



Meroncidius intermedius (Orthoptera: Tettigoniidae): A Threat to Brazilian Banana

Authors: Zanuncio-Junior, José Salazar, Fornazier, Maurício José, Martins, David dos Santos, Chamorro-Rengifo, Juliana, Queiróz, Renan Batista, et al.

Source: Florida Entomologist, 100(3) : 669-671

Published By: Florida Entomological Society

URL: <https://doi.org/10.1653/024.100.0329>

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

Meroncidius intermedius (Orthoptera: Tettigoniidae): a threat to Brazilian banana

José Salazar Zanuncio-Junior¹, Maurício José Fornazier^{1,*}, David dos Santos Martins¹, Juliana Chamorro-Rengifo², Renan Batista Queiróz¹, Alciro Lamão Lazzarini¹, and Paulo Sérgio Fiuza Ferreira³

Banana (*Musa* spp.) (Musaceae) is one of the most important fruits worldwide due to its relevance as a basic nutritional food source and its economic importance to several countries, particularly developing countries (Fioravanço 2003). In Brazil, this crop is cultivated principally by smallholders because it can be cultivated on a diversity of soils and under various climatic conditions. In addition, this crop requires low investment and labor for planting and maintenance and is easily commercialized. This crop is cultivated in tropical and subtropical regions of Brazil, and 17,000 farms may be found cultivating bananas on more than 25,000 ha (Espírito Santo 2012; IBGE 2016).

The principal pest problems of banana in Brazil are Sigatoka leaf spot disease *Mycosphaerella musicola* R. Leach ex J. L. Mulder (Mycosphaerellaceae); black leaf streak disease *Mycosphaerella fijiensis* M. Morelet (Mycosphaerellaceae); Fusarium wilt *Fusarium oxysporum* f. *cubense* (E. F. Sm.) W. C. Snyder & H. N. Hansen (Nectriaceae); and banana root borer, *Cosmopolites sordidus* (Germar) (Coleoptera: Curculionidae) (Borges et al. 2006). Katydids (Orthoptera: Tettigoniidae) such as *Idiarthron atrispinum* (Stål) (Orthoptera: Tettigoniidae) (Maes 2004) and *Idiarthron subquadratum* Saussure & Pictet (Orthoptera: Tettigoniidae) have been reported using banana trees only as shelter (Barrera et al. 2002) but no damage has been found previously. Species of this family have crepuscular habits and long developmental periods, with 5 to 6 instars (Barrera et al. 2003). Knowledge of the biology and species distribution of Tettigoniidae in South America is limited (Chamorro-Rengifo et al. 2011; Fialho et al. 2014), but katydids are infrequently associated with crop damage (Barrera et al. 2002; Foster et al. 2004; Mohammadbeigi & Port 2013).

Damage caused by katydids was observed on fruits of commercial crops of the banana cultivar Pacovan (*Musa* cv. Pacovan, genotype AAB) in several plantations in Espírito Santo State, Brazil. Nymphs and adults of this katydid were collected, preserved in 70% alcohol and sent to the Laboratory of Systematics and Biology of Coleoptera, Department of Animal Biology of the Federal University of Viçosa, Brazil. A key to species identification (Beier 1960) with additional information from Orthoptera Species File Online (Eades et al. 2017) were used to identify *Meroncidius intermedius* Brunner Von Wattenwyl (Orthoptera: Tettigoniidae) as the species associated with banana. Losses were measured in an area of 25

ha in the municipality of Alfredo Chaves (20.5115°S, 40.7743°W), Espírito Santo State, Brazil, from Oct 2012 to Sep 2013. Symptoms of this pest were evaluated after the harvest of banana fruits. In addition, 10 bamboo traps with attractive food (corn meal + sugar 5% + water) (Gallo et al. 2002) were used from May to Jul to capture nymphs and adults.

Damage caused by *M. intermedius* was due to the feeding of adults (Fig. 1a) and nymphs (Fig. 1b) observed on the fruit peel (Fig. 1c); however, they also may eat the fruit pulp, and in some cases the banana bunch is severely damaged (Fig. 1d). These symptoms of attack reduced the commercial value of the fruits.

These insects were first detected occurring in banana plantations in May (autumn), with outbreaks observed from the late winter (Aug) to the beginning of spring (Sep), and a decrease occurring in late spring (Nov) to mid-autumn (Apr). Immature specimens were most frequently observed from May to Sep. Nymphs and adults were found sheltered in bunches, below the first leaf that covered the peduncle, or between leaves, during the day. Feeding occurred at night. This behavior is similar to that of other katydid species (Barrera et al. 2002) in which adults were usually found alone, and instars 2 and 3 aggregated in small groups (Foster et al. 2004). *Meroncidius* sp. also has been observed attacking fruits and inflorescence of coconut in Brazil. The female of this genus has a long lance-shaped ovipositor used to open cracks in the leaf rachis, peduncle of bunches, floral branches, and fruits, where it lays eggs (Ferreira et al. 2013).

This is the first report of *M. intermedius* causing economic losses. This species was first reported in Brazil in 1950 (Ferreira & Mesa 2010), but no damage had previously been reported in economically important crops. Females of this katydid species use their ovipositor to open longitudinal slits in branches, where they lay eggs (Costa Lima 1938); however, few eggs were found in banana trees. Estimated fruit losses varied from 10 to 40%, depending on the season (Fig. 2) and the distance from the native Atlantic rainforest remnants. The dispersal behavior of *M. intermedius* may explain the greater amount of damage observed on the edges of the banana plantations, close to the forest remnants. This finding may indicate that these insects dwell principally in the native vegetation but sometimes relocate and feed on the banana crop.

¹Department of Entomology, Instituto Capixaba de Pesquisa, Assistência Técnica e Extensão Rural Incaper, PO Box 01146, 29001-970, Vitória, Espírito Santo, Brazil; E-mail: jjzanuncio@yahoo.com.br (J. S. Z.-J.), mauriciofornazier@gmail.com (M. J. F.), davidmartins@incaperes.gov.br (D. S. M.), renan.queiroz@incaperes.gov.br (R. B. Q.), alnazarino@hotmail.com (A. L. L.)

²Federal Universidade of Mato Grosso do Sul, Campus of Campo Grande, 79070-900, Campo Grande, Mato Grosso do Sul, Brazil; E-mail: julianachamorro@gmail.com (J. C.-R.)

³Department of Entomology, Federal University of Viçosa (UFV). Av. Peter Henry Rolfs s/n, Campus Universitário, CEP 36570-900, Viçosa, Minas Gerais, Brazil; E-mail: pfiuza@ufv.br (P. S. F. F.)

*Corresponding author; E-mail: mauriciofornazier@gmail.com (M. J. F.)

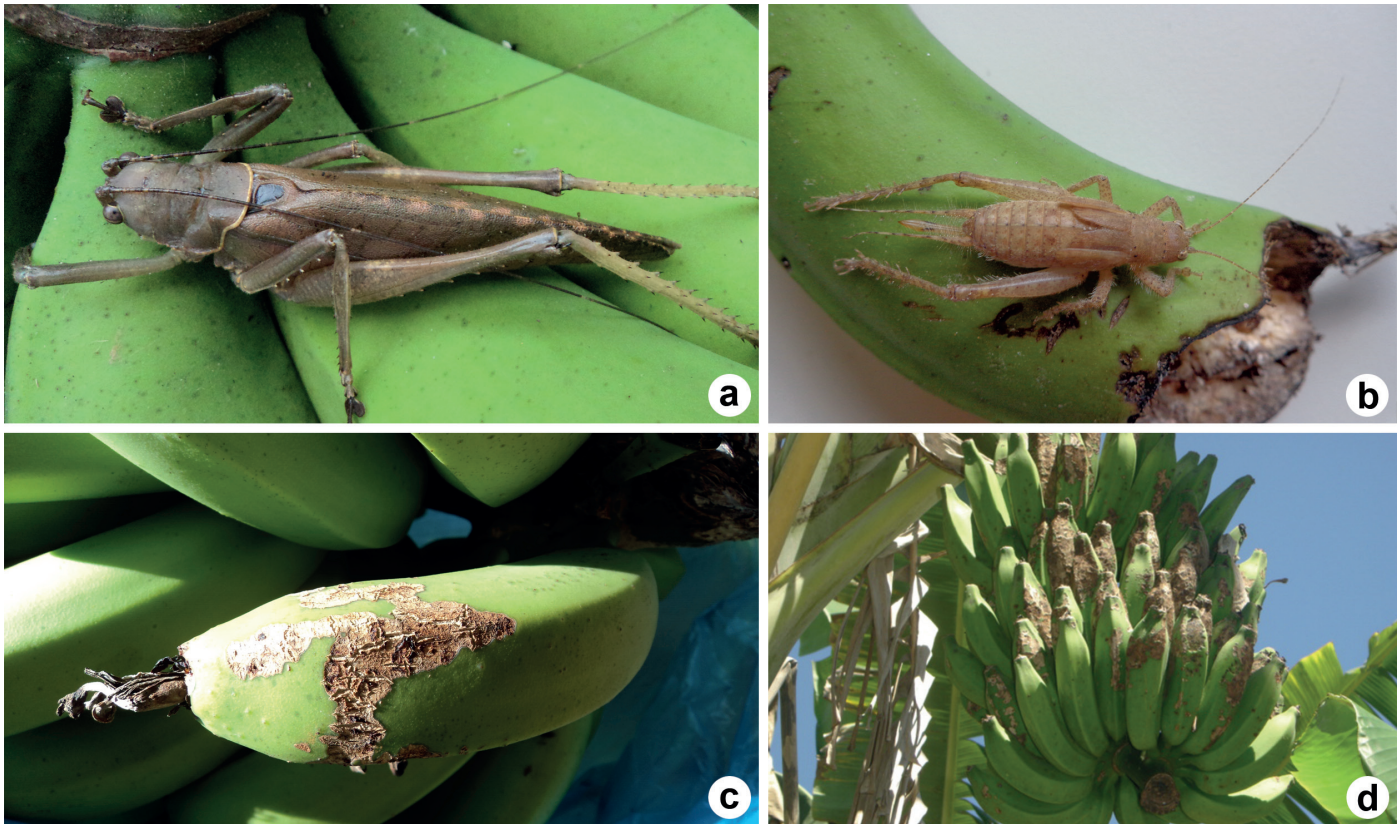


Fig. 1. Adults (a), nymphs (b) and damage (c, d) of *Meroncidius intermedius* (Orthoptera: Tettigoniidae) in banana cultivar Pacovan (genotype AAB).

The bamboo traps did not capture specimens of *M. intermedius* during the evaluation period. However, bamboo traps were previously found to be more attractive than banana to the katydid *I. subquadra-*

tum (Barrera et al. 2002). It is possible that *M. intermedius* finds shelter and food in banana plants, thereby leading to trap inefficiency. Further studies of its behavior and ecology are needed to understand its dam-

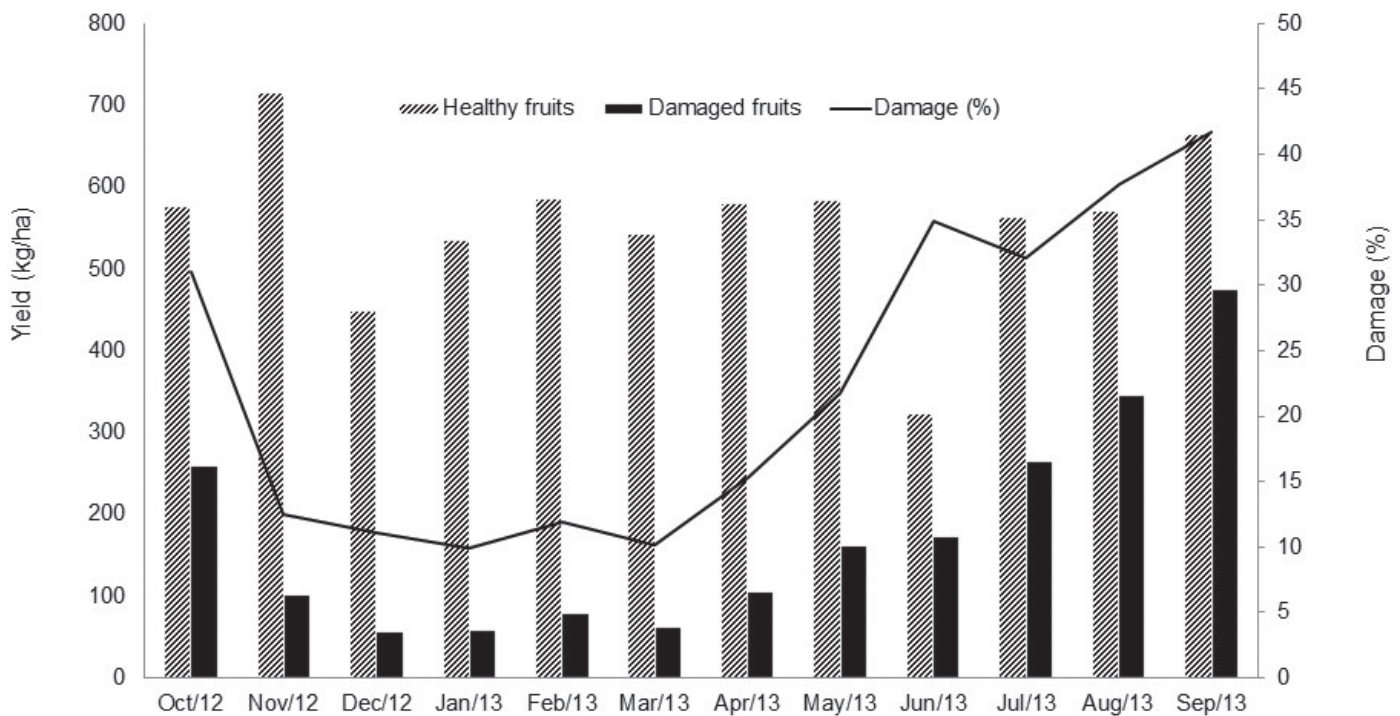


Fig. 2. Amount of damage caused by the katydid *Meroncidius intermedius* (Orthoptera: Tettigoniidae) to banana cultivar Pacovan (genotype AAB) from Oct 2012 to Sep 2013, municipality of Alfredo Chaves, Espírito Santo State, Brazil.

age potential and to facilitate the development of nonchemical management techniques.

We thank Instituto Capixaba de Pesquisa, Assistência Técnica e Extensão Rural (INCAPER) and Fundação de Amparo à Pesquisa e Inovação do Espírito Santo (FAPES) for financial support.

Summary

The family Tettigoniidae is associated with grassland damage in several countries, but there are few reports of tettigoniids causing damage to other crops. Specimens of katydids were found damaging banana fruits in Brazil. A survey of their occurrence was conducted, and the damage to banana fruits was quantified. Specimens were identified as *Meroncidius intermedius* Brunner Von Wattenwyl (Orthoptera: Tettigoniidae). This is the first report of damage caused by this species to an economic crop, and to banana. Symptoms and frequency of damage to banana crops, and behavior of *M. intermedius*, are discussed.

Key Words: fruit; katydid; *Musa* cv. Pacovan; pest

Sumário

A família Tettigoniidae é associada a danos em pastagens em vários países, mas existem poucos relatos de espécies causando danos em outras culturas. Foram coletados indivíduos causando danos em frutos de banana no Brasil, realizado levantamento de sua ocorrência e quantificado seus danos. Os indivíduos foram identificados como *Meroncidius intermedius* Brunner Von Wattenwyl (Orthoptera: Tettigoniidae) sendo este o primeiro relato de dano causado por este inseto em culturas econômicas e a banana. Sintomas, frequência de danos e comportamento de *M. intermedius* na cultura da banana são discutidos.

Palavras Chave: fruta; *Musa* cv. Pacovan; praga

References Cited

- Barrera JF, Herrera J, Zúñiga JA, Moreno B, Junghans C. 2002. Bioecología e hábitos del chacuatete del café en Siltepec, Chiapas, pp. 49–58 *In* Barrera JF [ed.], Tres Plagas del Café en Chiapas. El Colegio de la Frontera Sur, Tapachula, Chiapas, México.
- Barrera JF, Ventura S, García E. 2003. Ciclo de vida de *Idiarthron subquadrum* (Orthoptera: Tettigoniidae) en laboratorio. *Entomología Mexicana* 2: 119–123.
- Beier M. 1960. Orthoptera, Tettigoniidae (Pseudophyllinae II). *Das Tierreich* 74: 1–396.
- Borges AL, Souza LS, Maciel ZJ. 2006. Cultivo orgânico da bananeira. Circular Técnica 81. Embrapa Mandioca e Fruticultura, Cruz das Almas, Bahia, Brazil.
- Chamorro-Rengifo J, Cadena-Castañeda OJ, Braun H, Montealegre-Z. F, Romero RI, Marquez FHS, Gonzales R. 2011. Checklist and new distribution records of katydids (Orthoptera: Tettigoniidae) from Colombia. *Zootaxa* 3023: 1–42.
- Costa Lima AM. 1938. Insetos do Brasil: 1º tomo, série didática 2. Escola Nacional de Agronomia, Rio de Janeiro, Rio de Janeiro, Brazil.
- Eades DC, Otte D, Cigliano MM, Braun H. 2017. Orthoptera species file online. Version 5.0/5.0. Available at: <http://Orthoptera.SpeciesFile.org/> (last accessed 15 Jan 2017).
- Espírito Santo (Secretaria de Estado de Agricultura, Abastecimento, Agricultura e Pesca). 2012. Produção de banana cresce 15% no estado. Available at: <http://www.seag.es.gov.br/?p=2152> (last accessed 31 Jul 2016)
- Ferreira A, Mesa A. 2010. Cytogenetics studies in Brazilian species of Pseudophyllinae (Orthoptera: Tettigoniidae): 2n (2n) = 35 and FN = 35 the probable basic and ancestral karyotype of the family Tettigoniidae. *Neotropical Entomology* 39: 590–594.
- Ferreira JM, Lins PMP, Moura JIL, Moreira MAB, Teodoro AV. 2013. Esperança Marrom do Coqueiro. Embrapa Informação Tecnológica. Available at: <http://www.agencia.cnptia.embrapa.br/gestor/coco/arvore/CONT000g15lpw-bq02wx5ok0xkgq5jbgbc18.html> (last accessed 11 Sep 2016).
- Fialho VS, Chamorro-Rengifo J, Lopes-Andrade C, Yotoko KSC. 2014. Systematics of spiny predatory katydids (Tettigoniidae: Listrosclidinae) from the Brazilian forest based on morphology and molecular data. *PLoS One* 9: e103758.
- Fioravanzo JC. 2003. Mercado mundial de banana: produção, comércio e participação brasileira. *Informações Econômicas* 33: 15–27.
- Foster RN, Reuter KC, Black LR, McNeal D, McChesney R. 2004. Comparison of wheat bran, apple pumice and food waste (combined bakery, snack, cereal and confectionary) baits containing carbaryl for controlling Mormon crickets: studies of longevity and primary and secondary mortality. United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine. Available at: https://www.aphis.usda.gov/plant_health/cphst/downloads/dspmsl/reports/2004ReportsRangeland.pdf (last accessed 29 Mar 2017).
- Gallo D, Neto SS, Carvalho RPL, Baptista GC, Filho EB, Parra JRP, Zucchi RA, Alves SB, Vendramim JD, Marchini LC, Lopes JRS, Omoto C. 2002. Entomologia Agrícola. Fundação de Estudos Agrários Luiz de Queiróz, Piracicaba, Brazil.
- IBGE. 2016. Levantamento Sistemático da Produção Agrícola. Instituto Brasileiro de Geografia e Estatística, Rio de Janeiro, Brazil. Available at: [http://ftp.ibge.gov.br/Producao_Agricola/Levantamento_Sistemático_da_Producao_Agricola_\[mensal\]/Fasciculo/lspa_201610.pdf](http://ftp.ibge.gov.br/Producao_Agricola/Levantamento_Sistemático_da_Producao_Agricola_[mensal]/Fasciculo/lspa_201610.pdf) (last accessed 15 Dec 2016).
- Maes JM. 2004. Insectos asociados a algunos cultivos tropicales em el atlántico de Nicaragua. Parte VII. Banano (*Musa sapientatum*, *Musa acuminata*), Plátano (*Musa paradisiaca*) (Musaceae). *Revista Nicaraguense de Entomología*. 64: Suplemento 1, parte I: 37 p.
- Mohammadbeigi A, Port G. 2013. Efficacy of *Beauveria bassiana* and *Metarhizium anisopliae* against *Uvarovistia zebra* (Orthoptera: Tettigoniidae) via contact and ingestion. *International Journal of Agriculture and Crop Sciences* 5: 138–146.