



A Biological Agent Control for *Parkinsonia aculeata*, the Seed Beetle *Penthobruchus germani*, is Recorded for a New Country

Authors: Ribeiro-Costa, Cibele Stramare, Araldi, Dane Block, and Costa, Ervandil Corrêa da

Source: Florida Entomologist, 93(2) : 313-314

Published By: Florida Entomological Society

URL: <https://doi.org/10.1653/024.093.0226>

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.

A BIOLOGICAL AGENT CONTROL FOR *PARKINSONIA ACULEATA*, THE SEED BEETLE *PENTHOBRUCHUS GERMAINI*, IS RECORDED FOR A NEW COUNTRY

CIBELE STRAMARE RIBEIRO-COSTA, DANE BLOCK ARALDI² AND ERVANDIL CORRÊA DA COSTA²

Departamento de Zoologia, Universidade Federal do Paraná, Caixa Postal 19020, 81531-980, Curitiba, Paraná, Brazil
E-mail: stra@ufpr.br

²Departamento de Defesa Fitossanitária, Universidade Federal de Santa Maria, Centro de Ciências Rurais, Prédio 42, Sala 3229, 97105-900, Santa Maria, Rio Grande do Sul, Brazil
E-mail: dane@mail.ufsm.br; ervandilc@gmail.com

Parkinsonia aculeata L. is a shrubby tree which has generally been considered North American, but according to Hawkins et al. (2007), South America is included in the original native range, with records in Argentina, Venezuela, Paraguay, and Brazil. In Brazil, it has a disjunct distribution, being found in northeast ("caatinga") and in south ("campos") (Lorenzi 2002). Similar disjunct distributions have been recorded for many other plants by Prado (2000), who explained the pattern based on climatic shifts in South America during the late Pleistocene. Thus, *P. aculeata* is clearly native to both the northeast and south regions of Brazil.

Parkinsonia aculeata is useful for ornamentation, shade, supply of wood, evergreen hedge, soil fixation, regeneration of degraded areas, medicine, and food. Because of its uses, *P. aculeata* has been introduced in many countries (Weber 2003) and, in some of them, it has become invasive. It has invaded rangelands in Texas and Arizona, and in Australia it is a serious weed of pastures and rangelands, where it forms dense impenetrable thickets (Woods 1992). In northeast Brazil, populations of *P. aculeata* were restricted almost always to semi-arid lakes which remained flooded part of the year, but in recent years populations have invading pastures, fields and open areas; in some areas there are dense thickets (L. A. de Andrade, Univ. Fed. of Paraíba, personal communication).

Several methods of control are used in Australia, one of which is biological control with the beetle *Penthobruchus germani* (Pic), that was introduced into Australia and became widespread and damaging to *P. aculeata* (van Klinken 2006).

At the end of 2007 pods of *P. aculeata* were collected from Santa Maria (29°41'02" latitude south; 53°48'25" longitude west) and São Sepé (30°09'38" latitude south; 53°33'55" longitude west), Rio Grande do Sul, Brazil, in order to determine what insects were damaging seeds. The pods were packed in ventilated containers at room temperature. When adults emerged they were identified by the first author as *P. germani* mainly by the distinctive pattern of vestiture on the dorsum (Fig. 1) and the format of valves and

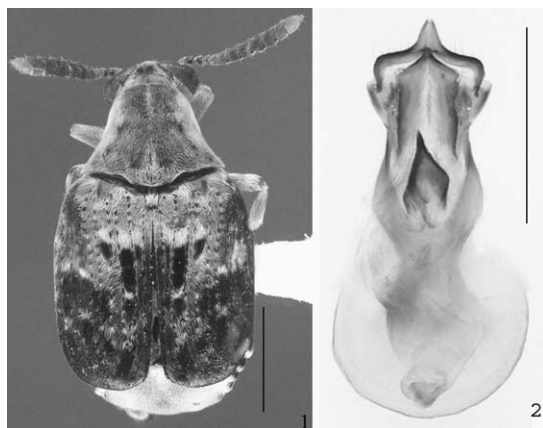


Fig. 1. *Penthobruchus germani*: 1. dorsal view (scale = 1.0 mm); 2. median lobe of male genitalia (scale = 0.5mm).

median sclerite in the internal sac of the median lobe of male genitalia that separate it from *P. cercidicola* Kingsolver (1973), previously confused by Terán (1962).

According to Kingsolver (1973) the native distribution of *P. germani* includes Chile (Santiago) and Argentina (Santa Fé, Buenos Aires), so this species is recorded for the first time in Brazil. In view of the fact that the previously recorded localities in Argentina, mainly Santa Fé, are closer to both Santa Maria and São Sepé in Brazil, we consider these new places of occurrence part of *P. germani* native distribution and not an introduction.

The range of bruchines typically overlaps the distribution of its hosts and *P. aculeata* also occurs in other Rio Grande do Sul locations, such as Parque do Espinilho, a conservation unit of Barra do Quaraí city, and Basin of Ibicuí River, so it is very probable that the distribution range of *P. germani* includes these places if more collectings were done. However, it is difficult to predict the occurrence to northeast Brazil, even with the presence of the host plant.

Specimens of *P. germani* are deposited in the Coleção de Entomologia Pe. J.S. Moure, Departamento de Zoologia, Universidade Federal do Paraná, Curitiba, Brazil. Now that *P. aculeata* is

known to occur in northeast Brazil and the high potential for *P. germani* to control *P. aculeata* because about 90-100% of cotyledons are destroyed during larval period preventing germination (Briano et al. 2002) and, at some sites in Australia, up to 95% of seeds are destroyed (Cochar & Jackes 2005), it is appropriate to begin research on seed predation by *P. germani* in Brazil to understand the role of this species in this new country of occurrence.

SUMMARY

The seed beetle, *Penthobruchus germani*, is a biological agent control for *Parkinsonia aculeata* in Australia. Collections of *P. aculeata* fruits in Brazil showed the presence of *P. germani* for the first time in this country.

ACKNOWLEDGMENTS

We thank Rieks van Klinken for valuable suggestions, The Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) for fellowship and research grant to the first author, and the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) for a fellowship to the second author. Contribution n° 1805 of the Departamento de Zoologia, Universidade Federal do Paraná, Brazil.

REFERENCES CITED

- BRIANO, J. A., CORDO H. A., AND DELOACH, C. J. 2002. Biology and field observations of *Penthobruchus germani* (Coleoptera: Bruchidae), a biological control agent for *Parkinsonia aculeata* (Caesalpinaceae). Biol. Control 24: 292-299.
- COCHARD, R., AND JACKES, B. R. 2005. Seed ecology of the invasive tropical tree *Parkinsonia aculeata*. Plant Ecol. 180: 13-31.
- HAWKINS, J. A., BOUTAOU, N., CHEUNG, K. Y., VAN KLINKEN, R. D., AND HUGHES, C. E. 2007. Intercontinental dispersal prior to human translocations revealed in a cryptogenic invasive plant. New Phytologist 175: 575-587.
- KINGSOLVER, J. M. 1973. Description of a new genus and a new species of Bruchidae from South America (Coleoptera). J. Washington Acad. Sci. 63: 142-146.
- LORENZI, H. 2002. Árvores brasileiras: Manual de identificação e cultivo de plantas arbóreas nativas do Brasil. vol. 1. 4th ed. Nova Odessa: Plantarum. 368 p.
- PRADO, D. E. 2000. Seasonally dry forests of tropical South America: From forgotten ecosystems to a new phyto-geographic unit. Edinburgh J. Botany 57:437-461.
- TERÁN, A. 1962. Observaciones sobre Bruchidae (Coleoptera) del noroeste Argentino. Acta Zool. Lilloana 18: 211-242.
- VAN KLINKEN, R. D. 2006. Biological control of *Parkinsonia aculeata*: what are we trying to achieve? Australian J. Entomol. 45: 268-271.
- WEBER, E. 2003. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, 560p.
- WOODS, W. 1992. Phytophagous insects collected from *Parkinsonia aculeata* [Leguminosae: Caesalpinaceae] in the sonoran desert region of the southwestern United States and Mexico. Entomophaga 37: 465-474.