

The Neotropical novelty of *Lexiphanes* Gistel, 1848 (Coleoptera: Chrysomelidae) on *Waltheria indica* L., 1753 (Malvales: Malvaceae), with life cycle notes on its immatures

La novedad neotropical de *Lexiphanes* Gistel, 1848 (Coleoptera: Chrysomelidae) sobre *Waltheria indica* L., 1753 (Malvales: Malvaceae), con notas sobre el ciclo de vida de sus inmaduros

Jefferson Duarte-de-Mélo^{1,2*} , Suianne Oliveira dos Santos Cajé^{1,3}  and Iracilda Maria de Moura Lima¹ 

¹Laboratório de Bioecologia de Insetos, Instituto de Ciências Biológicas e da Saúde, Universidade Federal de Alagoas. Maceió, Alagoas, 57072-900, Brazil. ²Laboratório de Sistemática e Bioecologia de Coleoptera, Departamento de Zoologia, Setor de Ciências Biológicas, Universidade Federal do Paraná. Curitiba, Paraná, 81531-980, Brazil. ³Laboratório de Estudos de Lepidoptera Neotropical, Departamento de Zoologia, Universidade Federal do Paraná. Curitiba, Paraná, 81531-980, Brazil. ✉ *jeffersonduartedemelo@gmail.com

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Abstract. The first record of a species of *Lexiphanes* Gistel (Cryptocephalini) on *Waltheria indica* Linnaeus (Malvaceae) flowers in eastern Brazil is presented. From eggs obtained in laboratory rearing, the duration of the life cycle of this species from egg to adult is reported, which was estimated at 66.5 days.

Key words: Cryptocephalini; larva; life cycle.

Resumen. Se presenta el primer registro de una especie de *Lexiphanes* Gistel (Cryptocephalini) sobre flores de *Waltheria indica* Linnaeus (Malvaceae) en el este de Brasil. A partir de huevos obtenidos de una crianza en laboratorio, se reporta la duración del ciclo de vida de esta especie desde huevo hasta adulto, el cual se estimó en 66,5 días.

Palabras clave: Ciclo vital; Cryptocephalini; larva.

Waltheria indica Linnaeus, 1753 (Malvaceae) (= *Waltheria americana* L., 1753) is a non-endemic native sub-shrub from Brazil that occurs in all geographic regions in different types of vegetation in the Brazilian territory (Coutinho *et al.* 2020). It is a plant recognized as medicinal in many parts of the world and has shown therapeutic potential for the treatment of inflammation, malaria, and some infectious diseases (Zongo *et al.* 2013). *Waltheria indica* is also a safe source of nectar throughout the year (Lopes *et al.* 2016) and an easily accessible resource for native butterflies (Venkata Ramana 2010) and bees (Magnacca 2020); in addition, as it grows easily in degraded areas and is much sought after by predatory wasps, it can be used as an aid in the biological control of pests (Macedo and Martins 1998, 1999).

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Chrysomelidae is the fourth family of Coleoptera in richness (Bouchard *et al.* 2017). Species of the subfamily Cryptocephalinae have the peculiar characteristic of building a fecal shelter for and by the immatures (Erber 1988). Cryptocephalinae has three tribes, being Cryptocephalini the one where the smallest representatives and most of the anthophages and polynyphages are concentrated (Chamorro 2014).

Six records of Cryptocephalinae were made on *Waltheria*, all Fulcidacini: *Chlamisus discipennis* (Jacoby, 1901), *Chlamisus gibbicollis* (Lacordaire, 1848) (= *Chlamys lebasii* Lacordaire, 1848) and *Chlamisus melochiae* Monrós, 1951 on *W. indica* in Argentina (Bokermann 1963); *Chlamisus quadrilobatus* (Schaeffer, 1926) (Karren 1972); *Pseudochlamys* nr. *megalostomoides* Lacordaire, 1848 on *W. indica* in Costa Rica (Flowers and Janzen 1997); and *Pseudochlamys* sp. on *W. indica* in Northeastern Brazil (Duarte-de-Mélo *et al.*, unpublished).

Here, is made the first record of the association between *W. indica* and an indeterminate species of *Lexiphanes* Gistel, 1848 (Cryptocephalini: Cryptocephalina); with what is the first notes on immatures of a Neotropical species of this genus, including the duration of the complete larval stage as a novelty.

Lexiphanes sp. adults were sighted copulating on *W. indica* leaves in July 2019 in a periurban region of Maceió, Alagoas (9°33'30" S - 35°46'34" W, 96 m), near the Área de Proteção Ambiental do Catolé e de Fernão Velho, a remnant of the Atlantic Forest. One couple was hand-picked and taken to the laboratory to be kept under rearing (24-26.1 °C; 62.3-77.3% RH; 12:12 h photoperiod) in transparent containers (140 cm³). The deposited eggs were separated daily. After hatching, each larva was individualized in the containers. Fresh branches of *W. indica* were added daily during the rearing. An identification key for Camptosomata (Agrain *et al.* 2017) was used to identify the genus of the beetle. The plant identification was made by Erlande Lins da Silva from MAC Herbarium of the Instituto do Meio Ambiente de Alagoas. Beetle vouchers are deposited in the Coleção Entomológica Padre Jesus Santiago Moure, Universidade Federal do Paraná (DZUP).

The beetle has been confirmed to be a *Lexiphanes* sp. (Fig. 1A). *Lexiphanes*, now a genus of Cryptocephalina (Gómez-Zurita and Cardoso 2021), can be distinguished from *Stegnocephala* Baly, 1877, a very similar genus, by having a more rounded pronotum, without basolateral depressions, and the anterior opening of the prothorax as a circumference in anterior view, with the dorsal and ventral margins in the same vertical plane in lateral view (Agrain *et al.* 2017). The female ($\approx$ 2.7 mm; n = 2) is a little larger than the male ($\approx$ 2.5 mm; n = 2) (Fig. 1B). The plant had its identification confirmed as *W. indica* (Fig. 1C), under registration MAC 65042.

A catalog published in the middle of the last century (Blackwelder 1944) compiles 42 species of *Lexiphanes* recorded in Brazilian territory. In the last 40 years, ten publications together bring 17 occurrences in Brazil (Winder and Harley 1983; Hickel and Ducroquet 1992; Collevatti *et al.* 1998; Chamorro-Lacayo and Konstantinov 2004; Gonçalves 2008; Dias 2016; Wheeler *et al.* 2016; Oliveira 2017; Ordóñez-Resendiz 2018; Boscardin *et al.* 2020). There are currently 50 species of *Lexiphanes* in Brazil (Sekerka *et al.* 2023).

The total development of *Lexiphanes* sp., from egg laying to adult emergence, was 66.5 days (n = 8). The period from egg fecal capsule (egg wrapped in maternal feces) to hatching of larvae lasted 14.3 days (n = 9); the larval period has four instars and lasted a total of 39.2 days (n = 9); the pupa fecal chamber period (prepupa and then pupa wrapped in larval feces) took 13.25 days (n = 8). The results are similar to the developmental stages of *Lexiphanes saponatus* (Fabricius, 1801) on *Chamaedaphne calyculata* (L.) Moench (1794) (= *Cassandra calyculata* (L.) Don (1834)) (Ericaceae) in Canada, in the only study that addressed the duration of the developmental stages of this genus: the embryonic period lasted 8-15 days and the pupal period 10-15 days (LeSage 1984).

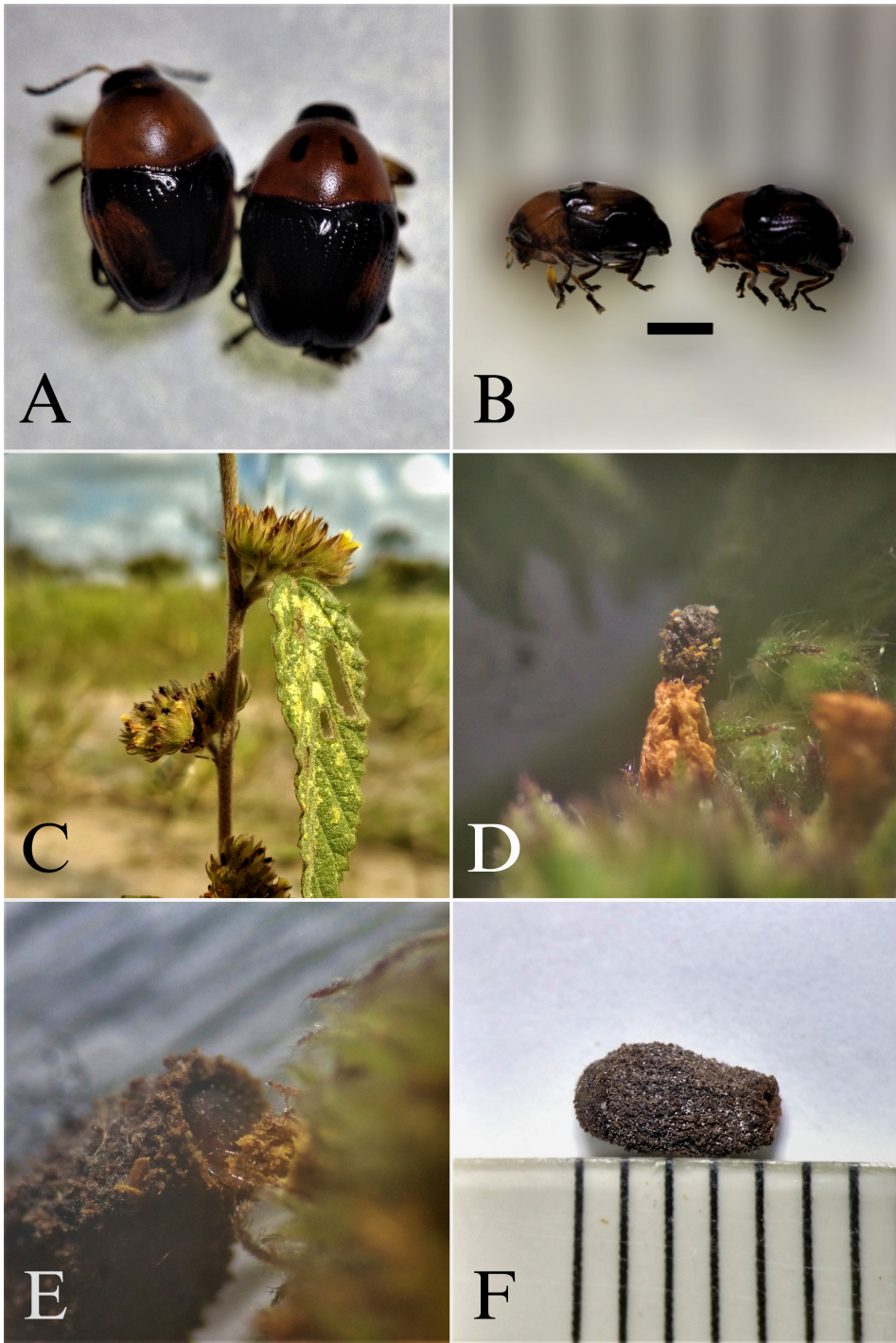


Figure 1. *Lexiphanes* sp. in the State of Alagoas, Brazil. **A.** Adults beetles in dorsal view. **B.** Female (left) and male (right) in lateral view. **C.** *Waltheria indica* in a periurban area of Maceió, Alagoas, where the beetles were spotted copulating. **D-E.** Larvae feeding on *W. indica* flower in laboratory. **F.** Pupa fecal chamber. Scale: 1 mm. / *Lexiphanes* sp. en el Estado de Alagoas, Brasil. **A.** Escarabajos adultos en vista dorsal. **B.** Hembra (izquierda) y macho (derecha) en vista lateral. **C.** *Waltheria indica* en un área periurbana de Maceió, Alagoas, donde los escarabajos fueron vistos copulando. **D-E.** Larvas alimentándose de una flor de *W. indica* en laboratorio. **F.** Cámara fecal de la pupa. Escala: 1 mm.

In laboratory, the adults of the species of *Lexiphanes* reported here feed on petals from the inflorescences of *W. indica*; females lay eggs without a stalk and egg fecal capsules fall onto the substrate; the larvae feed exclusively on the pollen of the tiny yellow flowers of *W. indica* (Figs. 1D-E) before pupation takes place inside the pupal chamber (Fig. 1F). Adult and immature *L. saponatus* feed on fresh *C. calyculata* leaves, advanced instars are able to hibernate, and newly hatched larvae climb the plant to feed (LeSage 1984).

Lexiphanes has more than 100 species (Agrain *et al.* 2017), with about 50 species in Brazil alone (Sekerka *et al.* 2023), and there has never been a taxonomic revision of the genus. So, although the data brought here are for an unidentified species, they are the first information for the group in the Neotropical region, a biological characteristic that is also informative, and that was only known for a Holarctic species (LeSage 1984). The complete period of larval development is a scientific novelty.

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