



Occurrence of *Eubulus* sp. (Coleoptera: Curculionidae) in fruits of *Alibertia edulis* (Rich.) A. Rich. (Rubiaceae) in the Cerrado of Minas Gerais, Brazil

Jardel Boscardin¹✉ & Jaqueline da Silva Souza²

1. Universidade Federal de Uberlândia, Monte Carmelo, Minas Gerais, Brazil. 2. LD Celulose S.A., Indianópolis, Minas Gerais, Brazil.

EntomoBrasilis 15: e1016 (2022)

Abstract. The puruí *Alibertia edulis* (Rich.) A. Rich. (Rubiaceae) is a naturally occurring species in the Cerrado biome in Brazil; its fruits serve as food for the local fauna (birds and mammals) and humans. Here, we report on a beetle feeding on the fruits of *A. edulis* in the Cerrado of Minas Gerais (MG). Monthly collections were carried out in four *A. edulis* trees in two areas of *Cerradão* in the vicinity of the municipality of Monte Carmelo, MG, between September and October 2018. These were a legal reserve area of Fazenda Juliana (ARL; Juliana Farm; 18°42'30" S and 47°33'05" W) and an area at the Atalho Community (ACA; 18°41'39" S and 47°34'49" W). Fruits with or without attack symptoms were collected from the treetop in the four cardinal directions. A total of 100 fruits (50 from each area) were collected from the trees and packed into plastic bags. The fruits were then transported to the laboratory, stored in plastic containers isolated with voile fabric, and checked daily for the emergence of adult insects. After emergence, the insects were identified. During the evaluation period, 33 beetles emerged in puruí fruits from ARL and 13 from ACA. The species has been identified as *Eubulus* (Kirsch) sp. (Coleoptera: Curculionidae). The animals consumed the entire fruit endocarp, leaving it with emergence orifices caused by the adult emergence. It is concluded that *Eubulus* sp. feeds on the pulp of *A. edulis* and is able to compete for this resource with other animal species.

Keywords: Beetles; Cerrado; interspecific competition; medicinal plant; puruí.

Edited by:

William Costa Rodrigues

Article History:

Received: 16.viii.2022

First Answer: 18.xi.2022

Accepted: 29.xi.2022

Published: 17.xii.2022

✉ Corresponding author:

Jardel Boscardin

✉ jardel.boscardin@ufu.br

Funding agencies:

↪ Without funding declared



doi: [10.12741/ebrazilis.v15.e1016](https://doi.org/10.12741/ebrazilis.v15.e1016)

© The Author(s) 2022. Published by Entomologistas do Brasil

This article is published by Entomologistas do Brasil and licensed under Creative Commons Licence 4.0 (CC-BY)



🔓 Article Full Open Access

Reduction of the natural areas of the Cerrado biome due to human exploration endangers diversity and plant species that have the potential to be used for various purposes, such as food, spices, ornamental plants, handicrafts, medicines, insecticides, timber, and shelter (MAMEDE & PASA 2019; REIS & SCHMIELE 2019). The family Rubiaceae is of great importance since it comprises 376 species distributed in all phytophysiognomies and is considered the seventh richest family in this biome (MENDONÇA *et al.* 2008).

Alibertia edulis (Rich) A. Rich. (Rubiaceae) is a plant known as puruí. Several studies have focused on its medicinal potential (AQUINO *et al.* 2017; AQUINO *et al.* 2020; LESCANO *et al.* 2021). The chemical composition of the leaves and stems of the species includes phenolic and iridoid compounds; these extracts are of low toxicity and have interesting medical properties, such as their antiplatelet and glucose-reducing activities (CASTRO & CARDOSO 2021), in addition to their use in pest control (PERES *et al.* 2017). The medicinal use of leaves, peels, and fruits of *A. edulis* have been reported, and the fruits are also traditionally used for human consumption (CASTRO & CARDOSO 2021).

Alibertia edulis is a small tree with an irregular canopy whose height ranges from 3 to 5 m. Its fruits are berry-like, with fleshy, dark, and sweet pulp, containing many seeds (LORENZI 2009). They ripen at the end of the dry season and the beginning of the rainy season (August to October) and are a food source for the local fauna (RODRIGUES & ALBUQUERQUE 2007). This study reports on a beetle feeding on the fruits of *A. edulis* in the Cerrado of Minas Gerais.

Fruits were collected in September and October 2018 in two areas of *Cerradão* in the vicinity of Monte Carmelo, MG. These were a legal reserve area of Fazenda Juliana (ARL; Juliana Farm; 18°42'30"S and 47°33'05" W) and an area at the Atalho Community (ACA; 18°41'39" S and 47°34'49" W). According to the Köppen climate classification, the seasonal climate (Aw type) prevails in this area, with a hot and rainy season (October to March) and a cold and dry season (April to September) (ALVARES *et al.* 2013). In each area (ARL and ACA), monthly fruit collections were carried out from four *A. edulis* plants, whose average height was 2 m. The trees were chosen randomly and were located within 100 m of the georeferenced points (ARL and ACA) and at a distance of 100 m from the border areas. *Alibertia edulis* plants were identified based on the description and characterization of the species in the list of species available at Flora of Brazil (FLORA & FAUNA DO BRASIL 2022).

The fruits of *A. edulis*, with or without attack symptoms (emergence orifices), were collected manually from the treetop in the four cardinal directions. A total of 100 fruits, 50 from each area, were picked. These were packed in plastic bags and taken to the laboratory. In the laboratory, the fruits were stored in plastic containers and isolated with voile fabric,

where they were checked daily for the emergence of adult insects for 45 days. After the emergence period, the insects were identified. Voucher specimens were deposited in the Laboratory of Forest Entomology of the Universidade Federal de Uberlândia, Uberlândia, Brazil.

The beetle species was identified as *Eubulus* (Kirsch) sp. (Coleoptera: Curculionidae) (Figure 1); the identified specimens were deposited in the collection of the Museum of Zoology of the Universidade de São Paulo (USP), São Paulo, Brazil, as type material. South American species belonging to the genus *Eubulus* have not been described since 1954, thus hampering identification at the species level (OLIVEIRA *et al.* 2019).



Figure 1. Lateral view of the adult of *Eubulus* (Kirsch) sp. (Coleoptera: Curculionidae).

During the study period, 33 beetles emerged from puruí fruits from ARL and 13 from ACA. The specimens consumed the entire endocarp of the *A. edulis* fruit, leaving it with adult emergence orifices (Figure 2). Puruí seeds are spread through barochoric dispersion. They can also be dispersed by birds, bats, primates, and secondarily by ants (RODRIGUES & ALBUQUERQUE 2007). Thus, when feeding on the pulp of *A. edulis*, *Eubulus* sp. may have to compete for this resource with other animal species.



Figure 2. Detail of the adult emergence orifice of *Eubulus* (Kirsch) sp. (Coleoptera: Curculionidae). Monte Carmelo, MG, Brazil. September 2018.

There are 135 species of the neotropical genus *Eubulus* in South America, of which 69 are endemic to Brazil (WIBMER & O'BRIEN 1986). The genus *Eubulus* has been described to accommodate Cryptorhynchinae species characterized by having a globose shape, elevated and alternating elytral intervals (in most cases with carinae), and an elevated transverse crest above the eyes (ANDERSON 2008).

Eubulus fairmairei Jekel, *Eubulus monachus* (Schönherr), and *Eubulus virgatulus* Marshall were registered in Brazil as the stem borers *Inga* sp. (Fabaceae), *Vernonia diffusa* (Less.) H. Rob. (Asteraceae), and different species of Acanthaceae (COSTA LIMA 1956). *Eubulus* cf. *elongatus* Hustache (Coleoptera:

Curculionidae) was registered as an important pest in cassava crops [*Manihot esculenta* Crantz (Euphorbiaceae)], whose insect larvae were found consuming the plant roots, causing the tissue to rot and making them unfit for consumption - they are capable of damaging 100% of produced roots (OLIVEIRA *et al.* 2019; OLIVEIRA *et al.* 2022). *Eubulus* sp. has been recorded as emerging from *A. edulis* trees in other parts of the Cerrado, such as in Cuiabá, Mato Grosso, but this is the first record of them being associated with the fruits of this species in the Cerrado of Minas Gerais.

Given the importance of the relationships between insects and host plants, future studies involving the description of species of *Eubulus* are necessary to fill this entomological gap. From the correct identification, it will be possible to study the biology and ethology of the species belonging to the genus and expand prevention and control methods required for the correct management of crops susceptible to their attack.

ACKNOWLEDGMENTS

To the researcher Dr. Sergio Antonio Vanin (*in memoriam*) of the Universidade de São Paulo, for the genus identification of the specimens. To the Institute of Agricultural Sciences of the Universidade Federal de Uberlândia for the availability of resources and infrastructure to carry out the work. To the owners of Fazenda Juliana for allowing the collection of fruits in its legal reserve area.

REFERENCES

- Alvares, CA, JL Stape, PC Sentelhas, JLM Gonçalves & G Sparovek, 2013. Köppen's climate classification map for Brazil. *Meteorologische Zeitschrift*, 22: 711-728. DOI: <https://doi.org/10.1127/0941-2948/2013/0507>
- Anderson, RS, 2008. A Review of the Genus *Eubulus* Kirsch 1869 in the United States and Canada (Curculionidae: Cryptorhynchinae). *The Coleopterists Bulletin*, 62: 287-296. DOI: <https://doi.org/10.1649/1064.1>
- Aquino, DFS, CAS Tirloni, SELT Menegati, CAL Cardoso, SCH Vieira, MC Vieira, AM Simonet, FA Macías & AG Junior, 2017. *Alibertia edulis* (L.C. Rich.) A.C. Rich - A potent diuretic arising from Brazilian indigenous species. *Journal of Ethnopharmacology*, 196: 193-220. DOI: <https://doi.org/10.1016/j.jep.2016.12.024>
- Aquino, DFS, TA Monteiro, CAL Cardoso, SCH Vieira, MC Vieira, KP Souza, J Amaya-Farfane, GCBC Carvalho, CS Moura & PN Morato, 2020. Investigation of the antioxidant and hypoglycemic properties of *Alibertia edulis* (L.C. Rich.) A.C. Rich. leaves. *Journal of Ethnopharmacology*, 253: 112648. DOI: <https://doi.org/10.1016/j.jep.2020.112648>
- Castro, TLA & CAL Cardoso, 2021. Uso tradicional, cultivo, composição química e atividades biológicas de *Alibertia edulis* (Rich.) A. Rich. ex DC. (Rubiaceae). *Revista Biodiversidade*, 20: 177-193. Available in: <https://periodicoscientificos.ufmt.br/ojs/index.php/biodiversidade/article/view/13249>. [Access: 16.viii.2022].
- Costa Lima, AM, 1956. *Insetos do Brasil: Coleópteros 4ª e última parte, Tomo 10. Escola Nacional de Agronomia, Rio de Janeiro, Brasil (Série Didática, 12).*
- Flora e Fauna do Brasil, 2022. Jardim Botânico do Rio de Janeiro. Available in: <https://floradobrasil.jbrj.gov.br/FB20682>. [Access: 16.viii.2022].
- Lescano, CH, FF Lima, CAL Cardoso, SCH Vieira, FZ Mônica & IP Oliveira, 2021. Rutin present in *Alibertia edulis* extract acts on human platelet aggregation through inhibition of cyclooxygenase/thromboxane. *Food & Function*, 12: 802-814. DOI: <https://doi.org/10.1039/D0FO02276D>
- Lorenzi, H, 2009. *Árvores brasileiras: manual de identificação e cultivo de plantas arbóreas nativas do Brasil.* Nova Odessa, Instituto Plantarum.

- Mamede, JSS & MC Pasa, 2019. Diversidade e uso de plantas do Cerrado na comunidade São Miguel, Várzea Grande, MT, Brasil. *Interações*, 20: 1087-1098. DOI: <https://doi.org/10.20435/inter.v20i4.2064>
- Mendonça, RC, JM Felfili, BMT Walter, MC Silva-Júnior, AV Rezende, TS Filgueiras, PE Nogueira & CW Fagg, 2008. Flora vascular do bioma Cerrado: checklist com 12.356 espécies, pp. 421-1279. *In*: Sano, SM, SP Almeida & JF Ribeiro (Orgs.). *Cerrado: ecologia e flora*. Brasília, Embrapa Cerrados/Embrapa Informação Tecnológica.
- Oliveira, CM, EA Vieira, JF Fialho & MR Frizzas, 2019. A species of the genus *Eubulus* (Coleoptera: Curculionidae): a new and more destructive cassava pest in the Brazilian Cerrado. *Journal of Economic Entomology*, 112: 3007-3011. DOI: <https://doi.org/10.1093/jee/toz209>
- Oliveira, CM, LG Leite, EA Vieira, JF Fialho, MR Frizzas & RB Lopes, 2022. Assessment of entomopathogenic nematodes and fungi against *Eubulus* cf. *elongatus* Hustache (Coleoptera: Curculionidae), a destructive cassava pest in Brazil. *Biocontrol Science and Technology*, 32: 989-1001. DOI: <https://doi.org/10.1080/09583157.2022.2070601>
- Peres, LLS, AI Sobreiro, IFS Couto, RM Silva, FF Pereira, SC Heredia-Vieira, CAL Cardoso, M Mauad, SPQ Scalon, SS Verza & RM Mussury, 2017. Chemical compounds and bioactivity of aqueous extracts of *Alibertia* spp. in the control of *Plutella xylostella* L. (Lepidoptera: Plutellidae). *Insects*, 8: 125. DOI: <https://doi.org/10.3390/insects8040125>
- Reis, AF & M Schmiele, 2019. Características e potencialidades dos frutos do Cerrado na indústria de alimentos. *Brazilian Journal of Food Technology*, 22: 1-12. DOI: <https://doi.org/10.1590/1981-6723.15017>
- Rodrigues, IF & LB Albuquerque, 2007. Papel das formigas na dispersão de sementes de *Alibertia edulis* (L.L. Rich) A.C. Rich. *Multitemas*, 35: 113-133. Available in: <<https://www.multitemas.ucdb.br/multitemas/article/view/854>>. [Access: 16.viii.2022].
- Wibmer, GJ & CW O'Brien, 1986. Annotated checklist of the weevils (Curculionidae sensu lato) of South America (Coleoptera, Curculionidae). *American Entomological Institute*, 39: 1-563.

