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Scientific Note

FIRST RECORD OF *GLYCASPIS BRIMBLECOMBEI* (MOORE) (HOMOPTERA: PSYLLIDAE) IN NORTH AMERICA: INITIAL OBSERVATIONS AND PREDATOR ASSOCIATIONS OF A POTENTIALLY SERIOUS NEW PEST OF EUCALYPTUS IN CALIFORNIA

Eucalyptus spp. were first introduced to California in the mid 1800s and within a short time were planted throughout the state for fuel wood, windbreaks, cut foliage, and landscaping. In California, eucalyptus were considered pest free until the early 1980s when the situation changed with the discovery of the psyllid *Blastopsylla occidentalis* Taylor (Taylor, K. L. 1985. J. Aust. Ent. Soc., 24: 17–30), and the borer *Phoracantha semipunctata* Fabr. (Scriven, G. T., Reeves, E. L. & Luck, R. F. 1986. Calif. Agric. 40: 4–6). Subsequently, several other eucalyptus feeding insects from Australia were discovered in California (Table 1). It is noteworthy that most of the species in Table 1 are psyllids, and two of them (*Ctenarytaina longicauda* Taylor and *C. spatulata* Taylor) were not described prior to their discovery in California (Taylor, K. L. 1987. J. Aust. Ent. Soc., 26: 299–233, Taylor, K. L. 1997. Aust. J. Ent., 36: 113–115). Presently, only the borers (*Phoracantha* spp.) and the blue gum psyllid (*C. eucalypti* Maskell) are considered economic pests of eucalyptus in California. University of California biological control programs introduced parasitoids from Australia which have effectively controlled *C. eucalypti* on the ornamental foliage crop *E. pulverulenta* Sims and *P. semipunctata* on several susceptible species (Dahlsten, D. L., Rowney, D. L., Copper, W. A., Tassan, R. L., Chaney, W. E., Robb, K. L., Tjosvold, S., Bianchi, M. & Lane, P. 1998. Calif. Agric., 52: 31–34; Hanks, L. M., Paine, T. D. & Miller, J. G. 1996. Calif. Agric., 50: 14–16). This note focuses on the initial distribution and predators in northern California of *Glycaspis brimblecombei* Moore, a recently recorded and potentially serious eucalyptus pest.

The genus *Glycaspis* Taylor (Homoptera: Psyllidae) is one of the largest of the Myrtaceae-feeding psyllids and includes over 120 species which are naturally distributed from Australia to the Philippine Islands (Moore K. M. 1970 Aust. Zool., 15: 248–342). We found no previous reports of *G. brimblecombei* or any *Glycaspis* spp. outside their native range. In contrast to the other free-living eucalyptus psyllids in California, *G. brimblecombei* nymphs live individually under round glabrous, conical coverings called 'lerps' (Morgan, F. D. 1984. Psylloidea of South Australia). The presence of the 1–4 mm diameter lerps on both sides of expanding and fully expanded leaves makes this psyllid highly conspicuous even at low population densities.

Glycaspis brimblecombei was first found in El Monte, Los Angeles County in June 1998 on *Eucalyptus camaldulensis* Dehnh (Cindy Werner, personal communication), and it was found in Fremont, Alameda County in northern California a month later. By September 1998, *G. brimblecombei* had been recorded in several other cities in northern California including Alameda, Hayward, Oakland, Palo Alto, San Bruno, San Mateo, South San Francisco, and San Francisco. The new

Table 1. Exotic pests of *Eucalyptus* found in California.†

	Date found	County
Psyllidae		
Blastopsylla occidentalis Taylor	1983	Los Angeles*
Ctenarytaina longicauda Taylor	1983	San Diego*
C. eucalypti Maskell	1991	Monterey*
C. spatulata Taylor	1991	Orange*
Cryptoneossa triangula Taylor	1995	Orange*
Glycaspis brimblecombei Moore	1998	Los Angeles*
Coleoptera		
Phoracantha semipunctata Fabr.	1984	Orange*
Gonipterus scutellatus Gyllenhal	1994	Ventura*
Phoracantha recurva Newman	1995	Riverside*
Trichomela sloanei Blackburn	1998	Riverside*
Hymenoptera		
Aprostocetus sp.	1995	Santa Barbara*

* New record for North America.
† Gill, R.J. 1998. Cal. Plant Pest Dis. Rpt., 17: 21–24.

psyllid is responsible for severe defoliation and decline of several eucalyptus species in northern California, and has become a nuisance in ornamental settings where the lerps and honey dew coated leaves stick to shoes of pedestrians. We speculate that the damage caused by *G. brimblecombei* in California may reflect the absence of natural enemies and the unusually high rainfall this past winter. In Australia, outbreaks of several species of lerp forming psyllids are known to follow years of high rainfall (Moore, K. M. 1961. Proc. Linn. Soc. N. S. W., 86: 185–200, White, T. C. R. 1969. Ecol., 50: 905–909).

In Australia, eight *Eucalyptus* spp. are known hosts of *G. brimblecombei: E. blakelyi* Maiden, *E. brassiana* Blake, *E. bridgesiana* Baker, *E. camaldulensis, E. camphora* Baker, *E. dealbata* Cunn. ex Schauer, *E. mannifera* ssp. *maculosa* Baker, *E. nitens* Deane & Maiden, and *E. teriticornis* Smith (Moore 1970; Carver, M. 1987. J. Aust. Ent. Soc., 26: 369–372). In contrast, we have found eggs, early through late stage nymphs, and adults of *G. brimblecombei* on three other species including *E. diversicolor* F. Muell, *E. globulus* Labill, and *E. sideroxylon* Cunn. ex Woolls. We are currently studying the host associations and effects of *G. brimblecombei* on additional *Eucalyptus* spp. in California in an effort to identify resistant species and monitor the effectiveness of existing predators.

Moore (1961) reported several predators (bell-birds, spiders, mites, and larvae of Syrphidae (Diptera), Hemerobiidae (Neuroptera), Chrysopidae (Neuroptera), and Coccinellidae (Coleoptera) and parasitoids (Chalcidoidea: Hymenoptera)) attacking *Glycaspis* spp. in Australia. At the Fremont site in northern California we have observed several arthropod predators associated with *G. brimblecombei* including: spiders, mites, Heteroptera (*Anthocoris nemoralis* Fabr. and *Zelus renardii* Kolenati), Coccinellidae (*Harmonia axyridis* Pallas, *Chilocorus bipustulatus* L., *Hippodamia convergens* Guérin, and *Coccinella californica* Mannerheim), Syrphidae, Hemerobiidae, and Chrysopidae. In California, *A. nemoralis* is an accidentally introduced predator of the Australian acacia psyllid (*Acizzia uncatoides*

Ferris & Klyver) (Hagen & Dreistadt 1990). Furthermore, despite the abundance of the introduced parasitoid of *C. eucalypti, Psyllaephagus pilosus* Noyes (Hymenoptera: Encyrtidae), in the area, neither this wasp nor others have been observed parasitizing *G. brimblecombei.* Based on our observations, there is an apparent inability of the existing predators to control this new psyllid in California, and we conclude that additional biological control organisms will need to be introduced to effect biological control.

The economic impact of *G. brimblecombei* may be far more serious and widespread than that of other eucalyptus psyllids in California for several reasons. First, *G. brimblecombei* oviposits and successfully completes its life cycles on both expanding and fully expanded leaves, and may defoliate the host. In contrast, the other extant psyllid species (*C. eucalypti, C. spatulata, B. occidentalis*) in California do not cause defoliation, and their populations are partially controlled by host phenology because they oviposit and feed almost exclusively in buds and tender foliage (Brennan, personal observation 1995–1998). Second, *G. brimblecombei* appears to have a broader host range than the other psyllids, and, thus, may impact commercial plantations, and ornamental and forestry plantings of eucalyptus. Third, of all the Australian psyllid species established in California, *Glycaspis* is the only genus within its native range known to exhibit outbreak populations and cause severe damage to eucalyptus forests and plantings (Moore 1961). Fourth, it is likely that the repeated defoliation caused by *G. brimblecombei* may induce stress and thus increase *Phoracantha* spp. attacks as has been observed with other *Glycaspis* spp. and beetles (*Xyleborus* sp.) in Australia (Moore 1961). The 'Eucalypt Dieback' syndrome in Australia that has caused the decline and premature death of eucalytpus in agricultural environments, is thought to be caused by interactions between weather-induced stress and attacks by several guilds of insects (Landsberg, J. 1990. Aust. J. Ecol., 15: 89–96).

It is clear that *G. brimblecombei* has the potential to affect eucalyptus culture in California. Existing biological controls are not effective at preventing damage and new ones are needed. Eucalyptus can no longer be considered pest-free in California, and pest resistance should be considered in selecting species for future plantings.

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