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Nota Técnica

Diversity of Scolytinae, Platypodinae (Curculionidae) and Bostrichidae in *Hevea brasiliensis* (Willd. ex A.Juss.) in the state of Goiás, Brazil

Diversidade de Scolytinae, Platypodinae (Curculionidae) e Bostrichidae em *Hevea brasiliensis* (Willd. ex A.Juss.) no estado de Goiás, Brasil

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ABSTRACT

In Brazil, the rubber tree *Hevea brasiliensis* (Willd. ex A.Juss.) is heavily planted in the so-called escape areas in order to avoid leaf blight. While there are reports on damage inflicted by insects and mites in the literature, these are sparse. The objective of this study was to survey the community of Scolytinae, Platypodinae (Curculionidae) and Bostrichidae, in a rubber tree plantation in Goianésia, state of Goiás, Brazil, with ethanol-baited flight intercept traps from March 2013 through March 2014. Scolytinae beetles (13 genera, 29 species) were the most abundant group, accounting for over 99% of trapped specimens, while six Bostrichidae, seven Cerambycidae and two Platypodinae species were also caught. *Hypothenemus obscurus* (Scolytinae) comprised ca. 89% of all trapped specimens. While no attack on live trees was observed during the survey, species with known ability to attack and successfully colonize standing trees were trapped in this study. Perhaps this is an indication that the plantation is well managed, not providing conditions where attacks on live trees may occur.

Keywords: Ambrosia beetles; Ethanol-baited trap; Seasonal variation

RESUMO

No Brasil, a seringueira *Hevea brasiliensis* (Willd. ex A.Juss.) é plantada em áreas de escape para evitar a doença do mal-das-folhas. Embora haja relatos de danos ocasionados por insetos e ácaros na literatura, estes são esparsos. O objetivo deste estudo foi realizar um levantamento populacional da comunidade de Scolytinae, Platypodinae (Curculionidae) e Bostrichidae em um plantio de seringueira em Goianésia, estado de Goiás, com armadilhas de impacto de voo iscadas com etanol, de março de 2013 a março de 2014. Scolytinae (13 gêneros, 29 espécies) foi o grupo mais abundante, representando mais de 99% dos espécimes capturados, enquanto que seis espécies de Bostrichidae, sete de Cerambycidae e duas de Platypodinae foram também capturadas. *Hypothenemus obscurus* (Scolytinae) representou cerca de 89% de todos os exemplares capturados. Embora nenhum ataque a árvores vivas tenha sido observado durante a pesquisa, espécies com capacidade conhecida de atacar e colonizar com sucesso árvores vivas foram capturadas neste estudo. Talvez isso seja uma indicação de que a plantação é bem gerenciada, não fornecendo condições para que isso ocorra.

Palavras-chave: Besouros da ambrosia; Armadilha de etanol; Variação sazonal

1 INTRODUCTION

The rubber tree, *Hevea brasiliensis* (Willd. ex A.Juss.) (Euphorbiaceae), is a forestry species natural of the Amazon basin. It is the only commercial source of latex, from which rubber is produced (GONÇALVES; FONTES, 2009).

Among the main pests of rubber trees there are mites (Acari), *Atta* and *Acromyrmex* leafcutting ants (Formicidae), and *Leptopharsa heveae* Drake & Poor (Tingidae) (SANTOS; FREITAS, 2008). We can also add to this list bark and ambrosia beetles (Coleoptera, Curculionidae, Scolytinae and Platypodinae), whose status of economic importance grew in the beginning of the 21st century (GONÇALVES; SILVA; FLECHTMANN, 2017). Additionally, these beetle borers are important forestry pests worldwide (CIESLA, 2011).

Most Scolytinae beetles are considered as secondary species, thriving in trees hit by fire or lightning, and stressed hosts, nutrient deprived, diseased, or with water stress (FLECHTMANN *et al*., 1995). In this sense, they are considered opportunistic species (FLECHTMANN; OTTATI; BERISFORD, 2001), which may increase in population density and then inflict economic damage to plantations by attacking live and healthy

trees (WOOD, 2007). However, in the process of colonizing and developing in stressed hosts, they contribute to the natural succession in forestry ecosystems, speeding up the process of biological decomposition, accelerating the nutrient cycling and contributing to the maintenance of the forestry dynamics (WOOD, 2007).

The establishment of seasonal variations for the main forest insect species in a community might be useful cues to help forecast peaks in activity, and hence help develop techniques to fight them in the context of an integrated pest management (PAES *et al*., 2014).

The main objective of this research was to determine, by the use of flight intercept traps baited with ethanol, the biodiversity of beetle borers in a stand of *Hevea brasiliensis*, in Goianésia, state of Goiás, Brazil.

2 MATERIAL AND METHODS

The beetle borers were surveyed in a commercial plantation of *Hevea brasiliensis* clone RRIM600, belonging to OL Látex, and located in Goianésia, state of Goiás, Brazil (15°19'0.07"S 49° 9'53.82"W).

Surveys were done biweekly with three 96% ethanol-baited flight intercept traps (modified from BERTI FILHO; FLECHTMANN, 1986), spaced 100 m among each other inside the stand, from March 2013 through March 2014, totaling 26 collections.

Voucher specimens were deposited at MEFEIS (Museu de Entomologia da Faculdade de Engenharia de Ilha Solteira, Universidade Estadual Paulista, Ilha Solteira, São Paulo, Brazil).

Meteorological data of mean air temperature (°C) and rainfall (mm) were obtained at the Climatic Station of Usina Jalles Machado S.A., located ca. 22 km from the rubber tree site.

3 RESULTS AND DISCUSSION

Over 18,000 specimens were trapped, in Scolytinae, Platypodinae, Bostrichidae and Cerambycidae. Scolytinae was by far the main group, both in number of genera (13), number of species (29) and number of specimens (over 99% of the trapped specimens). Bostrichidae contributed with six species, Cerambycidae with other seven species, and Platypodinae with only two species (Table 1).

The number of trapped Scolytinae species (Table 1) was somewhat similar to those found in a rubber tree plantation in Itiquira, state of Mato Grosso (DALL'OGLIO; PERES FILHO, 1997) and Sud Mennucci, state of São Paulo, Brazil (TROMBETA *et al*., 2014), but substantially lower than those found in Três Fronteiras and Castilho (São Paulo state), also in rubber tree plantations (SILVA; PINHEIRO; FLECHTMANN, 2015; PINHEIRO; FLECHTMANN, 2016). Perhaps the lower number of Scolytinae found in this survey was due to the low number of traps that was used in the survey.

Overall, the most abundant species of Scolytinae trapped in this survey matched the list of most abundant species found in surveys in other rubber tree stands, whether these were in the states of Mato Grosso, São Paulo or here in Goiás (DALL'OGLIO; PERES FILHO, 1997; TROMBETA *et al*., 2014; SILVA; PINHEIRO; FLECHTMANN, 2015; PINHEIRO; FLECHTMANN, 2016).

Hypothenemus obscurus corresponded to ca. 89% of all trapped specimens (Table 1). Except for the survey done in Itiquira, where *Hypothenemus eruditus* was the most common trapped species (16% of all catches; DALL'OGLIO; PERES FILHO, 1997), in other surveys reported in the literature *H. obscurus* was also the predominant trapped species (TROMBETA *et al*., 2014; SILVA; PINHEIRO; FLECHTMANN, 2015; PINHEIRO; FLECHTMANN, 2016).

As far as Bostrichidae and Platypodinae species found (Table 1), those numbers roughly match those found in surveys in rubber trees elsewhere in São Paulo and Mato Grosso states (DALL'OGLIO; PERES FILHO, 1997; TROMBETA *et al*., 2014; SILVA; PINHEIRO; FLECHTMANN, 2015; PINHEIRO; FLECHTMANN, 2016).

Species of the genus *Hypothenemus* are typically able to develop in plant material with a lower moisture content than that of their counterparts in the sub-family (WOOD, 2007). Considering that rubber trees have natural pruning (WEIR, 1926; GONÇALVES *et al*., 2013), this spontaneous phenomenon of rubber tree physiology provides plenty of material for the development of *Hypothenemus* beetles, hence explaining their abundance in this survey.

Bostrichidae (LESNE, 1911) and Cerambycidae (COCQUEMPOT; LINDELÖW, 2010) typically develop in dry host plant material, so it is not unexpected that representatives of those two families were trapped in our survey. We believe that dry material corresponded mainly to naturally pruned branches and wind-broken twigs and branches, normally found in rubber tree stands.

It is likely safe to ascertain that most (if not all) Scolytinae, Platypodinae, Bostrichidae and Cerambycidae specimens trapped in this survey were most likely developing in dead and/or dying rubber tree material piling up as a litter component or still hanging from trees. However, a good number of these species, including *Premnobius cavipennis*, *Xyleborus affinis*, *Xyleborus ferrugineus*, *Xyleborus volvulus* (Scolytinae) and *Euplatypus parallelus* (Platypodinae), to name a few (Table 1), were already reported attacking trunks of live rubber trees in Brazil (GONÇALVES; SILVA; FLECHTMANN, 2017). Hence, while no attack on live trees was observed in this study, there were a number of trapped species with the potential of attacking standing trees.

Table 1 – Scolytinae, Platypodinae (Curculionidae), Bostrichidae and Cerambycidae species trapped with ethanol-baited flight intercept traps. *Hevea brasiliensis* clone RRIM 600, Goianésia, Goiás state, Brazil, from March 2013 to March 2014

Family/Species	Total
Bostrichidae	
Bostrychopsis uncinata (Germar, 1824)	3
Dinoderus minutus (Fabricius, 1775)	2
Lichenophanes plicatus (Guérin-Méneville, 1844)	2
Micrapate brasiliensis (Lesne, 1899)	19

To be continued ...

Table 1 – Continuation

Family/Species	Total
Bostrichidae	
Micrapate horni (Lesne, 1899)	8
Xyloperthella picea (Oliver, 1790)	110
Cerambycidae	
Chlorida festiva (Linnaeus, 1758)	4
Chydarteres dimidiatus (Fabricius, 1787)	1
Epectasis juncea (Newman, 1840)	2
Estola sp.	3
Neoclytus pusillus Laporte & Gory, 1835	1
Neolampedusa obliquator (Fabricius, 1801)	3
Oxymerus aculeatus Dupont, 1838	2
Platypodinae	
Euplatypus parallelus (Fabricius, 1801)	9
Teloplatypus ratzeburgi (Chapuis, 1865)	1
Scolytinae	
Ambrosiodmus obliquus (LeConte, 1878)	6
Cnestus laticeps (Wood, 1977)	2
Cnestus retusus (Eichhoff, 1868)	180
Coccotrypes carpophagus (Hornung, 1842)	1
Corthylus sp. 1	8
Corthylus sp. 2	14
Corthylus sp. 3	10
Cryptocarenus diadematus Eggers, 1937	20
Cryptocarenus heveae (Hagedorni, 1912)	156
Cryptocarenus seriatus Eggers, 1933	7
Dryocoetoides cristatus (Fabricius, 1801)	5
Hypothenemus eruditus Westwood, 1836	77
Hypothenemus obscurus (Fabricius, 1801)	16.238
Hypothenemus opacus (Eichhoff, 1872)	6
Hypothenemus plumeriae (Nordlinger, 1856)	68
Microcorthylus minimus Schedl, 1950	40
Premnobius ambitiosus (Schaufuss 1897)	4
Premnobius cavipennis (Eichhoff, 1878)	468
Sampsonius dampfi Schedl, 1940	20
Tricolus subincisuralis Schedl, 1939	3
Xyleborinus gracilis (Eichhoff, 1868)	3
Xyleborinus reconditus (Schedl, 1963)	13
Xyleborus affinis Eichhoff, 1868	223
Xyleborus biconicus Eggers, 1928	1
Xyleborus ferrugineus (Fabricius, 1801)	11

To be continued ...

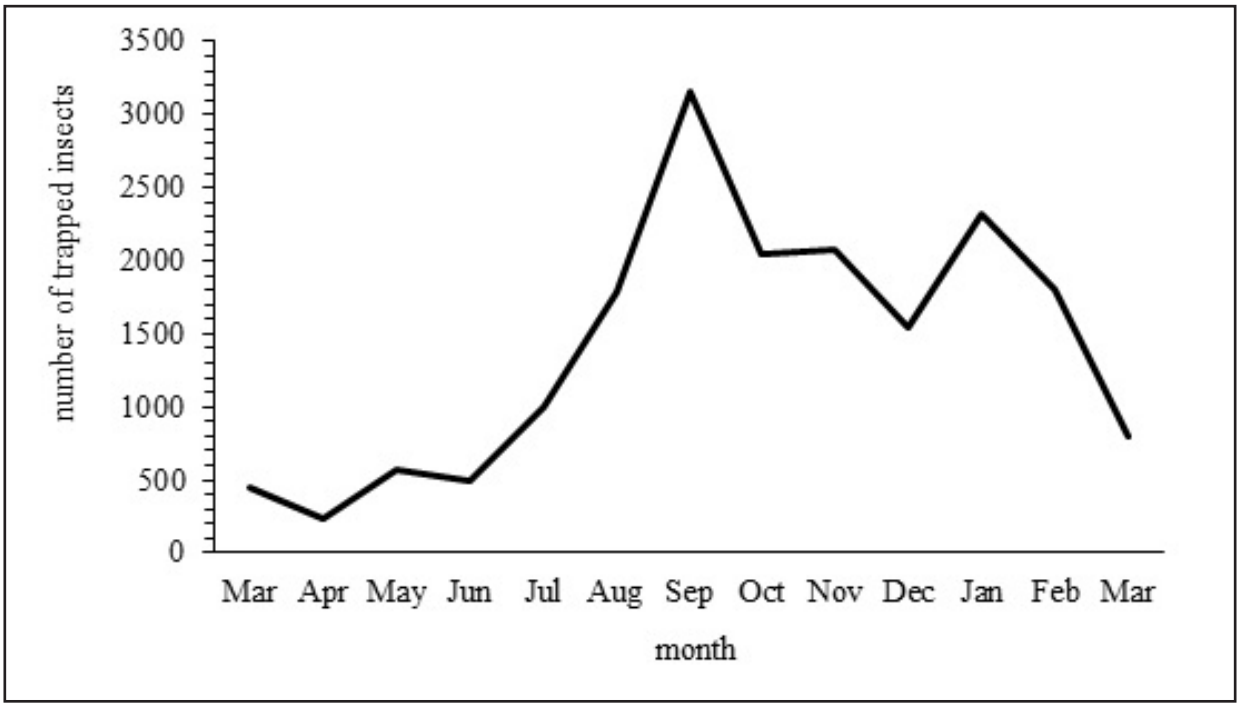
Table 1 – Conclusion

Family/Species	Total
Platypodinae	
Xyleborus spinulosus Blandford, 1898	488
Xyleborus volvulus (Fabricius, 1775)	11
Xylosandrus compactus (Eichhoff. 1875)	2
Xylosandrus curtulus (Eichhoff, 1869)	201
Total	18.486

Source: Authors (2021)

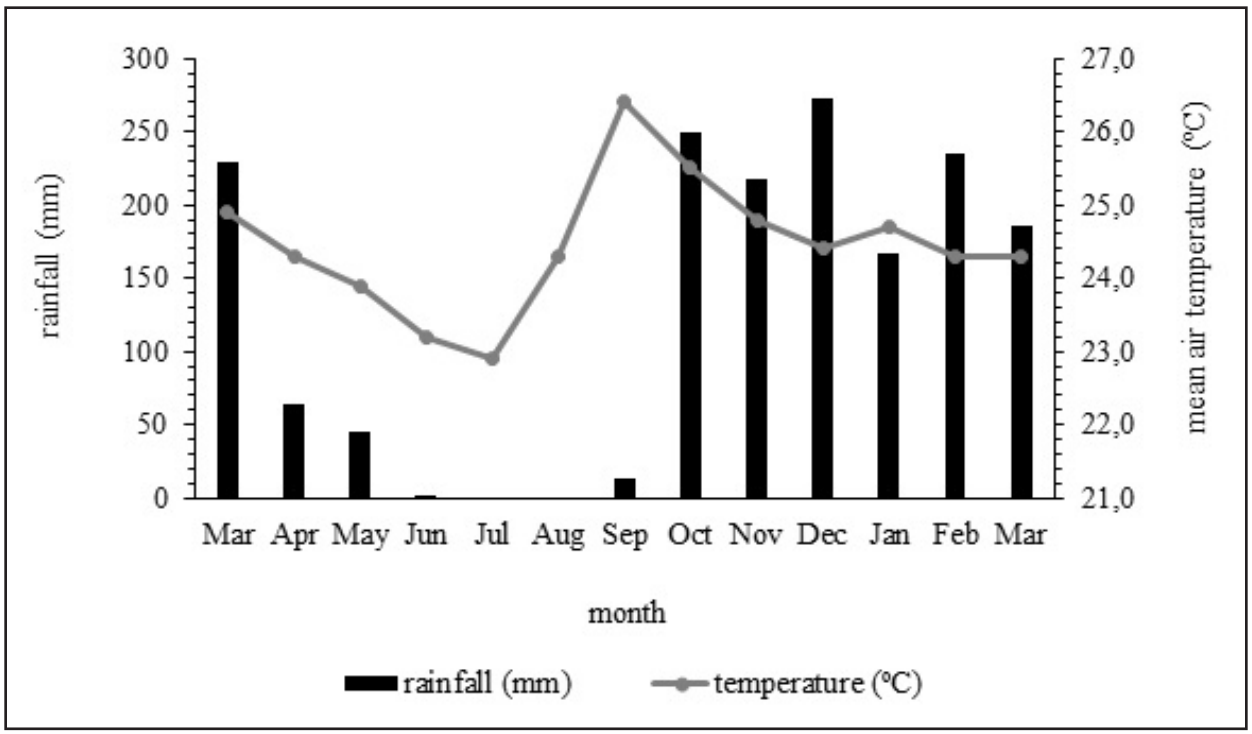
Overall, Scolytinae beetles were active throughout the trapping period, with however smaller catches in the period from March to July 2013 (Figure 1). This period coincided with the lowest average air temperatures, and with less rainfall (Figure 2).

Figure 1 – Total of Scolytinae, Platypodinae (Curculionidae), Bostrichidae and Cerambycidae beetle specimens trapped with ethanol-baited flight intercept traps. *Hevea brasiliensis* clone RRIM 600, Goianésia, Goiás state, Brazil, from March 2013 to March 2014



Source: Authors (2021)

Figure 2 – Monthly rainfall and mean air temperature. Goianésia, Goiás state, Brazil, from March 2013 to March 2014



Source: Authors (2021)

These results contrasted with those obtained in Itiquira, where higher catches were observed when rainfall was the lowest, from July to August/September (DALL'OGLIO; PERES FILHO, 1997). In the Cerrado domain, it is common to observe the highest catches of Scolytinae beetles coinciding with the lowest rainfall, when temperatures are milder (CAHF, unpublished data), which was not the case reported here.

4 CONCLUSION

The diversity of Scolytinae beetles in the surveyed rubber tree plantation was somewhat lower than that observed elsewhere in the Brazilian published literature on similar plantations, but the most abundant species reported here were also the

most abundant species mentioned in the literature. While no attack on live trees was observed during the survey, species with known ability to attack and successfully colonize standing trees were trapped in this study. Perhaps this is an indication that the plantation is well managed, not providing conditions for live standing trees to be attacked by these beetle borers.

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