



Agrilozodes Suarezii (Coleoptera: Buprestidae) as Secondary Colonizer of a Sclerolobium sp. Branch Girdled by Oncideres Saga (Coleoptera: Cerambycidae)

Authors: Corrêa, Carlos A., Sampaio, Iara S., Zanuncio, José C., Migliore, Letizia J., Curletti, Gianfranco, et al.

Source: Florida Entomologist, 102(1) : 254-256

Published By: Florida Entomological Society

URL: <https://doi.org/10.1653/024.102.0146>

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, 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 Complete 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 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.

Agrilozodes suarezi (Coleoptera: Buprestidae) as secondary colonizer of a *Sclerolobium* sp. branch girdled by *Oncideres saga* (Coleoptera: Cerambycidae)

Carlos A. Corrêa^{1,2,*}, Iara S. Sampaio³, José C. Zanuncio², Letizia J. Migliore^{1,4}, Gianfranco Curletti⁵, and Sérgio P. Ribeiro¹

Dead and decaying wood is a substantial part of forest biomass, providing shelter, food, and microhabitat for different organisms (Seibold et al. 2015). Primary wood colonization may inhibit or stimulate further colonization in response to interactions inside each trunk piece, such as larval competition or gallery openings, subsequently used by secondary colonizer species (Calderón-Cortés et al. 2011; Victorsson 2012).

The twig girdler guild is diverse and widely distributed in neotropical and northern regions of the American continent. The genus *Oncideres* Lepeletier & Audinet-Serville (Coleoptera: Cerambycidae) is composed of twig girdler beetles that are distributed from the US to Argentina (Monné 2002). *Oncideres* species girdle and lay eggs along host plant branches (Lemes et al. 2013, 2014; Paro et al. 2014). Branch girdling stops phloem flow, which is retained around the larvae, making the wood more nutritious (Forcella 1982). As a side effect, the abundance, frequency, and richness of secondary colonizers increase following girdling by other species (Calderón-Cortés et al. 2011). Secondary colonization has been associated with branches girdled by different twig girdler species, such as *Oncideres germarii* Thomson in Argentina, *Oncideres pustulata* LeConte in the US, *Oncideres albomarginata chamela* Chemsak & Giesbert in México, as well as *Oncideres captiosa* Martins, *Oncideres humeralis* Thomson, *Oncideres ocellaris* Thomson, and *Oncideres saga* (Dalman) in Brazil (Hovore & Penrose 1982; Di Iorio 1994; Neto & Link 1997; Paulino Neto et al. 2006; Calderón-Cortés et al. 2011; Lemes et al. 2013, 2015).

Oncideres saga occurs in Argentina, Brazil, and Paraguay as a generalist twig girdler species, girdling branches of host plants with different diam and vertical positions (Monné 2002; Paro et al. 2014). A *Sclerolobium* sp. branch (Fig. 1A), girdled by *O. saga*, was collected in early Oct 2014 in “Porto Capim” site, a secondary semideciduous forest, in the Rio Doce State Park, in Minas Gerais State, Brazil (19.771225°S, 42.626844°W) (Carvalho & Ribeiro 2018). The branch was found on the ground without leaves. It was cut into pieces, transported to the laboratory, and stored in a cardboard box, and moistened once a mo for 1 yr.

A total of 28 adult beetles from 4 species emerged from the branch. Individuals of *Agrilozodes suarezi* (Cobos) (Coleoptera: Buprestidae) (Fig. 1D), *Tropidion signatum signatum* (Audinet-Serville) (Coleoptera: Cerambycidae) (Fig. 1C), *Agrilus* sp. 1 (Coleoptera: Buprestidae) (Fig. 1E), and *O. saga* (Fig. 1B) emerged from the *Sclerolobium* sp. branch girdled by the latter species (Table 1).

The number of *O. saga* individuals that emerged from the girdled branch was higher than that of the secondary colonizers (Table 1). The branch condition, which had no leaves and low moisture, may have influenced secondary colonizer emergence. *Oncideres saga* individuals were the last and largest to emerge from the girdled branch, confirming its longer larval development (Table 1). The beetle development on branches depends on its exposure period, moisture content and season, all related to insect activity (Norhisham et al. 2013; Foit & Cermák 2014; Lee et al. 2014). The results corroborate the pattern reported for *O. albomarginata chamela* in *Spondias purpurea* L. in a dry tropical forest of Mexico (Calderón-Cortés et al. 2011).

Tropidion signatum signatum is widely distributed in Brazil, being reported in Bahia, Piauí, Santa Catarina, and São Paulo states (Moraes & Berti Filho 1974; Favretto et al. 2013; Galileo et al. 2013; Nascimento

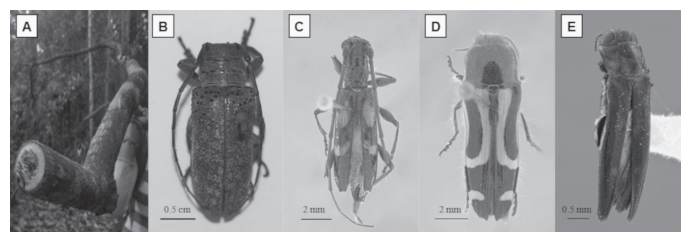


Fig. 1. *Sclerolobium* sp. branch girdled by the twig girdler (A), the twig girdler beetle *Oncideres saga* (Coleoptera: Cerambycidae) (B), and secondary borer beetles, *Tropidion signatum signatum* (Coleoptera: Cerambycidae) (C), *Agrilozodes suarezi* (D), and *Agrilus* sp. 1 (Coleoptera: Buprestidae) (E), emerged from this branch.

¹Universidade Federal de Ouro Preto, Departamento de Biodiversidade, Evolução e Meio Ambiente, Instituto de Ciências Exatas e Biológicas, Ouro Preto, Minas Gerais 35400-000, Brazil; E-mails: carlos.cb.mg.coleoptera@gmail.com (C. A. C.), lmigliore@usp.br (L. J. M.), serviopr@gmail.com (S. P. R.)

²Universidade 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.), zanuncio@ufv.br (J. C. Z.)

³Universidade Federal de Viçosa, Departamento de Engenharia Florestal, Viçosa, Minas Gerais 36570-900, Brazil; E-mail: iarasampaioufv@gmail.com (I. S. S.)

⁴Universidade de São Paulo, Departamento de Entomologia, MZUSP, São Paulo, São Paulo 04263-000, Brazil; E-mail: lmigliore@usp.br (L. J. M.)

⁵Museo civico di Storia naturale, Carmagnola, Turin 10022, Italy; E-mail: giancurletti@gmail.com (G. C.)

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

²Present address (C. A. C.)

⁴Present address (L. J. M.)

Table 1. Primary and secondary beetle colonizers, emergence period, number of individuals (N), and body size (length and width) of the species emerged from a *Sclerolobium* sp. branch girdled by *Oncideres saga* (Coleoptera: Cerambycidae).

Species	Emergence period	N	Length (mm)	Width (mm)*
Primary/ Cerambycidae <i>Oncideres saga</i> (Dalman)	1 May 2015 to 15 Aug 2015	23	19.50 ± 3.20	7.22 ± 1.27
Secondary/ Buprestidae <i>Agrilozodes suarezi</i> (Cobos)	20 Oct 2014 & 27 Oct 2014	2	12.18 ± 0.97	3.91 ± 0.59
<i>Agrilus</i> sp. 1	15 Oct 2014 & 18 Oct 2014	2	3.55 ± 0.49	0.65 ± 0.21
Secondary/ Cerambycidae <i>Tropidion s. signatum</i> (A-Serville)	23 Oct 2014	1	13 ± 0	4 ± 0

*Length and width is represented by mean ± standard deviation.

et al. 2016). The emergence of this beetle from the *Sclerolobium* sp. branch girdled by *O. saga* confirms that this species is opportunistic, because its emergence also has been reported from non-girdled *Lonchocarpus neuroscapha* Benth. branches in São Paulo and from a *Nectandra* sp. branch girdled by *O. saga* in Argentina (Moraes & Berti Filho 1974; Di Iorio 1994).

The observation of the *A. suarezi* emergence from a girdled *Sclerolobium* sp. branch was the first report of its secondary colonization on a branch girdled by *O. saga*. *Agrilozodes suarezi* specimens collected at Petrópolis, Rio de Janeiro, Brazil, were described as *Dactylozodes suarezi* Cobos, and repositioned to the *Agrilozodes* genus (Cobos 1962; Bellamy 2005). The genus *Agrilozodes* has 6 species reported in Brazil, most from Rio de Janeiro State (Portela & Mermudes 2013). This is the first report of this beetle in Minas Gerais State, Brazil.

The colonization of insects on a *Sclerolobium* sp. branch girdled by *O. saga* shows that wood-boring insects invaded these branches after girdling. The shorter larval stage of secondary colonizers seems to be a strategy to reduce or avoid competition with larger twig girdlers. The colonization of *A. suarezi* in a host plant is reported for the first time.

We are grateful to the State Park of Rio Doce and The Minas Gerais Institute of Forestry (IEF-MG) for field support and permits. We thank the Brazilian agencies “Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES/PELD), Fundação de Amparo à Pesquisa do Estado de Minas Gerais (FAPEMIG),” and “Programa Cooperativo sobre Proteção Florestal/ PROTEF” of the “Instituto de Pesquisas e Estudos Florestais/IPEF” for scholarships and financial support. We also thank Alexandre Bahia Gontijo from the Brazilian Forest Service for the identification of the host plant, Miguel A. Monné from “Museu Nacional da Universidade Federal do Rio de Janeiro” for identifying *O. saga*, the USP Zoology Museum (MZUSP) for access to the scientific collection, and Cinthia B. Costa-Milanez for help provided in the writing of an early version of this manuscript.

Summary

A large number of invertebrates use dead wood as shelter, food, and as a microclimate refuge. Ecological succession in this substrate depends on primary colonization, stimulating or inhibiting future successions. Twig girdler beetles girdle and lay eggs inside the bark of branches and trunks of different host plants. Branch girdling blocks the phloem flow, making it more nutritive for offspring and future colonizers. This study, in the State Park of Rio Doce (PERD), Minas Gerais, Brazil, is the first report of a secondary colonization by borers on a *Sclerolobium* sp. branch girdled by *Oncideres saga* (Coleoptera: Cerambycidae). A *Sclerolobium* sp. branch, girdled by *O. saga* was collected in Rio Doce State Park, cut into pieces, and brought to the laboratory,

where it was stored in a cardboard box and moistened monthly. A total of 28 adult beetles of 4 species emerged from this branch. *Agrilozodes suarezi* was found for the first time developing inside a branch of its first host plant. The life history of insects of the genus *Agrilozodes* is poorly known, because this is the first report of aspects of its biology.

Key Words: Buprestidae; host tree; Rio Doce State Park; twig girdler beetles

Sumário

Um grande número de invertebrados utiliza madeira morta como abrigo, alimento e refúgio microclimático. A sucessão ecológica neste substrato depende da colonização primária, estimulando ou inibindo futuras colonizações. Besouros serradores roletam e ovipositam no interior da casca de galhos e troncos de diferentes plantas hospedeiras. O roletamento do galho obstrui o fluxo do floema, tornando o local mais nutritivo para sua prole e futuros colonizadores. Este estudo foi o primeiro relato de colonização secundária de broqueadores em um galho de *Sclerolobium* sp. anelado pelo serrador *Oncideres saga* (Coleoptera: Cerambycidae) no Parque Estadual do Rio Doce (PERD), em Minas Gerais, Brasil. Um ramo de *Sclerolobium* sp., roletado por *O. saga* foi coletado no Parque Estadual do Rio Doce, seccionado em partes e levado ao laboratório, onde foi mantido em caixa de papelão e umedecido mensalmente. Um total de 28 besouros adultos de 4 espécies emergiram deste galho. *Agrilozodes suarezi* foi encontrado pela primeira vez se desenvolvendo no interior de um galho de sua primeira planta hospedeira. A história de vida de insetos do gênero *Agrilozodes* é pouco conhecida, sendo este o primeiro relato de aspectos de sua biologia.

Palavras Chave: Árvore hospedeira; besouros serradores; Buprestidae; Parque Estadual do Rio Doce

References Cited

- Bellamy CL. 2005. Nomenclatural notes and corrections in Buprestidae (Coleoptera). The Pan-Pacific Entomologist 81: 145–158.
- Calderón-Cortés N, Quesada M, Escalera-Vázquez LH. 2011. Insects as stem engineers: interactions mediated by the twig-girdler *Oncideres albomarginata chamela* enhance arthropod diversity. PLoS ONE 6: e19083. doi: 10.1371/journal.pone.0019083
- Carvalho B, Ribeiro SP. 2018. Architecture of *Mabea fistulifera* Mart. (Euphorbiaceae), a neotropical semideciduous tree: development and variations in crown allometry between environments. Flora 239: 104–110.
- Cobos A. 1962. Décima nota sobre Buprestidos neotropicales materiales para el estudio del género *Dactylozodes* Chevrolat (Insecta, Coleoptera). Archivos de Instituto de Aclimatación 11: 29–35.
- Di Iorio OR. 1994. Cerambycidae y otros Coleoptera emergidos de ramas cortadas por *Oncideres germari* (Lamiinae: Onciderini) en el norte argentino. Revista de Biología Tropical 42: 649–661.

- Favretto MA, Santos EB, Geuster CJ. 2013. Entomofauna do oeste do estado de Santa Catarina, Sul do Brasil. *EntomoBrasilis* 6: 42–63.
- Foit J, Cermák V. 2014. Colonization of disturbed Scots pine trees by bark and wood-boring beetles. *Agricultural and Forest Entomology* 16: 184–195.
- Forcella F. 1982. Why twig-girdling beetles girdle twigs. *Naturwissenschaften* 69: 398–400.
- Galileo MHM, Martins UR, Nascimento FEL. 2013. Cerambycidae (Coleoptera) do Parque Nacional da Serra das Confusões, Piauí, Brasil: novas espécies e novos registros. *Iheringia Série Zoológica* 103: 393–397.
- Hovore FT, Penrose RL. 1982. Notes on Cerambycidae co-inhabiting girdles of *Oncideres pustulata* Leconte (Coleoptera: Cerambycidae). *The Southwestern Naturalist* 27: 23–27.
- Lee CJ, Baxt A, Castillo S, Berkov A. 2014. Stratification in French Guiana: Cerambycid beetles go up when rains come down. *Biotropica* 46: 302–311.
- Lemes PG, Anjos N, Jorge IR. 2013. Bioecology of *Oncideres ocularis* Thomson (Coleoptera: Cerambycidae) on *Acacia mangium* Willd. (Fabaceae). *Journal of the Kansas Entomological Society* 86: 307–317.
- Lemes PG, Castro AA, Zanuncio JC. 2014. *Oncideres ocularis* (Coleoptera: Cerambycidae) girdling *Mimosa bimucronata* (Fabaceae) in Brazil. *Florida Entomologist* 97: 1240–1243.
- Lemes PG, Cordeiro G, Jorge IR, Anjos N, Zanuncio JC. 2015. Cerambycidae and other Coleoptera associated with branches girdled by *Oncideres saga* Dalman (Coleoptera: Cerambycidae: Lamiinae: Onciderini). *The Coleopterists Bulletin* 69: 159–166.
- Monné MA. 2002. Catalogue of the Neotropical Cerambycidae (Coleoptera) with known host plant – Part IV: Subfamily Lamiinae, Tribes Batocerini to Xenofreini. *Publicações Avulsas do Museu Nacional* 94: 1–92.
- Moraes GJ, Berti Filho E. 1974. Coleobrocas que ocorrem em essências florestais. *Revista do IPEF* 1: 27–42.
- Nascimento FEDEL, Botero JP, Bravo F. 2016. Checklist of the Cerambycidae (Insecta, Coleoptera) from central Bahia State (Brazil), with the description of two new species and new geographic records. *Zootaxa* 4109: 555–568.
- Neto LW, Link D. 1997. Cerambycidae associados a Lauraceae, na região central do Rio Grande do Sul, Brasil. *Ciência Florestal* 7: 33–39.
- Norhisham AR, Abood F, Rita M, Hakeem KR. 2013. Effect of humidity on egg hatchability and reproductive biology of the bamboo borer (*Dinoderus minutus* Fabricius). *SpringerPlus* 2: 1–6.
- Paro CM, Arab A, Vasconcellos-Neto J. 2014. Specialization of Atlantic rain forest twig-girdler beetles (Cerambycidae: Lamiinae: Onciderini): variation in host-plant use by microhabitat specialists. *Arthropod-Plant Interactions* 8: 557–569.
- Paulino Neto HF, Vasconcellos-Neto J, Carmelo-Guerreiro SM. 2006. The biology of *Oncideres humeralis* Thoms (Coleoptera: Cerambycidae: Lamiinae) and new Cerambycidae-Melastomataceae host-plant associations. *Studies on Neotropical Fauna and Environment* 41: 227–233.
- Portela C, Mermudes JRM. 2013. A new species of *Agrilozodes* Théry, 1927, new record for *A. pygmaeus* (Kerremans, 1897) and a key for the genus (Coleoptera, Buprestidae). *Zootaxa* 3637: 183–189.
- Seibold S, Bäessler C, Brandl R, Gossner MM, Thorn S, Ulyshen MD, Müller J. 2015. Experimental studies of dead-wood biodiversity – A review identifying global gaps in knowledge. *Biological Conservation* 191: 139–149.
- Victorsson J. 2012. Semi-field experiments investigating facilitation: arrival order decides the interrelationship between two saproxylic beetle species. *Ecological Entomology* 37: 395–401.