Atopozelus opsimus (Hemiptera: Reduviidae) Preying on Mastigimas anjosi (Hemiptera: Calophyidae), a Pest of Tropical Cedar, Cedrela fissilis (Meliaceae)

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Atopozelus opsimus (Hemiptera: Reduviidae) preying on Mastigimas anjosi (Hemiptera: Calophyidae), a pest of tropical cedar, Cedrela fissilis (Meliaceae)

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Tropical cedar, Cedrela fissilis Vell. (Meliaceae), is widely distributed in Central and South America (IUCN 2018), and produces wood used in the aerospace, furniture, and naval industries (Gandara et al. 2014). Deforestation and habitat loss threaten this plant (Sakuragui et al. 2013; IUCN 2018), and damage by pests limits commercial production on plantations in Brazil by reducing its growth, and modifying the shape of the tree (Pereira et al. 2016). The main pests of C. fissilis include the mahogany shoot borer, Hypsipyla grandella Zeller (Lepidoptera: Pyralidae), and Antaeotricha bicolor Zeller (Lepidoptera: Oecophoridae). Eacles imperialis magnifica Walker (Lepidoptera: Saturniidae), Megalopyge chrysocoma Herrich-Schäffer (Lepidoptera: Megalopygidae) (Kowalczyk et al. 2012), and Mastigimas anjosi Burckhardt (Hemiptera: Calophyidae) (De Queiroz et al. 2013).

Outbreaks of M. anjosi have been reported in Cedrela spp. and other Meliaceae plantations, such as Toona ciliata M. Roem., since 2010 (Burckhardt et al. 2011). Damage by this insect may cause chlorosis, deformation, curling, spotting, necrosis, abscission, and production of sooty mold on the leaves (Costa et al. 2015). Chemical control of this insect has been conducted in T. ciliata plantations (De Queiroz et al. 2013), but sustainable alternatives, such as biological control strategies, should be developed and used.

Syrphid predators (De Queiroz et al. 2013) and the parasitoid Psyllaephagus trioziphagus (Howard) (Hymenoptera: Encyrtidae) (Costa et al. 2015) are known to be natural enemies of M. anjosi. The objective of this work was to report, for the first time, Atopozelus opsimus Elkins (Hemiptera: Reduviidae) preying on M. anjosi nymphs and adults on C. fissilis trees in Minas Gerais State, Brazil.

Three C. fissilis trees (A1, A2, and A3) were surveyed between Apr and May 2018 on the campus of the Federal University of Minas Gerais in Montes Claros, Minas Gerais State, Brazil. These trees were of different ages and heights, and were planted among other vegetation. The height and diam at breast height of the trees were measured with clinometer and millimeter tape, respectively. The height and diam at breast height of trees A1, A2, and A3 were 6.5 m and 29.4 cm, 2.8 m and 6.0 cm, and 3.4 m and 13.6 cm, respectively.

Damage and behavior of M. anjosi on C. fissilis trees were observed. Leaves of this plant that were infested by M. anjosi and with A. opsimus were collected, taken to the Laboratory of Applied Forest Entomology, and placed in 3 wooden cages coated with clear plastic and a cover.

Mastigimas anjosi was found in colonies on the trees, mainly on the rachis and base of petioles. This insect caused leaflet deformation and curling, and sooty mold was observed on tree A1, even with the predator (A. opsimus) present. The leaves of this plant, a deciduous species, fell in May of that year, eliminating the insects. Trees A2 and A3 were younger, and suffered no injuries.

Atopozelus opsimus was observed on all 3 trees. Its eggs were deposited on the primary veins (Fig. 1a) on the abaxial face of the C. fissilis leaflets. Nymphs and adults were present primarily between the veins. Adults of A. opsimus preyed on M. anjosi nymphs and adults (Fig. 2). Adults of this predator exhibited parental care, and were observed standing over their eggs and nymphs (Fig. 1b). Immature predators preyed on nymphs of the psyllid and supplemented their diet by feeding on their honeydew. Musca domestica L. (Muscidae: Muscinae) adults also consumed M. anjosi honeydew on the leaves, and chrysopid eggs were observed on the C. fissilis leaflets.

The presence of M. anjosi apparently attracted A. opsimus to the C. fissilis trees, but this plant is deciduous, preventing the continuing presence of this predator. Atopozelus opsimus did not reduce M. anjosi damage on C. fissilis trees, which may be related to the high populations of this pest, and also to the temperatures of the region. Reproduction and development of the predator may have been inhibited, resulting in a lower number of individuals to control the pest. Temperatures above 36.36 °C for females and 31.57 °C for males can increase the development period and reduce A. opsimus reproduction rates ( Dias 2013). However, this predator assists in the management of Glycaspis brimblecombei Moore (Hemiptera: Psyl- lidae) in eucalyptus plantations (Dias et al. 2012), so it may contribute to M. anjosi population regulation following augmentative releases.

Atopozelus opsimus oviposition, which occurred mainly on the primary leaflet veins, may be related to proximity to the food source because M. anjosi was found principally on the base of the petiole and rachis. In addition, sugary substances such as honeydew and nectar produced by extrafloral nectaries (Guillermo-Ferreira et al. 2012), may complement the diet of A. opsimus in situations of prey scarcity, such as during the dry season, and could be used to rear this predator in the laboratory for augmentative releases (D’Ávila et
Atopozelus opsimus feeds on M. domestica adults in the laboratory (M. F. Matos, personal observation), and such hosts may complement the predator diet in case of M. anjosi scarcity. Parental care is a common behavior for species of this genus, as reported for Atopozelus pallens (Herrich-Schäffer) (Heteroptera: Reduviidae) adults, which protect their eggs and nymphs against natural enemies on Pithecellobium dulce (Roxb.) Benth. (Fabaceae) plants in Santiago de Cali, Colombia (Tallamy et al. 2004).

Fig. 1. Eggs deposited on the primary leaflet vein (A); Atopozelus opsimus (Hemiptera: Reduviidae) protecting their eggs and nymphs (B).
Atopozelus opsimus preyed on M. anjosi and, therefore, has potential to be used in the management of this pest.

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Fig. 2. Atopozelus opsimus (Hemiptera: Reduviidae) immature preying on Mastigimas anjosi (Hemiptera: Calophyidae) nymphs.
honeydew. This predator did not eliminate the damage to *C. fissilis*, which may have affected reproduction and increased its development period.

Key Words: biological control; bug; honeydew; predation, tropical cedar

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### Summary

Insects pests such as *Mastigimas anjosi* Burckhardt (Hemiptera: Calophyidae), native to Brazil, limit the establishment of commercial plantations of the tropical cedar *Cedrela fissilis* Vell. (Meliaceae), reducing growth and affecting tree shape. Insecticides have been used to suppress *M. anjosi* outbreaks, but sustainable alternatives should be developed to manage this pest. The objective of this work was to report, for the first time, the predator *Atopozelus opsimus* Elkins (Hemiptera: Reduviidae) preying on *M. anjosi* attacking *C. fissilis* trees in Minas Gerais State, Brazil. Trees of this plant were observed between Apr and May 2018 in Montes Claros, Minas Gerais State, Brazil. *Atopozelus opsimus* adults preyed on *M. anjosi* nymphs and adults, and fed on their honeydew. This predator did not eliminate the damage to *C. fissilis*, which may be related to the temperatures of the region, and which may have affected reproduction and increased its development period.

Key Words: biological control; bug; honeydew; predation, tropical cedar

### Sumário

Insetos pragas, como *Mastigimas anjosi* Burckhardt (Hemiptera: Calophyidae), nativo do Brasil, limitam o estabelecimento de plantios comerciais de *Cedrela fissilis* Vell. (Meliaceae), reduzindo o crescimento e afetando a forma das árvores. Inseticidas tem sido usados para suprimir surtos de *M. anjosi*, mas alternativas sustentáveis devem ser desenvolvidas para manear essa praga. O objetivo desse trabalho foi relatar, pela primeira vez, o predador *Atopozelus opsimus* Elkins (Hemiptera: Reduviidae) predaendo *M. anjosi* atacando árvores de *C. fissilis* no estado de Minas Gerais, Brasil. Árvores dessa planta foram observadas entre abril e maio de 2018 em Montes Claros, estado de Minas Gerais, Brasil. Adultos de *A. opsimus* prenderam ninhas e adultos de *M. anjosi*, e se alimentaram de honeydew. Esse predador não eliminou os danos em *C. fissilis*, o que pode estar relacionado às temperaturas da região, que podem ter afetado sua reprodução e aumentado seu período de desenvolvimento.

Palavras Chave: controle biológico; honeydew; percevejo; predação

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