

DETECTION OF *LEMA BILINEATA* GERMAR (COLEOPTERA: CHRYSOMELIDAE) IN AUSTRALIA

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Summary

The South American chrysomelid *Lema bilineata* Germar is recorded for the first time in Australia. Adults and larvae were found feeding on Prairie Ground Cherry (*Physalis viscosa* L.) in an open greenhouse in Wagga Wagga in southern New South Wales during November 2008. The greenhouse population was eradicated immediately after it was recognised as a potential biosecurity threat but further detections of *L. bilineata* were subsequently made in the Cootamundra area. *L. bilineata* feeds on a range of solanaceous plants including both crop species and weeds, and has potential negative and positive impacts on agriculture in south-eastern Australia.

Keywords: Solanaceae, *Salpichroa*, *Datura*, *Physalis*, *Nicandra*, *Nicotiana*, *Solanum*, biological control

INTRODUCTION

Lema bilineata Germar (Coleoptera: Chrysomelidae: Criocerinae) is native to South America where it feeds on a range of solanaceous plants including *Salpichroa organifolia* (Lam.) Baill. (= *Salpichroa rhomboidea* (Gill & Hook.) Miers, Pampas Lily-of-the-Valley) (Marelli 1927). Although *L. bilineata* is believed to have been introduced into South Africa during the Boer War (1899-1902), the earliest confirmed South African record for the species is from 1911 (van der Merwe 1921, Joubert 1969). By 1925 it was widespread throughout South African tobacco growing areas (Joubert 1969) and had become a serious pest of tobacco (*Nicotiana tabacum* L.), gaining the common name 'tobacco slug' because of the appearance of the larvae which cover their bodies with moist layers of their own excrement (van der Merwe 1921, Bennett *et al.* 1999).

The pest status of *L. bilineata* in South Africa and adjacent tobacco-producing countries prompted a series of studies and reviews that clarified many aspects of its biology, including its range of potential host plants (van der Merwe 1921, Marelli 1927, Joubert 1969). More recent studies (e.g. Araya *et al.* 2000, Ormeño *et al.* 2002) have focused on evaluating the host specificity of *L. bilineata* with a view towards using it in the biological control of solanaceous weeds, particularly *Datura stramonium* L. (= *D. taluta* L., Jimson Weed, Common Thornapple).

In addition to tobacco, *S. organifolia* and *D. stramonium*, *L. bilineata* is also capable of feeding on a

range of other plant species under either field or laboratory conditions. These include *D. ferox* L. (Fierce Thornapple), *Nicandra physalodes* (L.) P.Gaertn. (Apple of Peru), *Nicotiana glauca* R. Grah. (Tree Tobacco), *Physalis peruviana* L. (Cape Gooseberry), *P. minima* L. (Pygmy Ground Cherry), *P. lobata* Torrey (Purple Ground Cherry) and *P. viscosa* L. (= *P. curassavica* L., Prairie Ground Cherry) (van der Merwe 1921, Marelli 1927, Omer-Cooper and Miles 1951, Sengupta and Behura 1957, Joubert 1969, Araya *et al.* 2000, Ormeño *et al.* 2002). Specimens of *L. bilineata* have been collected from *Atropa belladonna* L. (Deadly Nightshade) (Joubert 1969) and whilst there is some anecdotal evidence to suggest that potatoes (*Solanum tuberosum* L.) may experience minor damage (van der Merwe 1921) this has been contradicted in experimental studies (van der Merwe 1921, Marelli 1927, Joubert 1969).

Detection and initial response

Adults (Figure 1) and larvae were initially observed in November 2008 on Prairie Ground Cherry (*P. viscosa*) plants in an unenclosed greenhouse at Wagga Wagga Agricultural Institute, Wagga Wagga, New South Wales (NSW), 35°03'11"S 147°20'52"E. The plants were being cultivated from local rootstock for use in research trials. Adult beetles were sent to the Australian National Insect Collection (ANIC, CSIRO, Canberra) for identification (T.A. Weir), with confirmation by the Australian Museum, Sydney (C.A.M. Reid).

Once the beetles were identified as an exotic species,



Figure 1. *Lema bilineata* Germar, dorsal and lateral views of adult ♂. Body length approximately 6 mm.

the appropriate State and national regulatory authorities (NSW Department of Primary Industries, now Industry & Investment NSW, Orange; Office of the Chief Plant Protection Officer, Department of Agriculture, Fisheries and Forestry, Canberra) were informed of the detection. After collection of a number of voucher specimens the infested plants were sprayed with Confidor® (200 g L⁻¹ imidacloprid, Bayer CropScience Pty. Ltd., East Hawthorn, Vic.) at a rate of 50 mL 100L⁻¹ spray volume. This treatment eliminated the greenhouse infestation, which has not re-established.

Limited survey work was conducted in the Wagga Wagga area during late 2008 and early 2009 and no further infestations were found, however subsequent routine monitoring by Industry & Investment NSW regulatory staff led to the detection of *L. bilineata* on Prairie Ground Cherry in the Cootamundra area, suggesting the species may now be well established in southern NSW. Voucher specimens of *L. bilineata* from the Wagga Wagga and Cootamundra populations have been lodged with ANIC, the Australian Museum and the Agricultural Scientific Collections Unit,

Orange Agricultural Institute, Industry & Investment NSW.

Implications

L. bilineata is the second exotic *Lema* species to establish in Australia. A North American species currently referred to in Australia as *L. trivittata* Say has been known from Queensland since 1978 when it was found feeding on potatoes, although it seems to prefer other solanaceous hosts (Franzmann 1978). This species may be the same as the one introduced into South Africa (Omer-Cooper and Miles 1951, Bennett *et al.* 1999), currently known there as *L. daturaphila* Kogan and Goeden, but at present it is impossible to identify and name the species involved accurately (Ed Riley, *pers. comm.*). The *Lema* species currently referred to *L. daturaphila* in South Africa is known to feed on tobacco, although it apparently prefers *Datura stramonium* under laboratory conditions (Bennett *et al.* 1999). When first detected these introductions were both referred to *L. trilineata* (Olivier), which is an unavailable name.

The literature suggests that *L. bilineata* is a significant pest only of tobacco, and legal tobacco production in Australia ceased in October 2006 following the cancellation of all grower licences (Australian Taxation Office 2008). There is little data to suggest that *L. bilineata* has the potential to be a serious pest of solanaceous vegetables. Feeding tests conducted by van der Merwe (1921) indicated that *L. bilineata* will not attack tomato (*Lycopersicon esculentum* Mill.), capsicum (*Capsicum annuum* L.), eggplant (*Solanum melongena* L.) or potato, and similar results have since been reported for tomato and capsicum by Marelli (1927) and for potato by Joubert (1969). These findings conflict with an anecdotal report quoted by van der Merwe (1921) which stated that potato may be attacked but that the damage was 'slight' compared to that caused to *Datura stramonium* plants within potato fields. Although adverse impacts from the accidental introduction of *L. bilineata* into Australia may yet become apparent, it is possible that the overall effect of this introduction may be beneficial, since this species has the potential to act as a biological control agent for Prairie Ground Cherry and other important solanaceous weed species.

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