Colobura dirce dirce (Lepidoptera: Nymphalidae) Larvae Damaging Cecropia hololeuca (Rosales: Urticaceae) in the Zona da Mata, Minas Gerais, Brazil

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Colobura dirce dirce (Lepidoptera: Nymphalidae) larvae damaging *Cecropia hololeuca* (Rosales: Urticaceae) in the Zona da Mata, Minas Gerais, Brazil

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"Zona da Mata" is 1 of the 12 mesoregions of the Brazilian state of Minas Gerais, which consists of 142 municipalities grouped into 7 microregions. One of these microregions is Viçosa, located in the middle region of the "Zona da Mata" (MRZM). The MRZM, located in the southeast of Minas Gerais, has 36,058 km^2, and represents 6.2% of the area of this State (Resende et al. 2009). The native vegetation consists of tropical rain forest with dense trees and an expansion of the Atlantic Forest (Portugal et al. 2010). However, most of these native forests have been replaced by agricultural crops (banana, coffee, and sugarcane), pastures (*Brachiaria* spp.; Poales: Poaceae) and forages, and reforestation (*Eucalyptus* spp.; Myrtales: Myrtaceae) (Souza et al. 2009; Tavares et al. 2011). The terrain of MRZM is irregular, with hills, narrow valleys, and ancient crystalline rocks forming mountains. However, some cities, such as Viçosa, have flat terrain. The altitude of the MRZM ranges from 100 m in the valleys of the "Rio Pomba" and "Paraíba do Sul" to 1,889 m in the "Pico do Brigadeiro" (Nunes et al. 2009). The climate is montane subtropical with warm summers and cool winters featuring cold breezes and dense fog and with temperatures averaging 19 to 25 °C that are lowest at the higher altitude regions (Santana et al. 2010). Precipitation is greatest in summer and varies from 1,200 to 1,400 mm (Reis et al. 2007).

Cecropia hololeuca Miq. (Rosales: Urticaceae) is an arboreal plant endemic to Brazil, and it reaches 15 m in height in the Atlantic Forest (Godoy & Takaki 2004). Its fruits are the favorite food of the sloth (Vaughan et al. 2007), and it is attractive to many bird and mammal species (Grelle & Garcia 1999). This plant has soft wood, it is undemanding in soil fertility, is commonly found in deforested areas, and is used in restoration and landscaping (Sposito & Santos 2001a). The hollow stems of *C. hololeuca* are colonized by ants, especially *Azteca* spp. (Hymenoptera: Formicidae), which protect the plant against herbivores in a symbiotic relationship (Sposito & Santos 2001b). Tea brewed from leaves of *C. hololeuca* has antidiabetic, antispasmodic, anthelmintic, decongestant, diuretic, expectorant, hypotensive, and wound-healing actions (Souccar et al. 2008; Aragon et al. 2010).

Species of *Colobura* Billberg (Lepidoptera: Nymphalidae) are common in forested habitats in the Neotropical Region (Muyshondt & Muyshondt 1976), and their range of distribution includes western Mexico, Ecuador west of the Andes, Venezuela to Bolivia east of the Andes, northern Paraguay, Argentina, southeastern Brazil, the Amazon basin in Guyana, and Trinidad (Hayward 1964; Willmott et al. 2001). Adults of *Colobura* spp. are common throughout the year in forests and secondary habitats from sea level to 1,600 m. Males are common in areas of human habitation and primary forests, and they are attracted to decomposing organic material (Willmott et al. 2001). Before this study, damage to *C. hololeuca* in the MRZM by larvae of *Colobura dirce dirce* L. (Lepidoptera: Nymphalidae) was unknown. Thus, the objectives of this study were to report on damage by larvae of *C. dirce dirce* on plants of *C. hololeuca* in the MRZM and to assemble published information concerning the hosts of *Colobura* spp.

Two hundred fifty-two larvae were found on 5 Apr 2013 damaging by defoliation 20 *C. hololeuca* plants at 50 cm height on the campus of the "Universidade Federal de Viçosa (UFV)" in Viçosa, Minas Gerais, Brazil (20°45'S, 42°52'W; 651 m asl). These larvae were brought to the "Laboratório de Controle Biológico de Insetos (LCBI)" and placed in cages (26 cm high × 16 cm wide × 16.8 cm long) with *C. hololeuca* branches exchanged daily until pupation. The stems of these branches were placed in glass tubes with water to reduce wilting of leaves. The adults from these larvae were fed—until they were killed and mounted—with nutrient solution (10.5 g honey, 1.05 L distilled water, 350 mL beer, 60 g sucrose, 1.05 g ascorbic acid, and 1.05 g nipagin) moistened on cotton swabs according to the method proposed for *Anticarsia gemmatalis* Hübner (Lepidoptera: Noctuidae) (Ferreira et al. 2008). After development, adult insects were killed in a killing chamber, mounted, and deposited at the LCBI at UFV. Some adults were sent to the "Departamento de Zoologia" of the "Universidade Federal do Paraná (UFPR)" in Curitiba, Paraná, Brazil, for identification. For this study, we also assembled published information concerning host plants of *Colobura* spp.

Larvae pupated 8 d after collection and adults emerged 15 d after pupation. These insects were identified as *C. dirce dirce* by Dr. Olaf Hermann Hendrik Mielke. The collection of this species in the MRZM increases the number of regions from which it is known to occur. Seventeen species from 6 plant families have been reported as hosts of *C. dirce dirce* (Table 1).

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Table 1. Host plants of *Colobura* spp. (Lepidoptera: Nymphalidae) reported from the literature.

Family	Species	Location: Reference
Caricaceae	*Carica microcarpa* *C. papaya*	Suriname: Sepp 1848
Euphorbiaceae	*Cassava* spp.	Suriname: Merian 1705; Stoll 1786
Fabaceae	*Cassia fistulosa*	Puerto Rico: Martorell 1976
	Inga sp.	Brazil: Hayward 1969
Urticaceae	*Cecropia eximia* *C. longipes* *C. virgusa*	Colombia: Constantino 1998
	C. hololeuca	Brazil: Hoffmann 1930
	C. mexicana	El Salvador: Muyshondt & Muyshondt 1976
	C. obtusa	French Guiana: Remillet 1988
	C. pachystachia	Brazil: Müller 1886
	C. peltata	Colombia: Willmott et al. 2001 Cuba: Dewitz 1879; Bruner et al. 1975; Beebe 1952 El Salvador: Muyshondt & Muyshondt 1976 Puerto Rico: Martorell 1976 Trinidad: Barcant 1970
	Cecropia spp.	Argentina: Hayward 1940 Brazil: Hoffmann 1936; Zikán & Zikán 1968; Bönninghausen 1896; Otero & Marigo 1990; Brown Junior 1992; Elias et al. 2007 Costa Rica: Mallet & Longino 1982; DeVries 1986, 1987 Guyana: Mallet & Longino 1982 West Indies: Riley 1975; Smith et al. 1994 Jamaica: Brown & Heineman 1972
Myrtaceae	*Eucalyptus* sp.	Brazil: Biezanko 1949
Rubiaceae	*Coffea* sp.	Guyana: Bodkin 1915
	Cassia sp. ?	Neotropics: Seitz 1914

Doubtful records are followed by a "?"

The presence of *C. dirce dirce* on 20 *C. hololeuca* plants at 50 cm height confirms the information of Mallet & Longino (1982) and DeVries et al. (1999) that larvae of this insect feed on plants in primary forests or in areas near to urbanization, and of Carneiro et al. (2008) that this subspecies occurs in the central-south region of Brazil. Furthermore, it confirms the polyphagous nature of this species and suggests that because of the lack of a preferred host species, *C. dirce dirce* might feed on other plants of different botanical families, which are abundant in the MRZM. Plants of agronomic importance, such as *Eucalyptus* spp. and *Coffea* spp. (Gentianales: Rubiaceae), are included as hosts of *C. dirce dirce* (Seitz 1914; Bodkin 1915; Biezanko 1949), suggesting that the devastation of the Atlantic Forest biome could cause this species to become a potential pest of crops.

Larvae were found in small groups, or even as lone individuals, and were clustered together on the adaxial part of the leaf. They preferred young leaves and left the leaf ribs intact. Solitary habits or occurrence of small groups of larvae on young trees or seedlings have also been reported by Willmott et al. (2001), who stated that larvae avoid mature leaves and large trees due to the high concentrations of toxic compounds, such as tannins. Natural enemies were not observed in larvae of *C. dirce dirce*.

Colobura dirce dirce has potential to damage and to complete its life cycle on *C. hololeuca* under natural conditions. Despite the large number of hosts of *C. dirce dirce*, more studies should be conducted to evaluate the effect of defoliation of this plant, which is important for feeding of sloths, birds, and mammals and in folk medicine used by the regional population.

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Summary

The Atlantic Forest biome includes the middle region of the Zona da Mata (MRZM) in southeastern Minas Gerais, Brazil. *Cecropia hololeuca* Miq. (Rosales: Urticaceae) is an arboreal plant endemic to Brazil. Species of *Colobura* Billberg (Lepidoptera: Nymphalidae) are common in forested habitats in the Neotropical Region. The aims of this study were to report damage by *C. dirce dirce* L. larvae on *C. hololeuca* in the MRZM, and to review host plants of *Colobura* spp. Two hundred fifty-two larvae were found damaging twenty 50 cm tall *C. hololeuca* plants on the campus of the "Universidade Federal de Viçosa" in Viçosa, Minas Gerais, Brazil, and brought to the "Laboratório de Controle Biológico de Insetos (LCBI)." Adults and exuviae of these larvae were deposited at the LCBI and identified in the "Departamento de Zoologia" of the "Universidade Federal do Paraná" in Curitiba, Paraná, Brazil, as *C. dirce dirce*. This is the first report of this lepidopteran on *C. hololeuca* in the MRZM. Seventeen species from 6 plant families have been reported as hosts for *C. dirce dirce*.

Key Words: Nymphalinae; Nymphalini; *Papilio dirce*; Papilionoidea

Sumário

O bioma Mata Atlântica inclui a região média da Zona da Mata, na parte sudeste de Minas Gerais, Brasil. *Cecropia hololeuca* Miq. (Rosales: Urticaceae) é uma planta arbórea endêmica ao Bra-

sil. Espécies de *Colobura* Billberg (Lepidoptera: Nymphalidae) são comuns em habitats florestais na região Neotropical. Os objetivos deste estudo foram relatar danos causados por lagartas de *C. dirce dirce* L. sobre *C. hololeuca* na região média da Zona da Mata e revisar as plantas hospedeiras de *Colobura* spp. Duzentas e cinquenta e duas lagartas foram encontradas danificando vinte plantas de 50 cm de altura de *C. hololeuca* no campus da Universidade Federal de Viçosa, em Viçosa, Minas Gerais, Brasil, e trazidas para o LCBI. Adultos e exúvias dessas lagartas foram depositadas no Laboratório de Controle Biológico de Insetos (LCBI) e identificados no Departamento de Zoologia da Universidade Federal do Paraná, em Curitiba, Paraná, Brasil, como *C. dirce dirce*. Este é o primeiro relato deste Lepidoptera sobre *C. hololeuca* na região média da Zona da Mata. Dezessete espécies de seis famílias de plantas têm sido relatadas como hospedeiras de *C. dirce dirce*.

Palavras Chave: Nymphalinae; Nymphalini; *Papilio dirce*; Papilionoidea

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