

Phoracantha recurva (Coleoptera: Cerambycidae): First Report in the Atlantic Rainforest of Minas Gerais, Brazil

Authors: Corrêa, Carlos A., dos Anjos, Norivaldo, Carvalho, Amélia G., Soares, Marcus A., dos Santos Junior, Valdeir C., et al.

Source: Florida Entomologist, 103(1) : 142-144

Published By: Florida Entomological Society

URL: <https://doi.org/10.1653/024.103.0426>

The BioOne Digital Library (<https://bioone.org/>) provides worldwide distribution for more than 580 journals and eBooks from BioOne's community of over 150 nonprofit societies, research institutions, and university presses in the biological, ecological, and environmental sciences. The BioOne Digital Library encompasses the flagship aggregation BioOne Complete (<https://bioone.org/subscribe>), the BioOne Complete Archive (<https://bioone.org/archive>), and the BioOne eBooks program offerings ESA eBook Collection (<https://bioone.org/esa-ebooks>) and CSIRO Publishing BioSelect Collection (<https://bioone.org/csiro-ebooks>).

Your use of this PDF, the BioOne Digital Library, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Digital Library content is strictly limited to personal, educational, and non-commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne is an innovative nonprofit that sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

Phoracantha recurva (Coleoptera: Cerambycidae): first report in the Atlantic rainforest of Minas Gerais, Brazil

Carlos A. Corrêa^{1*}, Norivaldo dos Anjos¹, Amélia G. Carvalho², Marcus A. Soares³, Valdeir C. dos Santos Junior¹, and José C. Zanuncio¹

Eucalyptus species (Myrtaceae), Australian trees with fast growth and wood suitable for different purposes (Pirralho et al. 2014; IBÁ 2017), have become the trees with the largest planted area in the world. Unfortunately, the increase of the planted area with *Eucalyptus* spp. and related species, and the international trade of its products, are increasing accidental introductions of exotic insects (Mansfield 2016; Almeida et al. 2018).

Phoracantha Newman (Coleoptera: Cerambycidae), a genus from Australia and New Guinea with 40 longhorn borer beetle species, use healthy or weakened *Angophora*, *Corymbia*, and *Eucalyptus* (Myrtaceae) trees or their logs (Wang et al. 1995, 1999) for development. Trees damaged by *Phoracantha* spp. have decayed crowns with discolored, dried, and withered leaves, bark with cracks, and sawdust and expelled excrement (Paine et al. 2009).

Phoracantha semipunctata (Fabricius) (Coleoptera: Cerambycidae) and *Phoracantha recurva* Newman (Coleoptera: Cerambycidae) have been introduced accidentally into different regions of the world, where they colonize weakened trees or cut logs. These insects can survive inside the wood while it is being processed for various uses (Wang et al. 1999; Mansfield 2016). Larvae of these insects damage the trunk of host trees or their logs by forming galleries beneath their bark, with higher survival on trees that have been subjected to water stress (Hanks et al. 1991).

Phoracantha recurva, which occurs naturally in Australia and the southern part of Papua New Guinea, has high dispersal capacity and survives for long periods inside stored logs. Therefore, it has potential to infest other regions of the world. This insect has been introduced into Argentina, Chile, France, Israel, Maltese Islands, Morocco, Portugal, Spain, Tunisia, Turkey, USA, and Uruguay (Lanfranco & Dungey 2001; Mifsud 2002; Monné et al. 2002; Bybee et al. 2004; Di-Iorio 2004; Grosso-Silva 2007; Friedman et al. 2008; Faucheux 2012; Dhahri et al. 2016; Özdikmen 2017; Valladares et al. 2017). In Brazil, this borer damaged *Corymbia citriodora* (Hook) Hill & Johnson (Myrtaceae) logs in Paranapanema, São Paulo State, Brazil, in 2001; *Eucalyptus urophylla* Blake (Myrtaceae) clone logs in Lavras, a cerrado region of the state of Minas Gerais, in 2005; and it was collected in ethanolic traps in Pinheiro Machado, Rio Grande do Sul (host plants not specified) in 2011 (Wilcken et al. 2002; Santos et al. 2007; Bernardi et al. 2011).

The objective of this report is to document the occurrence of *P. recurva* damaging weakened *C. citriodora* trees in an urban area of the Atlantic rainforest in Viçosa, Minas Gerais State, Brazil. This is the first report of its occurrence in this biome of Minas Gerais State, a region

with temperate climate with dry winters and hot summers (Cwa, Köppen climate classification system) (Sá Júnior et al. 2012).

Two *C. citriodora* trees were cut near the forest nursery of the Universidade Federal de Viçosa in early Jul 2017. Galleries were excavated under the bark (Fig. 1A), and 1 *P. recurva* male adult was observed in the trunk of the cut trees (Fig. 1B). The 2 *C. citriodora* trees had sparse crowns, leaf fall, and exit holes from adult insects on their bark. The source of the stress that predisposed these trees to *P. recurva* damage was not determined.

Phoracantha recurva differs from *P. semipunctata* by possessing long, dense gold-colored hairs below each antennal segment, and the elytra with a greater amount of cream to yellow color. The sex of *P. recurva* was determined by the antennae length, which is almost twice as long as the body for males, but only slightly longer for females (Wang 1995).

The importance of *P. recurva* is increasing worldwide due to its greater damage compared to *P. semipunctata*, as well as its greater reproductive capacity, faster development, and longer adult longevity (Millar et al. 2003; Bybee et al. 2004). Additionally, biological control of *P. recurva* populations seems to be less efficient than for *P. semipunctata* (Luhring et al. 2000).

Climatic conditions may favor or limit the dispersal of harmful insects to regions where their host plants are present (Liang & Fei

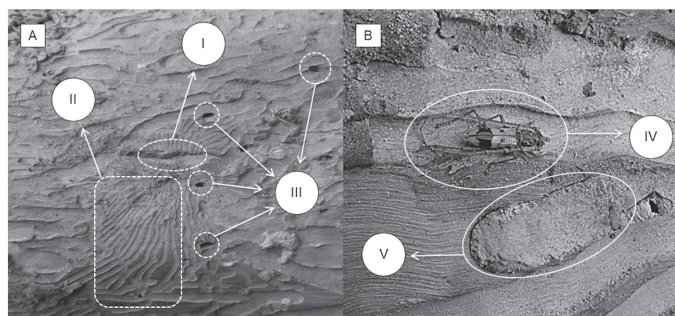


Fig. 1. *Phoracantha recurva* (Coleoptera: Cerambycidae) signs on *Corymbia citriodora* (Myrtaceae) trunk in Viçosa, Minas Gerais State, Brazil. *Corymbia citriodora* trunk bored by *P. recurva* larvae with oviposition sites, galleries, and adult exit holes (A), and *P. recurva* adult collected on the *C. citriodora* trunk gallery (B). Oviposition sites (I), galleries (II), adult exit holes (III), *P. recurva* adult (IV), and excrement (V). Photo: Norivaldo dos Anjos, 7 Jul 2017.

¹Universidade Federal de Viçosa, Departamento de Entomologia, Instituto de Biotecnologia, Aplicada à Agropecuária, Viçosa, Minas Gerais 36570-900, Brazil; E-mails: carlos.cb.mg.coleoptera@gmail.com (C. A. C.), nanjos@ufv.br (N. A.), scvaldeir@hotmail.com (V. C. S. J.), zanuncio@ufv.br (J. C. Z.)

²Universidade Federal de Viçosa, Departamento de Engenharia Florestal, Viçosa, Minas Gerais 36570-900, Brazil; E-mail: ameliagcarvalho@gmail.com (A. G. C.)

³Programa de Pós-Graduação em Produção Vegetal, Universidade Federal dos Vales Jequitinhonha e Mucuri, Diamantina, Minas Gerais, 39100-000, Brazil; marcussoares@yahoo.com.br (M. A. S.)

*Corresponding author; E-mail: carlos.cb.mg.coleoptera@gmail.com

2014). This is the first record of *P. recurva* in the Atlantic rainforest of Minas Gerais State, Brazil, a temperate climate with dry winters and hot summers (Cwa) (Sá Júnior et al. 2012). This shows a high plasticity of *P. recurva* to establish in regions with distinct climate conditions, and suggesting that it may survive in most parts of Brazil. Suitable forest practices, such as prevention and integrated pest management programs for this and other introduced insects, are fundamental to avoid or reduce their establishment in new areas, and to reduce economic losses in regions where they are present (Paine et al. 2009).

The record of *P. recurva* infesting *C. citriodora* logs in the Minas Gerais Atlantic rainforest region increases its distribution in Brazil; this knowledge is important to reduce or preventing its damage in Brazil.

The authors acknowledge the Brazilian agencies “Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq),” “Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES)” - Finance Code 001, “Fundação de Amparo à Pesquisa do Estado de Minas Gerais (FAPEMIG),” and “Programa Cooperativo sobre Proteção Florestal/PROTEF do Instituto de Pesquisas e Estudos Florestais/IPEF” for scholarships and financial support.

Summary

The expansion of the area planted with *Eucalyptus* species and the trade of its products in the world have been accompanied by accidental introduction of exotic insects. The genus *Phoracantha* Newman (Coleoptera: Cerambycidae), from Australia and New Guinea, has 40 borer species that use trees and freshly cut logs of the genus *Angophora*, *Corymbia*, and *Eucalyptus*. The objective of this report is to document the occurrence of *P. recurva* damaging weakened *C. citriodora* trees in an urban area of the Atlantic rainforest in Viçosa, Minas Gerais State, Brazil. Extensive feeding galleries and the presence of a *P. recurva* male adult were found in the trunks of weakened trees of *C. citriodora* logs in an area near the forest nursery of the Universidade Federal de Viçosa. This is the first report of this borer species in this climate zone of the Atlantic rainforest biome of Minas Gerais, Brazil. This suggests that *P. recurva* has high plasticity to establish in regions with different climatic conditions, being able to survive in most regions of Brazil. The record of *P. recurva* infesting *C. citriodora* trees in the Minas Gerais Atlantic rainforest region increases its distribution in Brazil. This knowledge is important in reducing or preventing its damage in Brazil.

Key Words: Australian eucalyptus borer; distribution; forest pest

Sumário

A expansão da área plantada com espécies de *Eucalyptus* e o comércio de seus produtos têm sido acompanhados pela introdução accidental de insetos exóticos. O gênero *Phoracantha* Newman (Coleoptera: Cerambycidae), originário da Austrália e Nova Guiné, tem 40 espécies de besouros broqueadores de árvores e toras recém-cortadas dos gêneros *Angophora*, *Corymbia*, e *Eucalyptus*. O objetivo deste registro é documentar a ocorrência de *P. recurva* danificando árvores enfraquecidas de *C. citriodora* em uma área urbana da Mata Atlântica em Viçosa, Minas Gerais, Brasil. Galerias extensas de alimentação e um macho adulto de *P. recurva* foram encontrados em troncos de árvores enfraquecidas de *C. citriodora*, cortadas em área próxima ao viveiro florestal da Universidade Federal de Viçosa. Este é o primeiro relato desta espécie broqueadora nesta zona climática do bioma da Mata Atlântica de Minas Gerais. Isso sugere que *P. recurva* tem alta

plasticidade para se estabelecer em regiões com diferentes condições climáticas, podendo estar presente em uma extensa parte do território brasileiro. O relato de *P. recurva* infestando um tronco de *C. citriodora* na região da Mata Atlântica de Minas Gerais amplia sua distribuição no Brasil. Esse conhecimento é importante na redução ou prevenção de seus danos no Brasil.

Palavras Chave: Broca-australiana-do-eucalipto; distribuição; praga florestal

References Cited

- Almeida KEC, Silva JGS, Silva IMA, Costa AL, Laia AL. 2018. Ecophysiological analysis of *Eucalyptus camaldulensis* (Dehn) submitted to attack from *Thaumastocoris peregrinus* (Carpintero & Dellape). Revista Árvore 42: e420120. doi.org/10.1590/1806-90882018000100020
- Bernardi O, Garcia MS, Ely e Silva EJ, Zazycki LCF, Bernardi D, Miorelli D, Finkenaue E. 2011. Besouros Cerambycidae associados à *Eucalyptus* spp. no município de Pinheiro Machado, RS. Ciência Florestal 21: 23–30.
- Bybee LF, Millar JG, Paine TD, Campbell K, Hanlon CC. 2004. Seasonal development of *Phoracantha recurva* and *P. semipunctata* (Coleoptera: Cerambycidae) in Southern California. Environmental Entomology 33: 1232–1241.
- Dahiri S, Lieutier F, Cheikhrouha FC, Jamma MLB. 2016. Distribution, preference and performance of *Phoracantha recurva* and *Phoracantha semipunctata* (Coleoptera Cerambycidae) on various *Eucalyptus* species in Tunisia. Journal of Zoology 99: 83–95.
- Di-lorio OR. 2004. Especies exóticas de Cerambycidae (Coleoptera) introducidas en la Argentina. Parte 1. el género *Phoracantha* Newman, 1840. Agrociencia 38: 503–515.
- Faucheux MJ. 2012. Ovipositor sensilla of the yellow longicorn beetle *Phoracantha recurva* Newman, 1840 (Coleoptera: Cerambycidae). Bulletin de l'Institut Scientifique de Rabat 34: 11–18.
- Friedman ALL, Rittner O, Chikatinov VI. 2008. Note: five new invasive species of longhorn beetles (Coleoptera: Cerambycidae) in Israel. Phytoparasitica 36: 242–246.
- Grosso-Silva JM. 2007. New and interesting beetle (Coleoptera) records from Portugal (5th note). Boletín Sociedad Entomológica Aragonesa 40: 471–472.
- Hanks LM, Paine TD, Millar JG. 1991. Mechanisms of resistance in *Eucalyptus* against larvae of the eucalyptus longhorned borer (Coleoptera: Cerambycidae). Environmental Entomology 20: 1583–1588.
- IBÁ (Indústria brasileira de árvores). 2017. Report.pdf (last accessed 22 May 2019).
- Lanfranco D, Dungey HS. 2001. Insect damage in *Eucalyptus*: a review of plantations in Chile. Austral Ecology 26: 477–481.
- Liang L, Fei S. 2014. Divergence of the potential invasion range of emerald ash borer and its host distribution in North America under climate change. Climatic Change 122: 735–746.
- Luhning KA, Paine TD, Millar JG, Hanks LM. 2000. Suitability of the eggs of two species of *Eucalyptus* longhorned borers (*Phoracantha recurva* and *P. semipunctata*) as hosts for the encyrtid parasitoid *Avetianella longoi*. Biological Control 19: 95–104.
- Mansfield S. 2016. New communities on eucalypts grown outside Australia. Frontiers in Plant Science 7: 1–9.
- Mifsud D. 2002. Longhorn beetles (Coleoptera, Cerambycidae) of the Maltese Islands (Central Mediterranean). The Central Mediterranean Naturalist 3: 161–169.
- Millar JG, Paine TD, Joyce AL, Hanks LM. 2003. The effects of *Eucalyptus* pollen on longevity and fecundity of *Eucalyptus* longhorned borers (Coleoptera: Cerambycidae). Journal of Economic Entomology 96: 370–376.
- Monné M, Bianchi M, Sánchez A, Escudero R. 2002. Cerambycoides (Coleoptera) que atacan *Eucalyptus globulus* y *Eucalyptus grandis* en Uruguay. Agrociencia 6: 63–68.
- Özdikmen H. 2017. A complete list of invasive alien longhorned beetles species for Turkey (Coleoptera: Cerambycidae). Munis Entomology & Zoology 12: 508–515.
- Paine TD, Dreistadt SH, Millar JG. 2009. *Eucalyptus* longhorned borers: integrated pest management for home gardeners and landscape professionals. Pest Notes 7425: 1–4.
- Pirralho M, Flores D, Sousa VB, Quilhó T, Knapic S, Pereira H. 2014. Evaluation on paper making potential of nine *Eucalyptus* species based on wood anatomical features. Industrial Crops and Products 54: 327–334.

- Sá Júnior A, de Carvalho LG, da Silva FF, Alves MC. 2012. Application of the Köppen classification for climatic zoning in the state of Minas Gerais, Brazil. *Theoretical and Applied Climatology* 108: 1–7.
- Santos A, Zanetti R, Mendonça LA, Mendes LM, Júnior JBG. 2007. Ocorrência da coleobroca *Phoracantha recurva* Newman, 1840 (Coleobroca: Cerambycidae) em diferentes clones de *Eucalyptus urophylla* no estado de Minas Gerais. *Cerne* 13: 1–4.
- Valladares L, Courtin O, Brustel H. 2017. *Phoracantha semipunctata* (Fabricius, 1775) en région toulousaine. Actualisation de son expansion et remarques sur *P. recurva* Newman, 1840 (Coleoptera, Cerambycidae). *Carnets Natures* 4: 5–12.
- Wang Q. 1995. A taxonomic revision of the Australian genus *Phoracantha* Newman (Coleoptera: Cerambycidae). *Invertebrate Taxonomy* 9: 865–958.
- Wang Q, Thornton IWB, New TR. 1999. A cladistic analysis of the Phoracanthine genus *Phoracantha* Newman (Coleoptera: Cerambycidae: Cerambycinae), with discussion of biogeographic distribution and pest status. *Annals of the Entomological Society of America* 92: 631–638.
- Wilcken CF, Berti Filho E, Ottati ALT, Firmino DC, Couto EB. 2002. Ocorrência de *Phoracantha recurva* Newman (Coleoptera: Cerambycidae) em eucalipto no Estado de São Paulo, Brasil. *Scientia Forestalis* 62: 149–153.