




## New records of Ceratocampinae (Lepidoptera: Saturniidae) species from the Cerrado of Maranhão, Brazil

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**Abstract:** Ceratocampinae (Lepidoptera: Saturniidae) is the second most diverse subfamily of Saturniidae with 300 species described in 30 genera from southern Canada to northern Argentina. Species of this subfamily are widely distributed in Southeast Brazil, with many endemics to the Cerrado, and important as indicators of ecosystem quality. Specimens of Ceratocampinae were collected in the Parque Estadual do Mirador, Maranhão state, Brazil. *Adeloneivaia acuta* (Schaus, 1896), *Adeloneivaia schubarti* Barros & O. Mielke, 1970, *Eacles penelope* (Cramer, 1775) and *Megaceresa pulchra* (Bouvier, 1923) are recorded for the first time in Maranhão state and Northeast Brazil and *Eacles fairchildi* May & Oiticica, 1941, only for Maranhão. The record of five Ceratocampinae (Saturniidae) species increases the knowledge on the diversity and the importance of preserving those of this subfamily in the Cerrado biome of Maranhão state and the Northeast region of Brazil.

**Keywords:** Conservation; Diversity; Moths; Northeast Brazil.

## Novos registros de espécies de Ceratocampinae (Lepidoptera: Saturniidae) para o Cerrado do Maranhão, Brasil

**Resumo:** Ceratocampinae (Lepidoptera: Saturniidae) é a segunda subfamília mais diversa de Saturniidae com 300 espécies descritas em 30 gêneros do sul do Canadá ao norte da Argentina. Espécies desta subfamília estão amplamente distribuídas no Sudeste do Brasil, com muitas endêmicas do Cerrado e importantes como indicadores da qualidade do ecossistema. Espécimes de Ceratocampinae foram coletados no Parque Estadual do Mirador, estado do Maranhão, Brasil. *Adeloneivaia acuta* (Schaus, 1896), *Adeloneivaia schubarti* Barros & O. Mielke, 1970, *Eacles penelope* (Cramer, 1775) e *Megaceresa pulchra* (Bouvier, 1923) são registradas pela primeira vez no estado do Maranhão e Nordeste do Brasil e *Eacles fairchildi* May & Oiticica, 1941 apenas para o Maranhão. O registro de cinco espécies de Ceratocampinae (Saturniidae) aumenta o conhecimento sobre a diversidade e a importância da preservação das espécies dessa subfamília no bioma Cerrado maranhense e na região Nordeste do Brasil.

**Palavras-chave:** Conservação; Diversidade; Mariposas; Nordeste do Brasil.

### Introduction

The Cerrado biome, second in area in Brazil with a wide variety of natural resources and unique neotropical plant formations and organisms, is a priority hotspot for conservation (Evangelista et al. 2021, Freitas et al. 2021).

Ceratocampinae are nocturnal moths with long, sphinx-shaped wings in males, adults with fusiform bodies, variable sizes, antennae quadripectinate in the basal half and filamentous in the apical part in males, and generally filamentous in females (Amarillo 2000, Prestes et al. 2009). This subfamily with 300 species described in 30 genera worldwide from southern Canada to northern Argentina and about

85 species in 21 genera in Brazil is the second most diverse of Saturniidae (Albertoni & Duarte 2015, Kitching et al. 2018).

Ceratocampinae species occur frequently in dry and open environments, with insufficient representation in humid tropical forests. This subfamily has ecological importance and may be bioindicators of environmental and climate change (Braga & Diniz 2018). The polyphagy of the Ceratocampinae larva provides the adaptation of species of this subfamily to several species of host plants, both natural and cultivated, being considered pests of forest crops, including *Eacles imperialis magnifica* Walker, 1856, the most known defoliator of this subfamily and pests of coffee plants (Prestes et al. 2009, Kowalczyk et al. 2012).

The objective is to report new records of Ceratocampinae species for the Cerrado biome in Maranhão state of the Northeast region of Brazil.

## Material and Methods

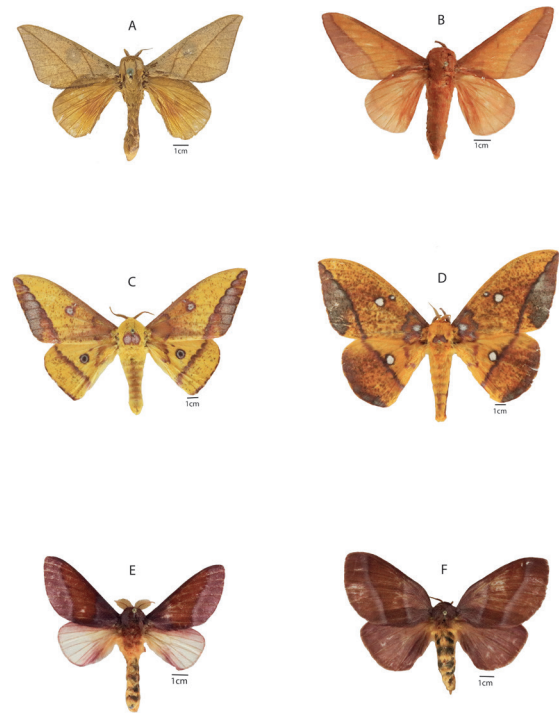
Ceratocampinae species were collected in the Parque Estadual do Mirador between the sources of the Itapecuru and Alpercatas rivers (06°10'S, 044°43'W and 06°42'S, 045°54'W) in the municipalities of Fernando Falcão, Formosa da Serra Negra and Mirador, Maranhão, Brazil. The vegetation of this park is of the Cerrado type with a sub-humid climate, annual rainfall of 1,200 to 1,400 mm and average maximum and minimum temperatures of 33°C and 19°C, respectively (Silva et al. 2020).

Ceratocampinae individuals were collected between 6:00 P.M. and 6:00 A.M. from October 2006 to March 2012 using a light trap with a white sheet (3 × 2 m) and a 250-watt mercury vapor lamp (UV) during waning or new moon nights. The insects were sacrificed with the injection of 1 ml of ammonia in their thorax. In laboratories, the individuals were mounted on specific boards with the fixation of entomological pins, remaining for 20 days, for dehydration at room temperature, after this period, labelled with information on the location and date of collection. These individuals were identified based on their external morphology, genitalia dissection and in the literature (Lemaire 1988) and deposited and preserved dry in the Zoological Collection of Maranhão, Brazil (CZMA), at the State University of Maranhão, on the Caxias campus.

## Results and Discussion

*Adeloneivaia acuta* (Schaus, 1896), *Adeloneivaia schubarti* Barros & O. Mielke, 1970, *Eacles penelope* (Cramer, 1775) and *Megaceresa pulchra* (Bouvier, 1923) (Figure 1) are new records for the Cerrado biome in the Maranhão state and the Northeast region and *Eacles fairchildi* May & Oiticica, 1941 (Figure 2) only for Maranhão, Brazil.

The new records of *A. acuta*, *A. schubarti*, *E. fairchildi*, *E. penelope*, *M. pulchra*, for the Cerrado biome of Maranhão and Northeast Brazil, indicate the need of additional studies on the diversity of Ceratocampinae in this state, biome and region. Fifty-two species of Ceratocampinae were reported for the Brazilian Cerrado with 15 collected in this biome in the Bahia and Maranhão states in Northeast Brazil (Camargo & Becker 1999), with the description of *Citheronula maranhensis* Brechlin & Meister, 2014, *Citheronia phomaranhensis* Brechlin, 2019, *Ptiloscota maranhensis* Brechlin, 2017 and *Schausiella maranhensis* Brechlin & Meister, 2013 for the state of Maranhão,



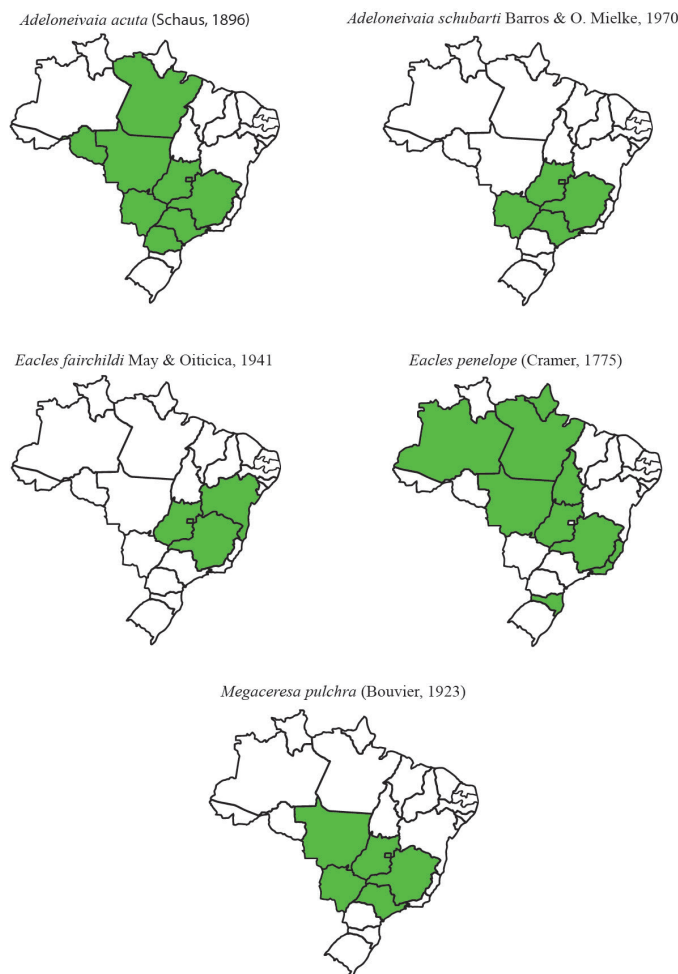
**Figure 1.** *Adeloneivaia acuta* (male) (A), *Adeloneivaia schubarti* (male) (B), *Eacles fairchildi* (male) (C), *Eacles penelope* (male) (D), *Megaceresa pulchra* (male) (E), *Megaceresa pulchra* (male) (F) (Ceratocampinae: Lepidoptera: Saturniidae) as new records for the Cerrado biome of the Maranhão state and the Northeast region of Brazil.

nineteen species of Ceratocampinae are known in the Cerrado of the Northeast Region, demonstrating the limited knowledge about the moth fauna in this state and region (Brechlin & Meister 2013, 2014, Brechlin 2017, Brechlin et al. 2019). *Adeloneivaia schubarti*, *E. fairchildi*, *M. pulchra* have been recorded in the Cerrado of the Midwest and Southeast Brazil (Camargo & Becker 1999) and *A. acuta* and *E. penelope* in the Cerrado, Amazon and Atlantic Forest biomes (Lemaire 1988, Camargo & Becker 1999, Miranda et al. 2015). The diversity of vegetation in the Cerrado and its proximity to other biomes, such as the Amazon Forest and the Caatinga, facilitate the adaptation of species to that biome, because those of different phytophysiognomies of the Cerrado present biogeographic affinity with other biomes, facilitated by their polyphagy (Camargo 2001, Braga & Diniz 2015). Deforestation reduces diversity and increases the need of conservation programs (Correa-Carmona et al. 2021) in the Cerrado and in other biomes in the Northeast region of Brazil, such as the Caatinga (Câmara et al. 2017). The diversity of Saturniidae, including species of the Ceratocampinae, is poorly known in the Cerrado (Camargo 2004).

## New Records of Ceratocampinae Species for the for State of Maranhão and Northeast Brasil

### 1. *Adeloneivaia acuta* (Schaus, 1896) (Figure 1A) (Figure 2)

Distribution: Brazil (Federal District, Goiás, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Pará, Paraná, Rondônia and São Paulo), Colombia, Ecuador, Peru and Venezuela (Lemaire 1988, Marinoni



**Figure 2.** Geographic distribution of *Adeloneivaia acuta*, *Adeloneivaia schubarti*, *Eacles fairchildi*, *Eacles penelope*, *Megaceresa pulchra* in Brazil.

et al. 1997, Camargo & Becker 1999, Racheli & Racheli 2005a, 2005b, Decaëns et al. 2007, Miranda et al. 2015).

New record for the state of Maranhão and Northeast Brazil.

Host plants: *Acacia baileyana* F. Muell (Fabaceae) (Mejia et al. 2020).

2. *Adeloneivaia schubarti* Barros & O. Mielke, 1970 (Figure 1B) (Figure 2)

Distribution: Brazil (Federal District, Goiás, Mato Grosso do Sul, Minas Gerais and São Paulo) (Lemaire 1988, Camargo & Becker 1999, Camargo & Schmidt 2009, Miranda et al. 2015).

New record for the state of Maranhão and Northeast Brazil.

Host plants: *Stryphnodendron adstringens* (Mart.) Coville (Fabaceae) (Diniz et al. 2001, Furtado 2001, Diniz et al. 2013, Mejia et al. 2020).

3. *Eacles fairchildi* May & Oiticica, 1941 (Figure 1C) (Figure 2)

Distribution: Brazil (Bahia, Goiás, Federal District and Minas Gerais) (Lemaire 1988, Camargo & Becker 1999, Camargo & Schmidt 2009, Miranda et al. 2015).

New record for the state of Maranhão, Brazil.

Host plants: no information.

4. *Eacles penelope* (Cramer, 1775) (Figure 1D) (Figure 2)

Distribution: Bolivia, Brazil (Amapá, Amazonas, Espírito Santo, Goiás, Mato Grosso, Minas Gerais, Pará, Rio de Janeiro, Santa Catarina and Tocantins), Colombia, Ecuador, Guyana, French Guiana, Panama, Peru and Suriname (Lemaire 1988, Camargo & Becker 1999, Racheli & Racheli 2006, Hawes et al. 2009, Miranda et al. 2015).

Host plants: *Lithraea brasiliensis* Marchand, *Malosma laurina* (Nutt) Abrams, *Schinus polygamus* (Cav.) Cabrera e *Schinus terebinthifolius* Raddi (Anacardiaceae), *Liquidambar styraciflua* L. (Altingiaceae), *Fagus sylvatica* L., *Quercus ilex* L. (Fagaceae), *Tripodanthus acutifolius* (Ruiz & Pav.) (Loranthaceae), *Psidium guajava* L. (Myrtaceae), *Zea mays* L. (Poaceae) e *Salix caprea* L. (Salicaceae) (Mejia et al. 2020).

5. *Megaceresa pulchra* (Bouvier, 1923) (Figure 1E, F) (Figure 2)

Distribution: Brazil (Federal District, Goiás, Mato Grosso, Mato Grosso do Sul, Minas Gerais and São Paulo) and Paraguay (Lemaire 1988, Camargo & Schmidt 2009, Díaz & Smith 2013, Miranda et al. 2015).

New record for the state of Maranhão and Northeast Brazil.

Host plants: *Anadenanthera peregrina* (L.) Speng e *Calliandra parviflora* Benth (Fabaceae) (Mejia et al. 2020).

## Conclusion

The register of five species of Ceratocampinae as new occurrences expands knowledge to 13 species known from the Cerrado of Maranhão and 23 species from the Cerrado biome of Northeast Brazil.

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## Author Contributions

Alberico Alves dos Santos: manuscript preparation.

Carlos Alberto Domingues da Silva: contributed to revision of the manuscript.

Roberto da Silva Camargo: contributed to revision of the manuscript.

Carlos Frederico Wilcken: contributed to revision of the manuscript.

Rodrigo Almeida Pinheiro: contributed to revision of the manuscript.

Pedro Guilherme Lemes: contributed to revision of the manuscript.

José Cola Zanuncio: contributed to writing and revision of the manuscript.

## Conflicts of Interest

The authors declare that they have no conflict of interest related to the publication of this manuscript.

## Ethics

This research did not involve actions with human beings and/or clinical trials to be approved by an Institutional Committee.

## Data Availability

Supporting data are available at <<https://doi.org/10.48331/scielodata.YRGRJ0>>.

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