ENTOMOLOGICAL Communications

Entomological Communications, 5, 2023: ec05021
doi: 10.37486/2675-1305.ec05021
e-ISSN: 2675-1305
Open Access Full Text Article

Scientific Note

First record of occurrence and injury of *Anomala testaceipennis* Blanchard, 1851 (Coleoptera: Scarabaeidae: Rutelinae) in arabica coffee in Brazil

Antônio S. Souza[1,2], Maria G. Silva[2], Maria E. S. Fernandes[2], Antonio G. O. Nascimento[2], Pamela F. Silva[2], Sérgio R. Rodrigues[3], Flávio L. Fernandes[2]

[1]Serviço Nacional de Aprendizagem Rural (SENAR), Belo Horizonte, MG, Brazil. [2]Universidade Federal de Viçosa, Campus Rio Paranaíba, MG, Brazil. [3]Universidade Estatual de Mato Grosso do Sul, Cassilândia, MS, Brazil.
Corresponding author: flaviofernandes@ufv.br

Edited by: Maria F. G. V. Penãflor

Received: June 26, 2023. Accepted: August 03, 2023. Published: September 11, 2023.

Abstract. The objective of this study is to record the injury of *Anomala testaceipennis* Blanchard, 1851 (Coleoptera: Scarabaeidae: Rutelinae) adults in coffee *Coffea arabica* L. in municipality of Piumhi, Minas Gerais, Brazil. This is the first reported of the *A. testaceipennis* attacking coffee.

Keywords: *Coffeea arabica*, beetle, polyphagous.

Agriculture has great economic importance in Brazil (Reis et al. 2023). Pests are agents that reduce profits are one of the biggest challenges faced (Savary et al. 2019). The coleopterans are the most diverse group of the insect class, with about 400,000 related species in the world, representing about 40% of insect class (Bernardes et al. 2020). The family Scarabaeidae consists of about 27,800 species distributed in all biogeographic regions of the world (Patole 2019). Beetles of this family are important in the food chain, contribute to nutrient cycling, feed on pollen, living or decaying plant matter, and attacking various crops (Sabatinelli et al. 2020; Nervo et al. 2022; Souza et al. 2023).

The genus *Anomala* Samouelle, 1819 (Coleoptera: Scarabaeidae: Rutelinae) includes more than 1,000 species (Ramírez-Ponce & Morón 2009). Larvae feed on roots and adults on leaves and flowers (Mondaca 2012; Souza et al. 2023). *Anomala testaceipennis* Blanchard, 1851 (Coleoptera: Scarabaeidae: Rutelinae) occurs in the midwest of Brazil, causing damage to soybean (*Glycine max* L.: Fabaceae), corn (*Zea mays* L.: Poaceae), wheat (*Triticum aestivum* L.: Poaceae), oat (*Avena strigosa* L.: Poaceae), and grass, *Brachiaria* spp. (Souza et al. 2023). However, it has not yet been reported in coffee crops worldwide (*Coffea* spp.). Thus, this is the first report of *A. testaceipennis* adults feeding on *Coffea arabica* L. in Brazil. In general, depending on the level of the environmental disturbance, they can become pest insects likely because of a large use of insecticides.

Adults of *A. testaceipennis* were observed feeding on coffee leaves, at the apex and middle of arabica coffee plants, in production stage (5 years after planting), located in the municipality of Piumhi, Minas Gerais, Brazil (20°24'41.8" S and 46°03'11.4" W), altitude 800 m, cultivar Arara, planted in 3.2 x 0.6 m spacing. In this field, the adults were observed to measure approximately 15 mm in length and brown wings with a metallic green head (Fig. 1C). The adults exhibited an aggregate feeding habit, consuming the leaf lamina and leaving the nerves without feeding at night (8:00 to 9:00 h p.m.) (Figs. 1A, 1E). We observed *A. testaceipennis* feeding in coffee plants from four fields and five points per field with 20 to 30 insects per plant. According to Oliveira et al. (2012a), this insect pest occurs in rows of approximately 50 m^2, where about 300 insects per meter and can be found feeding on the leaves of the middle and upper part of the soy plants. In Figs. 1A, 1D, 1E the place where they feed shows necrosis and senescence of the leaves and consequently leaf fall may occur.

The life cycle of *A. testaceipennis* lasts an average of 139.4 days (Rodrigues et al. 2008), with two generations per year. The adults have two broods, one in August, when females lay eggs and start the development of immatures, and another brood in December to February, when the second generation starts and completes the cycle in July and August (Ávila & Santos 2009). The females of this species oviposit in soils with high organic matter content in the nocturnal period (Rodrigues et al. 2008). After adult emergence, females survive about 12.5 days to reach sexual maturity (Rodrigues et al. 2008). This species presents a nocturnal habit, beginning its flight at dusk and finishing its activities around six in the morning (Rodrigues et al. 2014). They always fly in aggregate in swarms (Souza et al. 2023).

This study is the first report to *A. testaceipennis* in coffee crop in Brazil. This information is relevant for the integrated management of pest species, because its identification is a fundamental step in defining bioecology studies and directing specific control methods of its population. There are several reports of insects that were not identified as pests with possible adverse economic effects, and the lack of attention and inadequate management they became primary pests. In Brazil, since the late 19th century, insect pest species have been introduced into the country, causing significant economic losses, including *Bemisia tabaci* (Gennadius, 1889) (Hemiptera: Aleyrodidae), *Hypothenemus hampei* (Ferrari, 1867) (Coleoptera: Curculionidae), *Ceratitis capitata* (Wiedemann, 1824) (Diptera: Tephritidae), *Oryzophagus oryzae* (Costa Lima, 1936) (Coleoptera: Curculionidae) and *Anthonomus grandis* (Boheman, 1843) (Coleoptera: Curculionidae) (Oliveira et al. 2012b). *Liriomyza huidobrensis* (Blanchard, 1926) (Diptera: Agromyzidae) considered a pest in several crops in Brazil, was first reported in the Alto Paranaíba region in the onion crop (*Allium cepa* L.) in the year 2014 causing damage of 120 kg ha^{-1} (Alves et al. 2014), subsequently becoming primary pest in this crop in the region. Like other pests, the *A. testaceipennis* beetle can become a pest in the coffee crop by causing economic damage by intensive defoliation and opening wounds on the plants that favor the entry of pathogens. Therefore, *A. testaceipennis* needs to be monitored by Brazilian coffee growers on coffee crops, on other host plants, and at times of occurrence.

Figure 1. Species *Anomala testaceipennis* and injuries of this coleoptera in the coffee culture (*Coffea arabica*). A, E: Details of injuries on coffee leaves caused by *A. testaceipennis*; C: *Anomala testaceipennis;* B, D, F: Feeding by pointers, middle region of the plant. Photo: Kaike P. Mendonça (November and December of 2020).

Funding Information

No funding received.

Authors' Contributions

Field activities were conducted by ASS and FLF. Laboratory activities were conducted by ASS, MGS, AGON and FLF. The Coleoptera species was identified by PFS. FLF drafted the manuscript. All authors reviewed the manuscript.

Conflict of Interest Statement

The authors declare no conflict of interest.

References

Alves, F.; Fernandes, F. L.; Silva, P., Gorri, J.; Ribeiro, L. (2014) Primeira ocorrência da mosca minadora em cebola no Alto Paranaíba. *EntomoBrasilis*, 7(3): 235-237. doi: 10.12741/ebrasilis.v7i3.426

Ávila, C. J.; Santos, V. (2009) *Corós associados ao sistema de plantio direto no estado de Mato Grosso do Sul*. Embrapa Agropecuária Oeste: Embrapa.

Bernardes, A. C. C.; Oliveira, O. C. C.; Silva, R. A.; Albuquerque, P. M. C.; Rebêlo, J. M. M.; Viana, J. H.; Siqueira, G. M. (2020) Abundance and diversity of beetles (Insecta: Coleoptera) in land use and management systems. *Revista Brasileira de Ciência do Solo*, 44(1): e0190183. doi: 10.36783/18069657rbcs20190183

Mondaca, J. (2012) *Paranomala undulata peruviana* (Scarabaeidae: Rutelinae): Un nuevo escarabajo exótico introducido en Chile. *Revista Chilena de Entomología*, 37(1): 75-80.

Nervo, B.; Laini, A.; Roggero, A.; Fabbriciani, F.; Palestrini, C.; Rolando, A. (2022) Interactions between individuals and sex rather than morphological traits drive intraspecific dung removal in two dung beetle species. *Frontiers in Ecology and Evolution*, 10(1): 863669. doi: 10.3389/fevo.2022.863669

Oliveira, L. J.; Roggia, S.; Salvadori, J. R.; Ávila, C. J.; Fernandes, P. M.; Oliveira, C. M. (2012a) Insetos que atacam raízes e nódulos da soja. In: Hoffmann-Campo, C. B.; Corrêa-Ferreira, B. S.; Moscardi, F. (Eds.), *Soja: manejo integrado de insetos e outros artrópodes-praga,* pp. 75-144. Brasília: Embrapa.

Oliveira, C. M.; Auad, A. M.; Mendes, S. M.; Frizzas, M. R. (2012b) Economic impact of exotic insect pests in Brazilian agriculture. *Journal of Applied Entomology*, 137(1-2): 235-237. doi: 10.1111/jen.12018

Patole, S. S. (2019) Studies on diversity and relative abundance of dung beetles (Coleoptera: Scarabaeidae) from Sakri Tahsil, DistDhulia (MS) India. *Indian Journal of Applied Research*, 9(1): 57-60. doi: 10.36106/IJAR

Ramírez-Ponce, A.; Morón, M. A. (2009) Relaciones filogenéticas del gênero *Anomala* (Coleoptera: Melolonthidae: Rutelinae). *Revista Mexicana de Biodiversidade*, 80(1): 357-394. doi: 10.22201/ib.20078706e.2009.002.610

Reis, J. C.; Kamoi, M. Y. T.; Michetti, M.; Wruck, F. J.; Rodrigues, R. A. R.; Farias Neto, A. L. (2023) Economic and environmental impacts of integrated systems adoption in Brazilian agriculture-forest frontier. *Agroforest System*, 97(1): 847-863. doi: 10.1007/s10457-023-00831-5

Rodrigues, S. R.; Gomes, E. S.; Bento, J. M. S. (2014) Sexual dimorphism and mating behavior in *Anomala testaceipennis*. *Journal of Insect Science*, 14(1): 1-5. doi: 10.1093/jisesa/ieu072

Rodrigues, S. R.; Puker, A.; Abot, A. R.; Barbosa, C. L.; Ide, S.; Coutinho, G. V. (2008) Ocorrência e aspectos biológicos de *Anomala testaceipennis* Blanchard (Coleoptera, Scarabaeidae). *Revista Brasileira de Entomologia*, 52(1): 68-71. doi: 10.1590/S0085-56262008000100012

Sabatinelli, G.; Eberle, J.; Fabrizi, S.; Ahrens, D. (2020) A molecular phylogeny of Glaphyridae (Coleoptera: Scarabaeoidea): evolution of pollination and association with 'Poppy guild' flowers. *Systematic Entomology*, 45(1): 838-848. doi: 10.1111/syen.12429

Savary, S.; Willocquet, L.; Pethybridge, S.J.; Esker, P.; McRoberts, N.; Nelson, A. (2019) The global burden of pathogens and pests on major food crops. *Nature Ecology and Evolution*, 3(1): 430-439. doi: 10.1038/s41559-018-0793-y

Souza, A.C.; Fuhrmann, J.; Rodrigues, S. R. (2023) Host plants and antennal sensilla of *Anomala testaceipennis* Blanchard (Coleoptera: Scarabaeidae: Rutelinae). EntomoBrasilis, 16: e1028. doi: 10.12741/ebrasilis.v16.e1028