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ASSESSMENT OF THE CERAMBYCIDAE (COLEOPTERA) DIVERSITY AND FIRST RECORD OF FOUR SPECIES ATTACKING *Scutia buxifolia* REISSEK (RHAMNACEAE) TREES IN TACUAREMBÓ, URUGUAY

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ABSTRACT

Uruguayan native forests are home to many species but have been poorly studied. *Scutia buxifolia* (Rhamnaceae) ("coronilla") is a common species found in hill and riparian forests and is highly valued for its wood quality. Wood-eating and phleophagous insects are very diverse and some species are considered pests. Despite this, they have not been studied much in Uruguayan forests. The main objective of this work was to identify the insect species that emerged from *S. buxifolia* logs in a hill forest. In August 2023, logs of "coronilla" showing symptoms of insect attacks were collected in a hill forest near Tacuarembó city. They were conditioned in a laboratory in 200-liter tanks while awaiting the emergence of adult insects. In October 2023, traps with attractants were placed at the same site to capture the same species that emerged from the logs. We collected 32 exemplars of five native cerambycid species. Two of the five species of interest were captured from the traps. *Eurysthea hirta* was the most abundant (N=14), followed by *Cotyclytus curvatus* (N=11) and *Compsocerus violaceus* (N=5). All species were registered as a eucalypts host. Only *E. hirta* was previously reported to develop in *S. buxifolia*.

Key-words: Xylophagous, Phleophagus, Native forest, coronilla.

RESUMEN

Evaluación de la diversidad de Cerambycidae (Coleoptera) y primer registro de cuatro especies atacando árboles de *Scutia buxifolia* Reissek (Rhamnaceae) en Tacuarembó, Uruguay. Los bosques nativos uruguayos albergan una gran diversidad de especies, aunque han sido poco estudiados. *Scutia buxifolia* (Rhamnaceae) ("coronilla") es una especie frecuente en los bosques serranos y ribereños, cuya madera es muy valorada. Los insectos xilófagos y fleófagos son muy diversos, algunos son considerados plagas. A pesar de ello, no han sido estudiados en nuestro país. El objetivo principal de este trabajo fue identificar las especies de insectos que emergieron de troncos de *S. buxifolia* de un bosque serrano. En agosto de 2023, se recolectaron troncos de "coronilla" con síntomas de ataques de insectos en un bosque serrano cerca de la ciudad de Tacuarembó. Se acondicionaron en laboratorio en tanques de 200 litros mientras se esperaba la emergencia de adultos. En octubre de 2023, se colocaron trampas con atrayentes en el mismo sitio para capturar las especies que emergieron de las trozas. Recolectamos 32 ejemplares de cinco especies nativas de cerambícidos. Dos de las cinco especies fueron capturadas en las trampas. *Eurysthea hirta* fue la más abundante (N=14), seguida de *Cotyclytus curvatus* (N=11) y *Compsocerus violaceus* (N=5). Todas las especies fueron registradas como hospedantes de eucaliptos. Solo *E. hirta* había sido reportada como una especie asociada a *S. buxifolia*.

Palabras clave: Xylófagos, Fleófagos, Bosque nativo, Coronilla.

INTRODUCTION

The native forest of Uruguay hosts a great diversity of flora and fauna species and is widely distributed across the country (Ross et al., 2018a; Brazeiro et al., 2023; Brussa & Brussa, 2023). Six types of native forests can be recognized and classified in Uruguay based on their floristic composition and topographic location (Brussa & Grela, 2007; MGAP, 2018). Tacuarembó is the department with the largest area of native forest in the country (DIEA-MGAP, 2023). Hill and riparian forests have the greatest floristic diversity and are more widely distributed throughout the country (Brussa & Grela, 2007; Brazeiro et al., 2023). Hill forests are more common on the country's eastern

coast, being more important in Lavalleja, Maldonado, Tacuarembó (Toranza et al., 2020) and Rivera (Ross et al., 2018) departments.

Scutia buxifolia Reissek (Rhamnaceae), commonly known as "coronilla," is a low, corpulent tree native to Uruguayan hills and riparian forests, also found in Brazil, Argentina, and Paraguay (Ross et al., 2018). It grows up to 10 m tall, with persistent foliage, rough dark bark, and thorns on the branches reaching 4 cm long (Brussa & Grela, 2007; Geymonat & Lombardi, 2014). Blooming in spring, its greenish-yellow flowers form small inflorescences, and its fleshy, globose drupes ripen to red or black in autumn (Ross et al., 2018). Valued for its medicinal properties and high-quality wood, the species faces conservation challenges due to overexploitation and logging (Brussa & Grela, 2007; Ross et al., 2018).

Trees can be affected by several species of insects, fungi, bacteria, and other organisms, which weaken and can cause death in severe attacks (Ciesla, 2011). Insects are considered one of the main biotic factors affecting tree species (Wingfield et al., 2008; Haack, 2017; Whitehill et al., 2023).

Xylophagous and phleophagous are two insect guilds pests that can cause significant damage to the trunk and branches of trees and shrub species (Ciesla, 2011). The difference is that the first attacks the wood (sapwood and heartwood), and the latter attacks the bark (Bentancourt & Scatoni, 2010). Both form galleries when they feed on the wood or bark of their host throughout the larval cycle. These galleries cause mechanical resistance problems in trees and severe attacks; they can also cause tree death (Ibáñez et al., 2009; Ciesla, 2011).

Their attack causes stress and weakening, affecting the growth and development of the trees (Bonifacino et al., 2021). In some cases, they can cause girdling in branches or trunks, causing their death by cutting off the passage of nutrients (Ciesla, 2011). In addition, many of them are characterized by vectoring fungi and nematodes, and living in symbiosis, causing in the case of phytopathogenic species, damage of greater importance (UAC, 2007; Haack, 2017). Within these groups, the Coleoptera families Cerambycidae, Anobiidae, Bostrichidae, and Curculionidae (subfamilies Scolytinae and Platypodinae) stand out. Curculionidae (13%) and Cerambycidae (8%) are two of the five beetle families with the greatest species richness in the world (Bouchard et al., 2017). Despite its importance, the diversity of insects presents in native forests in Uruguay, particularly the long-horned beetles (Cerambycidae), has been poorly studied.

Several species of long-horn beetles are considered forest pests that attack health, decay, or develop in dead trees, and some of their lumber and wood products (Haack, 2017). Considering that native Cerambycid species have been reported attacking *Eucalyptus* spp. in Uruguay, it is important to study the species of this family associated with native forests. Therefore, the main objective of this work was to study the diversity of xylophagous and phleophagous insects in trunks and branches of *S. buxifolia* in a hill forest near Tacuarembó city, Uruguay.

MATERIAL AND METHODS

The study was conducted in a hill forest area located in the "Cuchilla casa de Piedra" locality approximately 43 km from Tacuarembó city (31°30'53.31" S, 56°11'10.88" W) (Fig. 1). The whole area has seven hectares, of which approximately five hectares are of a hill forest. The map was created with QGIS 3.28 Firenze (Fig. 1).

At this location, in August 2023, an inspection was carried out in search of *Scutia buxifolia* trees with attack symptoms (presence of sawdust, galleries, and adult emergence holes) (Fig. 2). One individual was selected, which had very severe attack symptoms (Fig. 2). *S. buxifolia* logs were cut and placed in closed bags to prevent insect escape during transport from the field to the laboratory. After emergence adult beetles were identified and fixed with labeled data.

The logs were placed in 200-litre tanks closed with a layer of voile held with elastic to allow air to pass through and prevent the emerging insect escape (Fig. 3 A). The tanks were kept in a room with ambient temperature and a 12:12 photoperiod. The samples were checked weekly for almost three months, during this time the emergence of insects was recorded. The emerging specimens were placed in Falcon tubes with 70% alcohol for their conservation and later identification. Bettles were classified primarily at the family and morphospecies levels (grouped based on their morphological similarity). For species-level, identification keys of the Cerambycidae genera and species were used. Due to the similarity between the species of the genus *Compsocerus* among themselves and with other genera of the tribe Compsocerini, the original descriptions of Fabricius (1792), White (1853), and Gounelle (1910) were revised.

To determine whether adults of the species that emerged from the logs in the laboratory could be captured in the forest, six flight interception traps were placed in *S. buxifolia* trees. They were installed at the end of October 2023. The traps consisted of two-liter plastic bottles and plastic jars using 95% ethanol and 70% eucalyptus-scented alcohol as attractants and 70% ethanol as a preservant (Fig. 3 B). These were active for 18 days. Captured insects were placed in 50 ml Falcon tubes with 70% alcohol for their conservation. For identification, the same procedure was followed for the specimens collected from the logs.

The sample conditioning and the identification of the emerged and collected adults were carried out in the Integrated Management Laboratory of Forest Insects (LabMIIF), belonging to the Sede Tacuarembó,

Fig. 1. Localization of the study site is indicated by the black dot.

CENUR Noreste, Udelar. The material collected was deposited in the entomological collection of the LabMIIF.

RESULTS

From the collected *S. buxifolia* logs in the field, 32 specimens emerged in the laboratory, all belonging to the Cerambycidae family and subfamily Cerambycinae Latreille, 1802. They were distributed in five species: *Chlorida costata* (Audinet-Seville, 1834) (Fig. 4), *Chydarteres striatus* (Fabricius, 1787) (Fig. 5), *Compsocerus violaceus* (White, 1863) (Fig. 6), *Eurysthea hirta* (Kirby, 1818) (Fig. 7) and *Cotyclytus curvatus* (Germar, 1821) (Fig. 8). *Eurysthea hirta* was the most abundant species with 14 individuals, followed by *C. curvatus* (N = 11) and *C. violaceus* (N = 5). The species *Chl. costata* and *Chy. striatus* were represented only by one exemplar.

Insects from various orders were captured in the flight interception traps with ethanol as an attractant. Within the interest species, *Cot. curvatus* (N= 4) was captured in four of the six traps, and an exemplar of *Com. violaceus* was captured in one of them.

Table 1 shows an updated list of trees and scrubs registered hosts as the Cerambycid species found in the present study (Table 1). All the cerambycid species that emerged from *S. buxifolia* logs were previously associated with attacks in *Eucalyptus* spp. Except for *E. hirta* that was previously registered using *S. buxifolia* host.

DISCUSSION

Native forests are home to many arthropods, especially insects (Hébert, 2023). Knowing their diversity and ecosystem function is important to collaborate in their conservation (Nascimento et al., 2017; Barros et al., 2020; Brazeiro et al., 2023) or to knowledge of polyphagous species that eventually may become pests on forest plantations.

All the species that emerged from the logs of *S. buxifolia* belonged to the Cerambycidae family, being registered as native species for Uruguay according to Zajciw & Ruffinelli (1962). The longhorn beetles attack symptoms are similar to each other, making it difficult to associate them with a particular species. Because the larvae make galleries inside the wood during feeding, they cause mechanical resistance damage (Moné et al., 2002). In turn, the emergency holes caused by adults along the trunks could be an entry point for pathogens and/or other phytophagous insects.

All cerambycid species found are polyphagous, especially *Com. violaceus* and *Chy. striatus,* which can develop in a great diversity of trees of native and exotic species (Table 1) (Bentancourt & Scatoni, 1992;

Fig. 2. A. *Scutia buxifolia* tree selected for this study, **B.** Emergency hole, **C.** Emergency hole, and sawdust. Photographs: L. Pérez.

Fig. 3. A. 200-litre tanks with logs. **B.** Ethanol traps. Photographs: L. Pérez

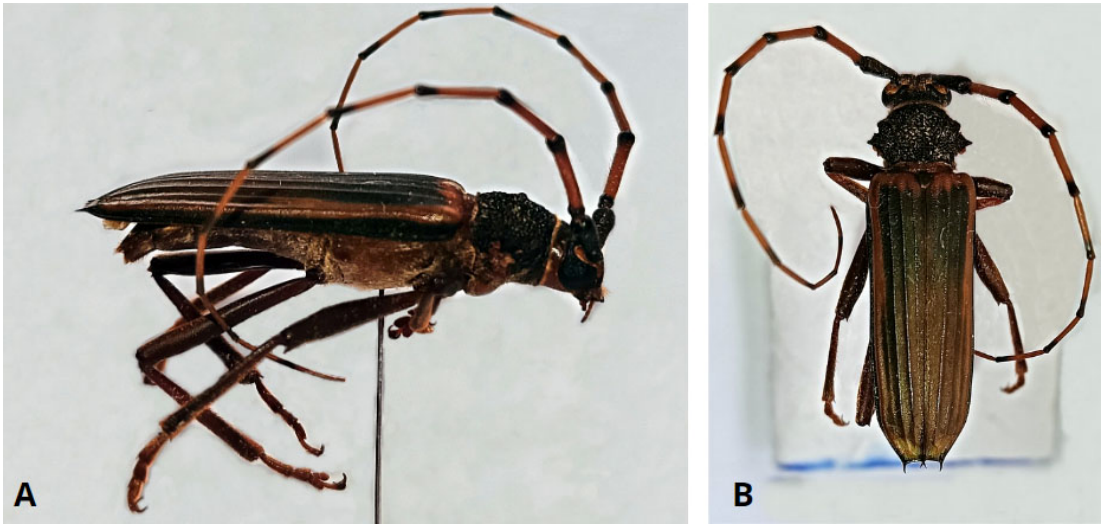

Fig. 4. *Chlorida costata* **A.** side view **B.** dorsal view. Photographs: L. Pérez

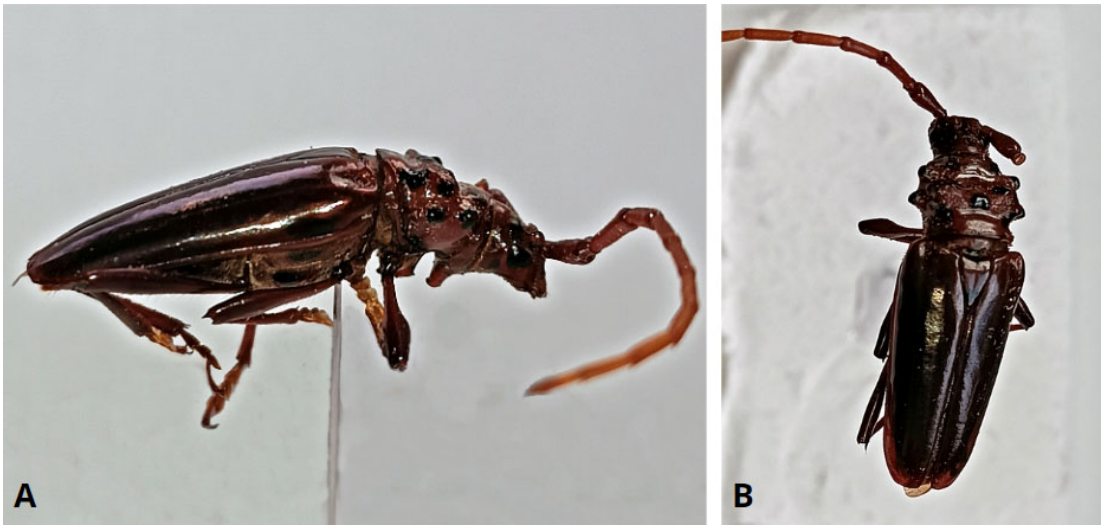

Fig. 5. *Chydarteres striatus* **A.** side view **B.** dorsal view. Photographs: L. Pérez

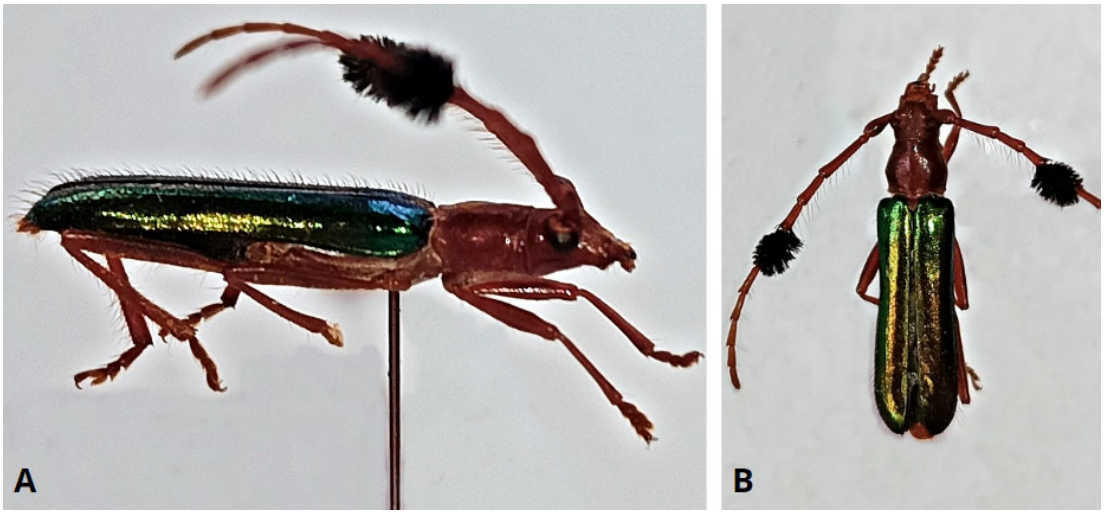

Fig. 6. *Compsocerus violaceus* **A.** side view **B.** dorsal view. Photographs: L. Pérez

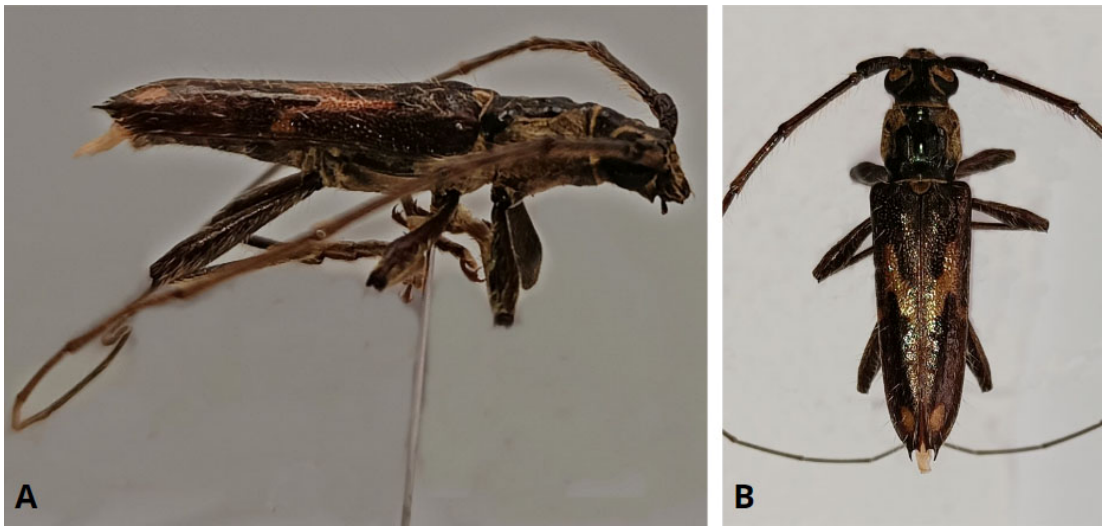

Fig. 7. *Eurysthea hirta* **A.** side view **B.** dorsal view. Photographs: L. Pérez

Fig. 8. *Cotyclytus curvatus* **A.** side view **B.** dorsal view. Photographs: L. Pérez

Bernardi et al., 2010; 2011; Di Iorio & Farina, 2009; Alaniz et al., 2016). It is interesting to betray that, within the native tree species, *S. buxifolia* has not been reported as a host for these cerambycid species, except for *E. hirta* (Morelli et al., 2006). That is the only longhorn beetle species found in our study reported to attack this tree species (Morelli et al., 2006). However, for most of these species, very little is known about their natural history, and only the data associated with their original description are available.

According to Brazeiro (2023), the species associated with native forests in Uruguay have been poorly studied. Considering the scarcity of insect species associated with native flora information, it is important to continue with studies to increase knowledge about the natural history of cerambycids. In addition, all species that emerged from *S. buxifolia* logs have been reported attacking *Eucalyptus* spp. (Monné et al., 2002; Bernardi et al., 2010; Bernardi et al., 2011).

CONCLUSIONS

We were able to verify that when selecting the *S. buxifolia* tree with symptoms of attack (sawdust, emergence holes, among others), it presented species of xylophagous and phleophagous insects developing on it. The five species that emerged from the collected

Table 1. Cerambycid species list found in the present study and their reported tree hosts (Species and Family). * Indicates the first record of the species for *Scutia buxifolia*.

Tribe	Species	Hosts		References
		Species	Family	
Bothriospilini Lane, 1950	*Chlorida costata* Audinet-Serville, 1834	*Eucalyptus spp.*	Myrtaceae	Bernardi et al., 2010; 2011
		Colubrina rufa	Rhamnaceae	Costa-Lima, 1955
		*Scutia buxifolia**		
Trachuderini Dupont, 1836	*Chydarteres striatus* Fabricius, 1787	*Casuarina cunninghamiana*	Casuarinaceae	Bentancourt & Scatoni, 1992
		Acacia spp.	Fabaceae	Bernardi et al., 2010; 2011
		Gleditsia triacanthos		Di Iorio & Farina, 2009
		Parkinsonia aculeata		Alaniz et al., 2016
		Carya illinoiensis	Juglandaceae	
		Eucalyptus spp.	Myrtaceae	
		Eucalyptus globulus		
		Ficus spp.	Moraceae	
		Morus nigra		
		*Scutia buxifolia**	Rhamnaceae	
		Malus domestica	Rosaceae	
		Prunus communis		
		Prunus domestica		
		Prunus perisca		
		Salix spp.	Salicaceae	
Compsocerini Thomson, 1864	*Compsocerus violaceus* White, 1853	*Schinopsis balansae*	Anacardiaceae	Bentancourt & Scatoni, 1992
		Schinus molle		Bernardi et al., 2010; 2011
		Celtis tala	Cannabaceae	Di Iorio & Farina, 2009
		Celtis australis		Alaniz et al., 2016
		Euonymus japonicus	Celastraceae	
		Acacia spp.	Fabaceae	
		Albizia julibrissin		
		Anadenanthera colubrina		
		Bauhinia forficata		
		Calliandra tweedii		
		Cercis siliquastrum		
		Enterolobium contortisiliquum		

Table 1. Cont.

Tribe	Species	Hosts		References
		Species	Family	
Compsocerini Thomson, 1864	*Compsocerus violaceus* White, 1853	*Gleditsia triacanthos*	Fabaceae	
		Mimosa polycarpa		
		Parkinsonia aculeata		
		Prosopis spp.		
		Robinia pseudoacacia		
		Wisteria sinensis		
		Quercus spp.	Fagaceae	
		Carya illinoiensis		
		Castanea sativa		
		Juglans regia	Juglandaceae	
		Laurus robilis	Laureaceae	
		Persea americana		
		Punica granatum	Lythraceae	
		Eucalyptus spp.	Myrtaceae	
		Broussonetia papyrifera	Moraceae	
		Ficus spp.		
		Maclura pomífera		
		Morus alba		
		Morus nigra		
		Ligustrum lucidum	Oleaceae	
		Passiflora caeruela	Passifloraceae	
		Pinus spp.	Pinaceae	
		*Scutia buxifolia**	Rhamnaceae	
		Mesplius germánica		
		Prunus spp.	Rosaceae	
		Rosa spp.		
		Citrus spp.	Rutaceae	
		Salix spp.	Salicaceae	
		Dodonaea viscosa	Sapindaceae	
		Urvillea spp.		
		Ulmus spp.	Ulmaceae	
Elaphidiini Thomson, 1864	*Eurysthea hirta ex Paramallocera hirta* Kirby, 1818	*Parasenegalia visco*	Fabaceae	Bernardi et al., 2010; 2011; Monné et al., 2002; Morelli et al., 2006;

Table 1. Cont.

Tribe	Species	Hosts		References
		Species	Family	
Elaphidiini Thomson, 1864	*Eurysthea hirta ex Paramallocera hirta* Kirby, 1818	*Eucalyptus spp.*	Myrtaceae	Limachi et al., 2017
		Eucalyptus globulus		
		Scutia buxifolia	Rhamnaceae	
Clytini Mulsant, 1839	*Cotyclytus curvatus* (Germar, 1821) *ex Neoclytus curvatus*	*Eucalyptus spp.*	Myrtaceae	Bernardi et al., 2010; 2011; Monné, 1970; Monné et al., 2002; Costa Lima, 1955
		Eucalyptus globulus		
		Hexachlamys edulis		
		*Scutia buxifolia**	Rhamnaceae	
		Pyrus communis	Rosaceae	
		Malus domestica		

logs were from Cerambycidae, which is one of the main families of insects that feed on the bark and wood of trees. *Eurysthea hirta* and *Cotyclytus curvatus* were the most abundant species observed emerging from the logs and the latest in the ethanol traps. In addition, all these species of Cerambycids have been associated with *Eucalyptus* spp. With the increase in the forested area in our country with this genus, it is vital to monitor Cerambycidae species, especially in those commercial plantations located near the native forests or fruit tree plantations.

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