'58.6" W), Guaraciaba (20°34'13.0" S and 43°00'30.5" W), Ubá (19°00'05.5" S and 46°18'49.3" W), and Rio Paranaíba (19°00'05.5" S and 46°18'49.3" W). The experiment was carried out when the mango fruit was with 6 years after planting. Mango fruits were sampled monthly from December/2020 to February/2021. Fruits were sampled at a distance of 100 m from each side of the trail, totaling a sampled area of about 50 samples per ha. Then, the variables fruits with damage and adults of *S. cyanea* were evaluated. The average of these variables was calculated for each area. The fruits from *M. indica* plants with injuries were collected to verify the damage caused by the insect's injury. The number of fruits with injury were recorded. All insects found were collected with a fine-tipped brush, packed in 70% ethyl alcohol (Figure 1). The loss (%) of fruits was determined by the ratio of the number of fruits with injury from the wasp attack by 100, multiplied by the total number of fruits.

We observed the specie *S. cyanea*, breaking the skin of fruits of the *M. indica* in all regions (Figure 1 and Table 1). Thus, the presence of this species in Forest Atlantic and Cerrado biomes was observed. In the field, the losses value for *S. cyanea* on *M. indica* was 36.08 to 55.88% per plant. Thus, higher yield losses occurred.

Table 1. Loss per plant (%) by *Synoeca cyanea* in *Mangifera indica* L. ("Tommy Atkins" cv).

Locate (plants per ha)	Number of fruits per plant	Number of fruits with injury	Loss per plant (%)
Guaraciaba (204)	162	85	52.47
Viçosa (238)	97	35	36.08
Ubá (204)	107	42	39.25
Rio Paranaíba (250)	68	38	55.88

*e-mail: flaviofernandes@ufv.br
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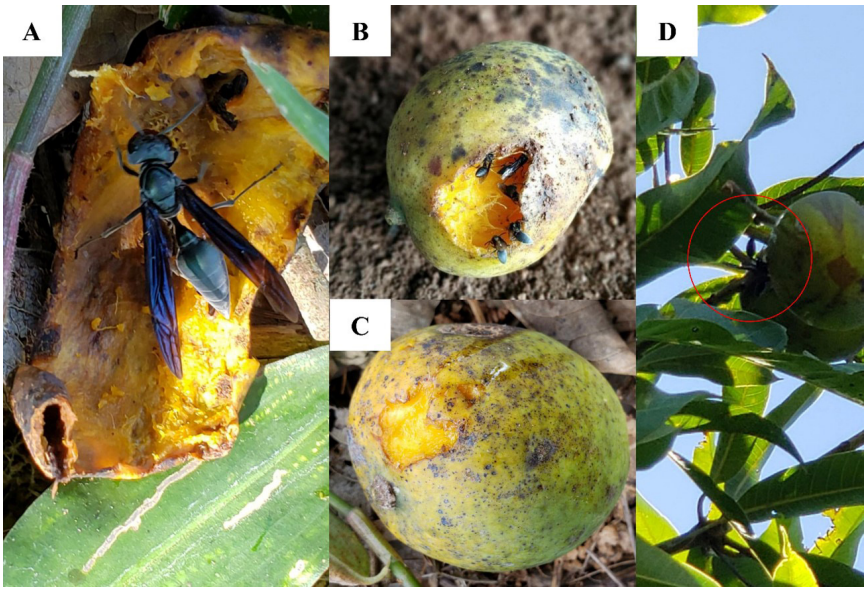

Figure 1. (A) Adult (*Synoeca cyanea*); (B) Atack from *S. cyanea* on the fruit of *Mangifera indica* L.; (C) and (D) injury on the fruit of *M. indica*.

Wasps can also feed on plants to meet their nutritional demand, where they obtain carbohydrates from nectar, pollen, fruits and plant sap (Coville, 1987; Hunt, 2007). The omnivorous habit of wasps can in some situations provide herbivory to cultivated plants and elevate the status from predator to pest of agricultural crops. How has been observed on different fruit species, such as grapes (Hickel and Schuck 1995), jabuticaba trees (Souza et al., 2010), cashew trees (Santos and Presley, 2010), guava trees (Brugger et al., 2011), pitanga trees (Souza et al., 2013), and Spanish prune (Prezoto and Braga, 2013). Other species of wasp may also damage fruit, how *Polybia scutellaris* (White) (Hymenoptera: Vespidae) in mango (*Mangifera indica* L. Anacardiaceae) (Barbosa et al., 2014), and *Polistes dominula* (Christ) (Hymenoptera: Vespidae) in grapes, *Vitis vinifera* L.

On the other hand, the interactions among social wasps and other insect can change the behaviour. For example, *S. cyanea* visit a wide variety of fruits to feed animal protein derived from prey insects that occur in fruits and that are used for feeding wasp larvae (Prezoto and Braga, 2013). Both behaviors, such as predator or phytophagous need to be better studied and monitored in the field to avoid applying insecticides to reduce the population of *S. cyanea*. As an alternative, repellent compounds can be used on the fruits to reduces the risk of attack *S. cyanea* to mango fruits. This is the first report of the feeding process of *S. cyanea* on *M. indica* and your losses. The report of *S. cynea* feeding on mango fruits increases the number of pests of this crop and the importance of Vespidae species. Thus, the wasp *S. cyanea* can be exploited as a component in pest management programs how a predator or phytophagous.

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