

## Notes for *Cardiaspina fiscella* (the brown lace lerp psyllid Hemiptera: Psyllidae) on Eucalypts in Western Australia

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### Background

*Cardiaspina* spp are psyllids in the family Psyllidae. This group of insects are sapsuckers and build protective tests, called lerps under which the nymph lives on the leaf. The nymphs and adults vaguely resemble aphids or small cicadas. Adults are winged and can disperse easily on the wind and in the jet stream. This genus contains many species known to outbreak on eucalypts throughout Australia as outlined in Table 1.

**Table 1** *Cardiaspina* species in Australia.

Species	Authority	Outbreak Status	State outbreak occurred
alba	(Frogg)		
albicollaris	Taylor		
albitextura	Taylor	**	SA, Vic
artifex	(Schwarz)	*	Qld
bilobata	Taylor	*	Vic (new in 1984)
brunnea	(Frogg)		
cerea	(Signoret)		
corbula	Taylor		
densitexta	Taylor	**	SA, (Vic)
fiscella	Taylor	*	NSW, (Qld)
jerramungae	Taylor	**	WA (new in 1982)
maniformis	Taylor	*	NSW, (Qld)
pinnaeformis	(Frogg)		
retator	Taylor	*	Vic, (SA)
spinifera	(Frogg)		
spinosula	(Signoret)		
squamula	Taylor	*	Tas
tenuitela	Taylor	*	NSW
textrix	(Frogg)		
virgulipelta	Taylor		
vittaformis	(Frogg)		

(\* = outbreak recorded, \*\* = known for prolonged outbreaks)

From Morgan (1984)<sup>i</sup>, supplemented by recent knowledge.



Left: *C. fiscella* test found at Perth Zoo Koala enclosure on *Eucalyptus* sp. Right: Example of leaf damage caused by *Cardiaspina* psyllids (species in picture *C. jerramungae*).

Of the 21 species listed above, 10 are known to outbreak and cause severe defoliation on eucalypts. Of these outbreaking species, 3 are known to cause severe prolonged defoliation due to population outbreak.

The genus predominates in eastern Australia (Hollis 2004). In Western Australia there is only one known endemic species of *Cardiaspina* (*C. jerramungae*) which was discovered in 1982 in outbreak levels on *E. occidentalis* (flat-topped yate) in the lower great southern.

*Cardiaspina fiscella*, commonly known as the brown lace lerp psyllid, is known to outbreak on all its hosts in NSW and Vic. In Western Australia it was first noticed in a *Eucalyptus robusta* plantation on Hanrahan Rd Albany WA in October 2001. Samples were sent to CSIRO Canberra where they were positively confirmed as *C. fiscella* on Nov 6 2001 by Mary Carver. Subsequently the major insect collections at the then Dept Conservation and Land Management, Agricultural Department of WA and the Western Australian museum were contacted and all confirmed no records of *C. fiscella*. Consequently it was concluded that there was an incursion of *C. fiscella* in WA. However, subsequent to the initial discovery, further populations were found in Yarloop on *E. botryoides* (an amenity tree in a park at the south end of the old Yarloop workshops) on 7 Nov 2001, on amenity trees (*E. botryoides*) at the University of Western Australia research station at Floreat on 11 Nov 2001 where all populations were at high levels and later in the koala enclosure at the Perth Zoo on April 19 2003. The psyllid has also been observed on *E. botryoides* in the memorial avenues of Kings Park. The then Forest Health Advisory Committee (FHAC) therefore concluded that although a generic incursion had occurred the species was now wide spread throughout southern WA and so the Generic Incursion Management Plan (GIMP) for species eradication would not be implemented.

## Biology

Within the genus *Cardiaspina* there are usually 3-5 generations a year, determined by ambient temperature. In W.A. *C. jerramungae* has 3 generations per year, one in winter (May-Nov) and 2 in summer/autumn (Dec-Feb, Feb-May). But exact timing can vary depending on the season. It is likely that generation timing for *C. fiscella* will be similar.

Nymphs of the species *C. fiscella* usually live on the underside of leaves together with another lerp, *C. maniformis* on the upper leaf surface. To date *C. maniformis* has not been found in WA.

## Hosts

Host range for individual species is usually restricted to 2-3 closely related eucalypts. The hosts of *C. fiscella* in eastern Australia are *E. grandis*, *E. saligna*, *E. robusta*, and *E. botryoides*. All are in the Transversaria section of *Eucalyptus* and all are closely related (Borland et al 1985)<sup>ii</sup>. Karri also belongs to this group and is closely related to *E. saligna* and *E. grandis*, although it exists alone in the series Diversicolores. Therefore Karri is a potential host for *C. fiscella*.

## *C. fiscella* incursion in NZ

*C. fiscella* was introduced to New Zealand in 1996 and spread rapidly (Withers 2001)<sup>iii</sup>. It was first discovered at Auckland airport. The first year it spread 50 km and in successive years spread by more than double the rate of the year before. The hosts were *E. botryoides* and *E. saligna*. As the insect spread, decline of affected species was rapid and highly visible. The parasitoid *Psyllaephagus gemitus* was investigated in 1997 as a possible biological control (Withers & Bain)<sup>iv</sup> but was later (1999) found in populations of *C. fiscella* in NZ. In WA *Psyllaephagus* sp has been isolated from *C. jerramungae* populations, but the species has not been identified further and this parasitoid achieves little control in outbreak populations.



Parasitised *C. fiscella* (from Withers and Bain 2000)

## Control

*Cardiaspina* spp generally outbreak in natural vegetation, thus control is often not applied. For plantations, control is usually implemented on a management basis, since in their natural distribution reinvasion will occur from outside the target area. Ideally, since this insect is a sapsucker and the nymphs live under a protective test, a systemic insecticide may be appropriate. However past experience has shown that impromptu application of insecticide for controlling outbreaks associated with this genus in natural environments can exacerbate rather than solve the problem unless extensive measures are taken to control populations on all nearby hosts and repeated applications are timed with

the species' generations. Further information on insecticidal control can be found in, Morgan (1984), Stone (1993)<sup>v</sup>, Neuman and Collett (1997)<sup>vi</sup>, Collett (2001)<sup>vii</sup>.

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<sup>i</sup> Borland, D.J, Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnstone, R.D., Kleinig, D.A. and Turner, J.D. (1985). *Forest trees of Australia*. Nelson, CSIRO Australia.

<sup>i</sup> Collett, N. (2001). Biology and control of psyllids, the possible causes for defoliation of *Eucalyptus camaldulansis* Dehnh. (river red gum) in south-eastern Australia – a review. *Aust. For* 64(2): 88-95.

Hollis, D. (2004) Australian Psylloidea. Jumping plantlice and lerp insects. ABRS Canberra, Australia.

<sup>i</sup> Morgan, F.D. (1984). Psylloidea of South Australia. Government Printer South Australia.

<sup>ii</sup> Neuman, F.G. and Collett, N.G. (1997) Insecticide trials of the steele blue saw fly (*Perga affinis*), a primary defoliator in young commercial eucalypt plantations of south-eastern Australia. *Aust For* 60: 75-83.

<sup>ii</sup> Stone, C. (1993). Fertilizer and insecticide effects on tree growth and psyllid infestation of young *Eucalyptus grandis* and *E. dunnii* plantations in northern New South Wales. *Aust For*. 56(3):257-263.

<sup>iii</sup> Withers, T.M. (2001) Colonization of Eucalypts in New Zealand by Australian insects. *Austral Ecology* 26:467-476.

<sup>iv</sup> Withers, T.M. and Bain, J. (2000). Mysterious arrival of *Cardiaspina* parasitoid. *NZ Tree Grower*. May, 33