

An annotated checklist of the psyllids of California (Hemiptera: Psylloidea)

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Abstract

A revised checklist to the species of Psylloidea (Hemiptera) from California is presented, with information on host plant data, distributions, introduced and pest species, parasites, parasitoids, and predators, and biological control programs. The list includes 164 species, of which six are newly recorded. In total, this comprises a 26% increase in the number of species recorded for California since the last published checklist in 1988. *Choricymoza* Bliven is a **new synonym** of *Phylloplecta* Riley, and 10 species previously in *Euphalerus* Schwarz are recombined under *Nyctiphalerus* Bliven. California has the richest native psyllid fauna in North America, and the influence of climatic and floristic diversity on this diversification is considered.

Key words: biogeography, host plant, jumping plant lice, species diversity, pest species.

Introduction

From a review of the literature and examination of specimens at the California State Collection of Arthropods (CSCA), the California Academy of Sciences (CAL), the Essig Museum of Entomology (EMEC), and the Bohart Museum of Entomology (UCDC) (all institutions in California, USA), we present an updated checklist of the psyllids (Psylloidea, Hemiptera) of California. The checklist updates the published records for California and includes all of the new records of species and host plants for California post-1988 (the date of the last published checklist, Hodkinson 1988). Synonymies are not provided, these can be found in prior publications (e.g., Hodkinson 1986, 1988; Hodkinson & Bird 2000; Hodkinson & Hollis 1987; Burckhardt & Lauterer 1997; Ouvrard 2010; and references therein).

This treatment includes 164 psyllid species for California (121 of these were included in Hodkinson 1988, 37 of these have been published since 1988, and 6 of these are previously unpublished records). These 164 species records represent an increase of 26% since 1988 (Hodkinson 1988). The increase of 43 additional species for California is due in large part to the addition of 16 introduced species since 1988. Table 1 provides a summary of Californian psyllid genera, species numbers, and host plant genera associations.

Several native Californian psyllid genera require further revisionary work, in particular *Neophyllura* Loginova, which has numerous colour and wing pattern variations. A more in depth look at the Californian *Calinda* Blanchard species would help to determine the range of variation and distribution in these species, and the genus *Calophya* Löw needs additional investigation as there are undescribed species and notable polymorphism in some specimen series. Further, undescribed *Calophya* species from southern California appear to be related to species described from Mexico (more information on this potentially under-explored biogeographic link is given below). *Aphalaroida* Crawford was revised by Hodkinson (1991a), and in his revision, four *Aphalaroida* species previously recorded for California were considered to be restricted to other US states; material in Californian collections needs to be reviewed, particularly the specimens now collectively placed under the widespread species, *A. pithecolobia* Crawford. Several other genera are taxonomically complex and/or require additional systematic work, these include *Aphalara*, *Bactericera*, *Cacopsylla*, and *Craspedolepta*.

TABLE 1. Summary of Californian psyllid genera with current psyllid family assignment and well established host plant genera associations; species level host plant associations, as well as unconfirmed host plant associations, and additional information are provided in the text; psyllid genera in bold contain only introduced taxa in California.

psyllid genus (# species)	psyllid family	host plant genus (family)
Acizzia (3)	Psyllidae	<i>Acacia</i> , <i>Albizia</i> , <i>Samanea</i> (Fabaceae); <i>Grevillea</i> , <i>Hakea</i> (Proteaceae)
<i>Amorpha</i> (1)	Psyllidae	<i>Amorpha</i> (Fabaceae)
<i>Aphalara</i> (6)	Psyllidae	<i>Polygonum</i> , <i>Rumex</i> (Polygonaceae)
<i>Aphalaroida</i> (4)	Psyllidae	<i>Pithecellobium</i> , <i>Prosopis</i> (Fabaceae)
Arytaina (1)	Psyllidae	<i>Cytisus</i> (Fabaceae)
Arytainilla (1)	Psyllidae	<i>Cytisus</i> (Fabaceae)
<i>Bactericera</i> (10)	Triozidae	<i>Barkleyanthus</i> (Asteraceae); <i>Convolvulus</i> (Convolvulaceae); <i>Capsicum</i> , <i>Lycium</i> , <i>Solanum</i> (Solanaceae); <i>Lavatera</i> (Malvaceae); <i>Salix</i> (Salicaceae)
Blastopsylla (1)	Psyllidae	<i>Eucalyptus</i> (Myrtaceae)
<i>Cacopsylla</i> (31)	Psyllidae	<i>Betula</i> , <i>Corylus</i> (Betulaceae); <i>Cercocarpus</i> , <i>Purshia</i> , <i>Pyrus</i> (Rosaceae); <i>Elaeagnus</i> (Elaeagnaceae); <i>Fatsia</i> (Araliaceae); <i>Pittosporum</i> (Pittosporaceae); <i>Ribes</i> (Grossulariaceae); <i>Salix</i> (Salicaceae); <i>Viburnum</i> (Caprifoliaceae)
<i>Calinda</i> (3)	Triozidae	<i>Baccharis</i> (Asteraceae)
<i>Calophya</i> (6)	Calophyidae	<i>Rhus</i> , <i>Schinus</i> (Anacardiaceae)
<i>Ceanothia</i> (9)	Psyllidae	<i>Ceanothus</i> (Rhamnaceae); <i>Cercocarpus</i> (Rosaceae)
<i>Craspedolepta</i> (21)	Psyllidae	<i>Achillea</i> , <i>Artemisia</i> , <i>Chrysanthamnus</i> , <i>Gutierrezia</i> , <i>Solidago</i> (Asteraceae); <i>Chamerion</i> (Onagraceae); <i>Frankenia</i> (Frankeniaceae); <i>Salsola</i> (Amaranthaceae)
Cryptoneossa (1)	Psyllidae	<i>Eucalyptus</i> (Myrtaceae)
Ctenarytaina (3)	Psyllidae	<i>Eucalyptus</i> , <i>Lophostemon</i> (Myrtaceae)
Diaphorina (1)	Psyllidae	<i>Citrus</i> , <i>Murraya</i> (Rutaceae)
<i>Diclidophlebia</i> (1)	Psyllidae	<i>Fremontodendron</i> (Malvaceae)
Eucalyptolyma (1)	Psyllidae	<i>Eucalyptus</i> (Myrtaceae)
<i>Euglyptoneura</i> (3)	Psyllidae	<i>Ceanothus</i> (Rhamnaceae)
Euphyllura (1)	Psyllidae	<i>Olea</i> (Oleaceae)
<i>Freysuila</i> (2)	Psyllidae	<i>Caesalpinia</i> , <i>Haematoxylum</i> (Fabaceae); <i>Phoradendron</i> (Santalaceae)
Glycaspis (1)	Psyllidae	<i>Eucalyptus</i> (Myrtaceae)
<i>Heteropsylla</i> (3)	Psyllidae	<i>Acacia</i> , <i>Leucaena</i> , <i>Prosopis</i> (Fabaceae)
Homotoma (1)	Homotomidae	<i>Ficus</i> (Moraceae)
<i>Kuwayama</i> (1)	Triozidae	No confirmed host plant associations
<i>Livia</i> (3)	Psyllidae	<i>Carex</i> (Cyperaceae)
<i>Neophyllura</i> (5)	Psyllidae	<i>Arbutus</i> , <i>Arctostaphylos</i> (Ericaceae)
<i>Neotriozella</i> (1)	Triozidae	No known host plant associations
<i>Nyctiphalerus</i> (9)	Psyllidae	<i>Ceanothus</i> (Rhamnaceae); <i>Cercocarpus</i> (Rosaceae)
Pachyopsylla (2)	Psyllidae	<i>Celtis</i> (Ulmaceae)
<i>Pexopsylla</i> (1)	Psyllidae	<i>Cercocarpus</i> (Rosaceae)
<i>Phylloplecta</i> (2)	Triozidae	<i>Rubus</i> (Rosaceae)
Platycorypha (1)	Psyllidae	<i>Tipuana</i> (Fabaceae)
<i>Psylla</i> (4)	Psyllidae	<i>Alnus</i> (Betulaceae); <i>Buxus</i> (Buxaceae); <i>Prunus</i> (Rosaceae)
Psyllopsis (1)	Psyllidae	<i>Fraxinus</i> (Oleaceae)
<i>Purshivora</i> (2)	Psyllidae	<i>Purshia</i> (Rosaceae)
<i>Triozia</i> (17)	Triozidae	<i>Acmena</i> , <i>Metrosideros</i> , <i>Syzygium</i> (Myrtaceae); <i>Amelanchier</i> (Rosaceae); <i>Chenopodium</i> , <i>Atriplex</i> (Amaranthaceae); <i>Laurus</i> (Lauraceae); <i>Urtica</i> (Urticaceae); <i>Frangula</i> , <i>Rhamnus</i> (Rhamnaceae); <i>Phoradendron</i> (Santalaceae)
Total genera in California: 37 (164 species)		

We found several specimen records in Californian collections that are unconfirmed and require further study to confirm their presence in California; these include *Calophya nigripennis* Riley (EMEC), *Aphalara persicaria* Caldwell and *Aphalara manitobaensis* Caldwell (CSCA), *Cacopsylla hamata* (Tuthill) (EMEC), *Cacopsylla rara* (Tuthill) (CSCA), and *Leuronota maculata* (Crawford) (CSCA). Two species currently only determined to genus are also known from California. An *Acizzia* species close to *Acizzia jucunda* (Tuthill) has been found on several *Acacia* spp. in California; first recorded in California in 1992 (Gill 1992), this species was informally assigned to species #22 by Australian entomologist Keith Taylor. In addition, because the North America material assigned to *Aphalara calthae* (Linnaeus, 1761) is not conspecific with this European species (Hodkinson 1988; Daniel Burckhardt pers. comm.), we have not included *A. calthae* in our checklist, and further work on the North American *Polygonum*-feeding *Aphalara* will be required to determine the number of Californian species.

This checklist project was initiated in 2010 in response to the discovery in 2008 of *Diaphorina citri* Kuwayama, the Asian citrus psyllid (ACP), in California (Anon. 2010). This invasive psyllid pest poses a serious threat to the Californian citrus industry primarily due to the transmission of *Candidatus Liberibacter* spp., a bacterium responsible for citrus greening (Huanglongbing) disease (Grafton-Cardwell *et al.* 2006; Grafton-Cardwell 2010). In order to aid in the selection of psyllid species for host range testing of potential biological control agents, we completed this review of the psyllid fauna of California. Given the concerns raised by ACP, as well as other psyllid pests in California, we also provide information on the known parasites, parasitoids, and predators of psyllids, some of which are effective biological control agents (e.g., Dahlsten *et al.* 1998). Much of the work surveying the parasites of native Californian psyllids was undertaken by Dilworth Jensen (1910–1973) (Essig Museum of Entomology, University of California, Berkeley). Jensen (1951, 1957a) undertook a survey of psyllid parasites over a number of years, often rearing parasitoids from field collected psyllid nymphs. The majority of parasites known from psyllids belong to nine hymenopteran species of parasitoid from six families. Parasitoid larvae develop in the 3rd–5th instar nymphs of psyllids, but it is not always possible to identify the host psyllid species from parasitized nymphs alone. Future developments using DNA methods for analyzing the gut contents of arthropods may assist in identifying both the host plant diet, and the diet of biocontrol agents (e.g., Agusti *et al.* 2003; Jurado-Rivera *et al.* 2009). The most promising biocontrol agent for ACP, which is currently undergoing host specificity testing and review at the University of California, Riverside, is the solitary ectoparasitoid, *Tamarixia radiata* (Waterston) (Hymenoptera: Eulophidae) (Hoddle 2010). Ongoing biological control agent testing for host specificity of this parasitoid includes native Californian psyllid species that occur in and around citrus growing areas (e.g., native psyllids on common native plants in wilderness areas around citrus orchards in the Central Valley, including *Heteropsylla* and *Ceanothia* species); and native Californian psyllid genera that are most closely related phylogenetically to ACP (with *Neophyllura* being the closest of these, followed by *Dictidophlebia* and, more distantly, *Calophya*).

Summary of information on psyllid parasites and parasitoids

In 1957, Jensen published the first review of California psyllid parasitoids covering Hymenoptera and Diptera (Jensen 1957a). In California, Jensen reared parasitoids from more than 30 psyllid species in 11 genera. The majority of psyllid parasitoids attack the immature, nymphal stages, although a few cases are known of adult parasitism, such as the gall midge genus *Endopsylla*. Lal (1934) studied the biology of an *Endopsylla* species in Scotland (UK) and determined that females lay eggs on the fore wings of the adult psyllid. These eggs hatch in 8 to 13 days, and larvae feed initially for 3 or 4 days as ectoparasites, and then burrow into the haemocoel of the host to complete development. In addition to hymenopteran and dipteran parasitoids, adult psyllids can frequently be found with mites (Acariformes) attached. No hymenopteran parasitoids are known to attack adult psyllids, and the majority are ectoparasitoids of nymphs. A notable exception is the eulophid parasitoid, *T. radiata*, which is an ectoparasitoid and feeds on hemolymph from the point of attachment underneath ACP nymphs. In addition, adult female *T. radiata* can kill ACP nymphs via host feeding. To host feed, female parasitoids damage psyllid nymphs with the ovipositor and imbibe hemolymph that issues from the wound. The trauma of host feeding is often sufficient to kill nymphs.

A number of native Californian psyllids are known to have multiple parasitoids. For example, *Neophyllura arbuti* (Schwarz), *Trioza beameri* Tuthill and *Pexopsylla cercocarpi* Jensen are each known to host three different

species of parasitoid from three genera in three different families; and *Ceanothia ceanothi* (Crawford) is parasitized by four species of parasitoid in four different genera in three families. Some parasitoids of psyllids, such as the encyrtid genus *Prionomitus*, appear to be parasitic principally on psyllids, and *Prionomitus mitratus* (Dalman) is recorded from at least 13 psyllid species in four genera, all of which have host plants in the Rosales, including *Ceanothus*, *Cercocarpus*, *Salix*, *Rhamnus*, and *Alnus*. Another encyrtid genus, *Psyllaephagus*, primarily parasitizes psyllids and has been used in the biocontrol of the pistachio psyllid (*Agonoscena pistaciae* Burckhardt & Lauterer) (Mehrnejad & Copland 2006), the blue gum psyllid (*Ctenarytaina eucalypti* (Maskell)) (Dahlsten *et al.* 1998), and the red gum lerp psyllid (*Glycaspis brimblecombei* Moore) (Daane *et al.* 2005). At least 10 *Psyllaephagus* species were reared from native Californian psyllids by Jensen (1957a), including several undescribed species of *Psyllaephagus* from seven different psyllid genera. At least eight species of *Tamarixia* are known to parasitize more than 20 species of psyllid. The impact that invasive psyllids, such as *D. citri*, have on native California psyllids is unknown, neither is it known whether any native parasitoids could be sufficiently generalist to exploit a new resource in the form of introduced psyllid species.

Summary of psyllid-host plant biogeography and co-diversification

North American psyllid species fall primarily into three major faunistic groups with different biogeographic affinities (Hodkinson 1988). First, there are a number of genera with holarctic distributions (with most of these also represented in California, e.g., *Aphalara*, *Bactericera*, *Cacopsylla*, *Craspedolepta*, *Livia*, *Psylla*, and at least two monophyletic species groups of the currently polyphyletic genus *Trioxa*), including a number of species that are widespread and occur on a single host plant species or several closely related host plants across wide pan-arctic distributions (e.g., *Bactericera salicivora* found on *Salix* in Asia, Europe and North America, including California). Second, there are genera that are primarily from tropical Central and South America, with some species distributions extending into southern and eastern USA (these are not represented in California, with the possible exception of some triozid lineages). Third, there is an element of the fauna that is endemic to North America (14 genera are endemic to North America, and at least seven of these are represented in the Californian fauna, including: *Ceanothia*, *Euglyptoneura*, *Neophyllura*, *Neotrioxella*, *Nyctiphalerus*, *Pexopsylla*, *Purshivora*). This element is the largest faunistic component, with 67% of North American species endemic to the region. There is also an element that is particularly important in California: the genera are often tropical or South American in origin (e.g., *Aphalaroida*, *Calinda*, *Freysuila*, *Heteropsylla*) but there are Californian members that are adapted to arid regions and therefore able to adjust to California's highly variable winter rainfall. In addition, numerous psyllid introductions from Australasia (e.g., *Acizzia*, and five *Eucalyptus*-feeding taxa) share a similar arid-adapted ecology. At present, there are 17 arid-adapted species recorded from both Mexico and California, but we expect that more extensive sampling in southern California would increase the number of species and genera sharing this biogeographic association.

California has the largest part of the endemic North America psyllid fauna with 57% of endemic North American psyllid genera, and 38% of endemic North American psyllid species, represented in California, and 31% of these species are found only in California. Several genera, such as *Ceanothia*, *Nyctiphalerus*, and possibly *Euglyptoneura*, appear to have a centre of endemism in California. California has the richest floristic diversity in North America (Calsbeek *et al.* 2003), and studies have shown that herbivorous insect diversity is directly correlated with plant species diversity (e.g., Novotny *et al.* 2006); it is therefore not surprising that California has the highest diversity of psyllid species in North America. The unique endemic diversity of psyllids in California compared to the rest of North America, with a sharp drop in endemism even in neighbouring western states (e.g., Arizona [east of California] and Oregon [north]), is due to both the geographic and topological diversity of California, and the richness of the Mediterranean-type plant biota of the Californian Floristic Province. Psyllids are found on a number of characteristic, species rich Californian plant groups (e.g., *Arctostaphylos*, *Ceanothus*, *Cercocarpus*, and *Salix*) (Table 1). The best examples of regional co-diversification among psyllid and host plant groups are with the genera *Ceanothus* and *Salix*. In particular, *Ceanothus*, with around 55 species (~45 species in California) and a centre of diversity and endemism in California (Hardig *et al.* 2000), has been colonized multiple times by psyllid lineages and is host to three psyllid genera and 15 psyllid species.

Hodkinson (2009) pointed out that psyllid species occurring in strongly seasonal Mediterranean-type climates have compressed periods of reproduction and development. In particular, variability of rainfall and temperature can influence the evolutionary development of periodicity; and temperature and precipitation gradients are significantly correlated with regional diversity in the Californian flora (Ackerly 2009). High psyllid species diversity is found in Mediterranean-type climatic zones around the world. The temporally compressed periods of psyllid development in these regions may be promoting both host specificity and speciation because of the need to synchronize with the host plant resource within a short period of time (e.g., plant growth flush), thus potentially promoting an increased likelihood of reproductive asynchronicity and isolation between psyllid species on different host species. This effect may be particularly important in promoting psyllid diversity in California, where short developmental periods may be even less likely to overlap given the diverse array of topologically complex microclimates.

Another factor contributing to high psyllid diversity in Mediterranean-type climatic zones is the spatial distribution of host plants. Studies have shown that psyllids are able to better track the spatial and temporal availability of their host plants when dispersion within and among host plant populations is facilitated by a relatively high density of host plant individuals (Hodkinson 2009), and there is likely a critical population density threshold of host individuals needed to sustain a host specific psyllid lineage through time (Percy *et al.* 2004). The combination of high plant species richness with relatively high localized density of individuals for a given host plant in Mediterranean-type zones may make these environments likely to promote species diversity in psyllids. In comparison, although tropical forests have higher overall plant species diversity, they are also characterized by greater spatial distance between individuals of a given plant species, creating a highly heterogeneous plant community. Conversely, at the other end of the spectrum, in northern temperate and boreal regions, there is poor plant species richness but host plant species are often widely distributed with very large effective population sizes. Californian and other Mediterranean, and similarly highly seasonal biomes may therefore present a favourable combination of environmental factors: relatively high plant species richness coupled with relatively high levels of homogeneous patchiness in the structure of plant populations, which together promote both psyllid species diversification and persistence of highly adapted and host specific psyllid lineages through time.

There are 30 species that are considered introduced to California in this treatment. The pest psyllid species in California include both native North American species, for instance *Bactericera cockerelli* (Šulc), a major pest of tomatoes native to the USA that has been repeatedly introduced or invaded California from other states (Hansen *et al.* 2008); *Pachypsylla celtidismamma* (Fletcher), and *P. celtidisvesiculum* Riley, are minor pests of *Celtis*, native to eastern and central USA and considered introduced in California), as well as species introduced from Asia (e.g., *Cacopsylla fatsiae* (Jensen), *Diaphorina citri*), Australia (e.g., *Acizzia uncatoides* (Ferris and Klyver), *Glycaspis brimblecombei*), Europe (e.g., *Psyllopsis fraxinicola* (Foerster), *Trioza alacris* Flor), and South America (e.g., *Calophya schini* Tuthill, *Platycorypha nigrivirga* Burckhardt), which have continued to be associated with their original host plants after introduction into California. Many psyllid pest species are multivoltine (e.g., *Bactericera cockerelli* and *Cacopsylla fatsiae*) and may be broader in their dietary tolerance than native species. For instance, host preferences of introduced species may expand in regions of introduction relative to the host preference in the native range (e.g., the eugenia psyllid, *Trioza eugeniae* Froggatt, which in its native range feeds on *Syzygium* host species, has expanded its host range to include another introduced myrtaceous genus, *Metrosideros*, in California; the olive psyllid, *Euphyllura olivina* (Costa), is on *Olea* spp. in its native range, but alternate hosts in California may include *Elaeagnus angustifolia*, and *Phillyrea latifolia*; and *Acizzia hakeae* is recorded on *Hakea* (although the native host plant preferences are not well known), but in California it is recorded from *Hakea* and *Grevillea*, both Proteaceae).

California faces a number of challenges with introduced psyllid species, some of which have been effectively controlled with biological control programs (e.g., Dahlsten *et al.* 1998). There are also a number of taxonomic complexities and interesting biogeographic patterns, as well as undescribed species diversity in the native California fauna, which remain to be explored. Consequently, to emphasise these issues and to assist with the primary objective of better understanding the California psyllid fauna in light of the *D. citri* invasion, this checklist has been compiled to aid in directing and guiding research efforts in these areas.

Checklist. Species are listed alphabetically with the current psyllid family assignment given in Table 1.

***Acizzia* Heslop-Harrison**

***acaciaebaileyana* (Froggatt, 1901)**

Type locality: Australia.

Additional distribution: Philipines, New Zealand; introduced in South Africa, Europe, and USA.

Host plants: *Acacia baileyana*, *A. dealbata*, *A. podalyriifolia*, and *Samanea saman* in Philipines.

Remarks: First recorded for California in 1987 (Gill 1987).

Parasitoids: None specifically, but *Psyllaephagus* sp. are known from other *Acizzia*.

***hakeae* (Tuthill, 1952)**

Type locality: New Zealand (introduced).

Additional distribution: Presumably Australia (but as yet undocumented). Introduced in USA, California.

Host plant: *Hakea acicularis* (in New Zealand), and possibly *Hakea dactyloides* (in Australia, see remarks below); in California recorded from *Grevillea* and *Hakea* spp., including *Hakea suaveolens*, *Grevillea* 'Noellii', and *G. banksii*.

Remarks: First recorded in California, in May 2000 (Gill 2000, 2001, 2002). Tuthill (1952) described this species, first collected in New Zealand, as "apparently introduced from Australia" and mentions that "Keith L. Taylor of the Division of Entomology [CSIRO], Australia, has taken a closely related species from *Hakea dactyloides* in New South Wales." The Californian introduction may therefore have originated from either Australia or New Zealand.

***uncatoides* (Ferris and Klyver, 1932)**

Type locality: New Zealand (but not native there).

Additional distribution: Native in Australia; introduced in Chile, Colombia, Europe, Guadeloupe, Mexico, USA.

Host plant: *Acacia* and *Albizia* species, (Jensen 1957b; Munro 1965; Burckhardt 1989).

Remarks: First recorded in California in 1954 (Jensen 1957b; Beardsley *et al.* 1995).

Predators: *Diomus pumilio* (Weise) (black lady beetle, Coleoptera: Coccinellidae), *Anthocoris nemoralis* (Fabricius) (pirate bug, Hemiptera: Anthocoridae) (Dreistadt *et al.* 2004). Six predaceous insect species have been introduced into California to control *Acizzia uncatoides* (Dreistadt & Hagen 1994).

***Amorphicola* Heslop-Harrison**

***amorphae* (Mally, 1894)**

Type locality: USA, Iowa.

Additional distribution: USA, California, Florida, Nebraska.

Host plant: *Amorpha canescens*, *A. fruticosa*.

Parasitoids: Jensen (1957a) recorded this species in California, and published two associated encyrtid parasitoids, *Cheiloneurus* sp. and *Psyllaephagus* sp., but he noted that *Cheiloneurus* are primarily associated (as hyperparasitoids) with soft scales (Coccidae) and may be secondary Parasitoids of psyllids.

***Aphalara* Foerster**

***curta* Caldwell, 1937**

Type locality: USA, Arizona, California, Colorado, Iowa, Kansas, Nebraska, South Dakota, Utah, Wisconsin, Wyoming.

Additional distribution: Canada, Alberta.

Host plant: Unknown, possibly *Polygonum* sp.

***dentata* Caldwell, 1937**

Type locality: USA, California, Wyoming.

Additional distribution: Canada, Alberta.

Host plant: Unknown.

***loca* Caldwell, 1937**

Type locality: USA, Arizona, California, Colorado, Illinois, Iowa, New Mexico, Oregon, Tennessee, Washington, Washington DC.

Additional distribution: Canada, Alberta, Manitoba

Host plant: *Polygonum erectum*.

***maculata* Caldwell, 1937**

Type locality: USA, California.

Host plant: Unknown.

***rumicis* Mally, 1894**

Type locality: USA, Iowa.

Additional distribution: USA, Arizona, California, Colorado, Illinois, Mississippi, Montana, Oregon, Texas, Washington, Wyoming; Canada, British Columbia, Nova Scotia.

Host plant: *Rumex altissimus*.

***simila* Caldwell, 1937**

Type locality: USA, California, Colorado, Idaho, Oregon, Utah, Washington, Wyoming.

Additional distribution: Mexico.

Host plant: Unknown.

***Aphalaroida* Crawford**

***californica* Tuthill, 1939**

Type locality: USA, California.

Host plant: Unknown.

***inermis* Crawford, 1914**

Type locality: USA, Arizona, California, Texas.

Additional distribution: Mexico.

Host plant: *Prosopis juliflora*, *P. glandulosa*.

***pithecolobia* Crawford, 1914**

Type locality: USA, Texas.

Additional distribution: USA, Arizona, New Mexico.

Host plant: *Pithecellobium* sp., and possibly *Acacia greggii*.

Remarks: Hodkinson (1991a) identified a number of specimens previously placed under *A. acaciae* Crawford (Hodkinson 1988) and *A. spinifera* Crawford under this species; *A. pithecolobia* is therefore now considered to be a widespread species in California.

Parasitoids: *Psyllaephagus* sp.

***rauca* Hodkinson, 1991**

Type locality: USA, California.

Additional distribution: USA, Arizona, New Mexico; Mexico.

Host plant: *Prosopis juliflora*, *P. glandulosa*.

***Arytaina* Foerster**

***genistae* (Latreille, 1804)**

Type locality: Europe.

Additional distribution: introduced in USA, California, Oregon, North Carolina, Massachusetts, Washington; Canada, Nova Scotia.

Host plant: *Cytisus scoparius*.

Remarks: First recorded in North America in the early 1900s, and first recorded in California in 1993 (Wheeler & Hoebeke 2004). Although an accidental introduction, the combination of this species together with another introduced psyllid, *Arytainilla spartiophila*, may help to control the host plant, which is considered a noxious weed.

***Arytainilla* Loginova**

***spartiophila* (Foerster, 1848)**

Type locality: Europe.

Additional distribution: Introduced in Australia, New Zealand, and North America; USA, California, Oregon, Virginia, Washington; Canada, British Columbia.

Host plant: *Cytisus scoparius*.

Remarks: Although deliberately introduced as a biocontrol agent for *Cytisus scoparius* in Australia and New Zealand, it is an accidental introduction in North America (Wheeler & Hoebeke 2004). Early collections in California are from the 1970s (CSCA); common name: broom psyllid.

***Bactericera* Puton**

***californica* (Crawford, 1910)**

Type locality: USA, California.

Additional distribution: USA, Arizona, Colorado.

Host plant: Possibly *Salix*.

***cockerelli* (Šulc, 1909)**

Type locality: USA, Colorado.

Additional distribution: USA, Arizona, California, Idaho, Iowa, Kansas, Minnesota, Montana, Nebraska, New Mexico, Nevada, North Dakota, Oklahoma, South Dakota, Texas, Utah, Wyoming; Canada, Alberta, British Columbia, Saskatchewan; Mexico. Introduced in New Zealand.

Host plant: Various species of Solanaceae including *Capsicum*, *Lycium*, and *Solanum* species.

Remarks: A pest of potatoes, tomatoes, capsicum, and aubergine (Solanaceae) (Liu & Trumble 2004, 2007); sporadic but potentially devastating outbreaks are known in greenhouses and potato growing areas of Arizona, California, Colorado, New Mexico, Texas and since 2006, New Zealand (Teulon *et al.* 2009). Heavy nymph infestations cause symptoms known as potato yellows, and this species is known to vector a *Candidatus* Liberibacter bacterium (Hansen *et al.* 2008). Recorded in California in the 1950s (Jensen 1954).

Parasitoids: *Metaphycus psyllidis* Compere in California, and *Tamarixia triozae* (Burks) in Arizona.

***dubia* (Tuthill, 1943)**

Type locality: USA, Arizona.

Additional distribution: USA, California; Mexico; Guatemala.

Host plant: *Barkleyanthus salicifolius* (= *Senecio salignus*).

***incerta* (Tuthill, 1943)**

Type locality: USA, Alaska, California, Colorado, Oregon, Utah, Washington; Canada, British Columbia.

Additional distribution: Utah.

Host plant: *Salix bebbiana*.

***lavaterae* (Van Duzee, 1924)**

Type locality: USA, California.

Host plant: *Lavatera assurgentiflora*.

***lobata* (Crawford, 1914)**

Type locality: USA, Arizona, California.

Additional distribution: USA, Colorado, Nevada, New Mexico, Wyoming.

Host plant: *Lycium barbarum*, *L. cooperi* (Burckhardt & Lauterer 1997).

***maculipennis* (Crawford, 1910)**

Type locality: USA, California.

Additional distribution: USA, Utah.

Host plant: *Convolvulus* sp.; adults collected from *Solanum xanti* (CSCA).

Parasitoids: *Tamarixia* sp.

***minuta* (Crawford, 1910)**

Type locality: USA, Iowa.

Additional distribution: USA, widespread; Canada, Alberta; Mexico.

Host plant: *Salix* spp., including *S. lasiandra*, *S. lasiolepsis*, *S. exigua*.

Remarks: This species is part of a complex of *Salix*-feeding species (Burckhardt & Lauterer 1997).

Parasitoids: *Tamarixia triozae*, and *Metaphycus* sp.

***salicivora* (Reuter, 1876)**

Type locality: Europe.

Additional distribution: Widespread holarctic species; Asia; USA, Alaska, California, Colorado, Illinois, Nevada, New Mexico, Oregon, Utah, Washington; Canada, Alberta, British Columbia.

Host plant: *Salix* spp., including *S. lasiolepsis*, *S. exigua*, *S. laevigata*, *S. lasiandra*, *S. bebbiana*.

Remarks: This native species is sometimes considered a pest on ornamental willows in California where feeding by nymphs may cause blister-like depressions that distort the leaves (Burckhardt & Lauterer 1997).

Parasitoids: *Tamarixia* sp.

varians (Crawford, 1910)

Type locality: USA, Colorado.

Additional distribution: USA, California, Utah; Canada, Alberta, British Columbia.

Host plant: *Salix* spp., including probably *Salix exigua*.

***Blastopsylla* Taylor**

***occidentalis* Taylor, 1985**

Type locality: Australia.

Additional distribution: Introduced in Mexico, New Zealand, USA (Hodkinson 1991b; Halbert *et al.* 2001).

Host plant: *Eucalyptus spathulata*, *E. lehmannii*, *E. globulus*, *E. spathulata*, *E. sideroxylon*, *E. polyanthemos*.

Remarks: First recorded in California in 1983 (Gill 1985).

***Cacopsylla* Ossiannilsson**

***acuminata* (Jensen, 1956)**

Type locality: USA, California.

Host plant: *Cercocarpus ledifolius*.

***alba* (Crawford, 1914)**

Type locality: USA, California, New Mexico, Nevada, Texas.

Additional distribution: USA, Colorado, Idaho, Utah, Washington, Wisconsin, Wyoming; Canada, Alberta.

Host plant: *Salix exigua*.

***americana* (Crawford, 1914)**

Type locality: USA, California; (Canada, Alberta? see below).

Additional distribution: USA, Colorado, Idaho, Oregon, Utah, Washington; Canada, Nova Scotia; Mexico.

Host plant: *Salix lasiolepis*, *S. lasiandra*.

Remarks: Tuthill (1943) considered the type specimens from California typical and the Alberta specimens as a separate species.

Parasitoids: *Prionomitus mitratus* (Dalman).

***breviata* (Patch, 1912)**

Type locality: Canada, Ontario.

Additional distribution: USA, Alaska, California, Michigan, Nevada.

Host plant: *Salix* sp.

Parasitoids: *Prionomitus* sp.

***brevistigmata* (Patch, 1912)**

Type locality: USA, California

Additional distribution: USA, Arizona, Colorado, Nevada, New Mexico, Utah.

Host plant: *Cercocarpus betuloides*, *C. ledifolius*.

Parasitoids: possibly *Pachyneuron* sp. (as a hyperparasitoid)

***confusa* (Tuthill, 1943)**

Type locality: USA. Arizona, Nevada, Utah.

Additional distribution: USA, California.

Host plant: Probably *Salix* sp.

***coryli* (Patch, 1912)**

Type locality: USA, Colorado.

Additional distribution: USA, Arizona, California, Colorado, Idaho, Nevada, Oregon, Utah, Washington; Canada, British Columbia.

Host plant: Possibly *Purshia tridentata*.

***curta* (Tuthill, 1943)**

Type locality: USA, California, Colorado.

Additional distribution: USA, Oregon.

Host plant: *Salix eastwoodiae*.

***difficilis* (Tuthill, 1943)**

Type locality: USA, Idaho, Montana.

Additional distribution: USA, California.

Host plant: *Cercocarpus ledifolius*.

***dilonchi* (Caldwell, 1938)**

Type locality: USA, Ohio.

Additional distribution: USA, California, Minnesota, Nevada, Wisconsin; Canada, Alberta.

Host plant: *Corylus rostrata*.

***fatsiae* (Jensen, 1957)**

Type locality: USA, California (introduced).

Additional distribution: native to Japan.

Host plant: *Fatsia japonica*.

Remarks: This introduced species appears to have already been well established in California when it was described in 1957 from the San Francisco Bay area (Jensen 1957c).

***hirsuta* (Tuthill, 1938)**

Type locality: USA, Nevada, Oregon.

Additional distribution: USA, California, Idaho, Montana, Washington.

Host plant: possibly *Purshia tridentata*.

***insignita* (Tuthill, 1943)**

Type locality: USA, California, Utah.

Host plant: possibly *Cercocarpus ledifolius*.

***maculata* (Crawford, 1914)**

Type locality: USA, Colorado.

Additional distribution: USA, California, Utah.

Host plant: *Cercocarpus* sp.

Remarks: According to Tuthill (1943), Crawford's 1914 Californian specimen is a different species; this may also apply to the record by Papp and Johnson, 1979 (Hodkinson 1988).

***magna* (Crawford, 1914)**

Type locality: USA, Nevada, Utah.

Additional distribution: USA, California.

Host plant: possibly *Cercocarpus ledifolius*.

***magnicauda* (Crawford, 1914)**

Type locality: USA, Colorado, Wyoming.

Additional distribution: USA, California, Minnesota, Montana, North Dakota; Canada, Alberta, British Columbia, Saskatchewan, Manitoba.

Host plant: *Elaeagnus commutata*.

***media* (Tuthill, 1943)**

Type locality: USA, Utah.

Additional distribution: USA, California.

Host plant: *Cercocarpus ledifolius*.

Parasitoids: *Prionomitus mitratus*.

***minor* (Crawford, 1914)**

Type locality: USA, Colorado

Additional distribution: USA, Alaska, California, Oregon, Utah, Washington, Wyoming; Canada, Alberta, British Columbia.

Host plant: *Salix* spp., including *S. eastwoodiae*, *S. lasiolepis*.

Remarks: Some of Crawford's records from California may refer to *curta* (Tuthill 1943; Hodkinson 1988).

***minuta* (Crawford, 1914)**

Type locality: USA, Arizona, California, Colorado, Nevada, Utah.

Additional distribution: USA, Idaho.

Host plant: *Purshia tridentata*.

Parasitoids: *Psyllaephagus* sp.

***nigranervosa* (Jensen, 1956)**

Type locality: USA, California.

Host plant: Possibly *Cercocarpus*; adults have been collected from *Senna armata* and *Hoffmannseggia microphylla* (these are CSCA host records that need confirmation).

***notapennis* (Jensen, 1956)**

Type locality: USA, California.

Host plant: *Ribes* sp.

***omani* (Tuthill, 1943)**

Type locality: USA, California.

Host plant: Unknown.

***parallela* (Crawford, 1914)**

Type locality: USA, California.

Additional distribution: Records for Washington and British Columbia recorded by Klyver are possibly incorrect (Tuthill 1943; Hodkinson 1988).

Host plant: *Salix* sp.

***pararibesiae* (Jensen, 1956)**

Type locality: USA, California.

Additional distribution: USA, Nevada, Utah, Washington.

Host plant: *Ribes* sp.

***pyricola* (Foerster, 1848)**

Type locality: Europe.

Additional distribution: West Palearctic to E. Siberia, S. Korea and Japan; introduced in Argentina, Canada, USA.

Host plant: *Pyrus communis*; CSCA records for California include nymphs and adults collected from *Pyrus calleryana*.

Remarks: This species and several closely related taxa are responsible for considerable economic losses in fruit production via the vectoring of phytoplasmas.

Parasitoids: Several encyrtid primary parasitoids and hyperparasitoids have been recorded from related psyllids (*C. pyri* and *C. pyrisuga*) feeding on pear in Europe (Sullivan & Volkl 1999) (including, *Prionomitus*, *Psyllaephagus*, *Sectiliclava*, *Syrphophagus*, *Trechnites* (all as primary), and *Pachyneuron* (as secondary)).

***ribesiae* (Crawford, 1911)**

Type locality: USA, Colorado.

Additional distribution: USA, Arizona, California, Idaho, Kansas, Nebraska, Nevada, New Mexico, Oregon, South Dakota, Utah, Wyoming.

Host plant: *Ribes longiflorum*, *R. aureum*.

Remarks: Klyver listed *Ceanothus thyrsiflorus* as a host, but this is incorrect according to Jensen (1956).

***spiculata* (Jensen, 1951)**

Type locality: USA, California.

Additional distribution: Utah.

Host plant: *Salix* sp.

***striata* (Patch, 1911)**

Type locality: USA, Maine.

Additional distribution: Widespread in USA and Canada.

Host plant: *Betula* spp., including *B. occidentalis*.

***tenuata* (Jensen, 1951)**

Type locality: USA, California.

Host plant: *Salix laevigata*.

Parasitoids: *Prionomitus mitratus*.

***tobirae* (Miyatake, 1964)**

Host plant: *Pittosporum tobira*.

Remarks: The transfer of this species to *Edentatipsylla* by Chen *et al.* (2008) is considered artificial (Daniel

Burckhardt pers. comm.). First recorded in California in 2007 (Gill & Watson 2007b). The host is native to Asia (Taiwan, Japan, Korea), and the psyllid was likely introduced with nursery stock.

yosemitensis (Jensen, 1951)

Type locality: USA, California.

Additional distribution: USA, Nevada.

Host plant: Unknown, possibly *Salix*.

Calinda Blanchard

collaris (Crawford, 1910)

Type locality: USA, California.

Additional distribution: USA, Arizona, Texas; Mexico.

Host plant: *Baccharis salicifolia*, *B. pilularis* (CSCA), *B. douglasii* (CSCA).

fumipennis Olivares & Burckhardt, 1997

Type locality: USA, California.

Host plant: *Baccharis* sp. (Olivares & Burckhardt 1997).

longistylus (Crawford, 1910)

Type locality: USA, Colorado.

Additional distribution: USA, Arizona, California, Nevada, New Mexico, Texas.

Host plant: *Baccharis salicina*, *B. salicifolia* (Olivares & Burckhardt 1997).

Calophya Löw

californica Schwarz, 1904: 242

Type locality: USA, California.

Additional distribution: USA, Arizona.

Host plant: *Rhus integrifolia*, *R. ovata*.

Parasitoids: *Tamarixia triozae*; a common eulophid parasitizing a wide diversity of psyllids in several families.

Although approved as a biocontrol agent in some areas for the tomato/potato psyllid (*Bactericera cockerelli*), this parasitoid also attacks many other native species.

dubia Crawford, 1914

Type locality: USA, Colorado.

Additional distribution: USA, California, Montana, Utah.

Host plant: *Rhus trilobata*.

Remarks: previously unpublished EMEC specimens were identified from California by D.D. Jensen.

nigrella Jensen, 1957

Type locality: USA, California.

Host plant: *Rhus trilobata*.

Parasitoids: *Tamarixia (Tetrastichus) triozae*.

oweni Tuthill, 1939

Type locality: USA, Colorado.

Additional distribution: USA, California.

Host plant: Unknown; adults collected from *Phoradendron juniperinum*.

Remarks: previously unpublished EMEC specimens were identified from California by D.D. Jensen.

schini Tuthill 1959

Type locality: Peru.

Additional distribution: Bolivia; introduced in Argentina, Chile, New Zealand, USA, California.

Host plant: *Schinus molle*.

Remarks: First recorded in California in 1984 (Gill 1984); common name: peppertree psyllid (Downer *et al.* 1988; Burckhardt 1988; Burckhardt & Bassett 2000).

Parasitoids: In 1987, a biological control program was initiated in California with the release of a eulophid parasitoid, *Tamarixia schina* Zuparko, native to Chile, which may provide satisfactory control (Paine & Dreistadt 2007; Zuparko *et al.* 2011), but the effectiveness of this natural enemy to control the peppertree psyllid may be limited by high seasonal variation in psyllid populations (Hagan & Tassan 1996).

***triozomima* Schwarz, 1904**

Type locality: USA, Arizona

Additional distribution: USA, California, Colorado, Idaho, Utah.

Host plant: *Rhus trilobata*.

Parasitoids: *Tamarixia triozae*.

***Ceanothia* Heslop-Harrison**

***aculeata* (Crawford, 1914)**

Type locality: USA, California.

Host plant: *Cercocarpus betuloides*.

Parasitoids: *Psyllaephagus* sp.

***assimilis* (Crawford, 1914)**

Type locality: USA, California.

Host plant: *Ceanothus crassifolius*, and probably *C. cuneatus*.

***bicolor* (Jensen, 1957)**

Type locality: USA, California.

Host plant: *Ceanothus cuneatus*.

Parasitoids: *Prionomitus* sp., *Tamarixia* sp.

***boharti* (Jensen, 1957)**

Type locality: USA, California.

Host plant: *Ceanothus cuneatus*.

***ceanothi* (Crawford, 1914)**

Type locality: USA, California.

Additional distribution: USA, Montana, Utah, Washington.

Host plant: *Ceanothus crassifolius*, *C. rigidus*, *C. cuneatus*, *C. thyrsiflorus*, *C. velutinus*.

Parasitoids: *Prionomitus mitratus*, *Tamarixia triozae*, *Psyllaephagus* sp., and *Pachyneuron* sp. (as a hyperparasitoid).

***essigi* (Jensen, 1957)**

Type locality: USA, California.

Host plant: *Ceanothus tomentosus*, *C. oliganthus*, *C. papillosus*, and *C. crassifolius*.

Parasitoids: *Prionomitus mitratus*.

***insolita* (Tuthill, 1943)**

Type locality: USA, California, Utah.

Host plant: *Ceanothus velutinus*.

Parasitoids: *Prionomitus mitratus*.

***mitella* (Jensen, 1957)**

Type locality: USA, California.

Host plant: *Ceanothus oliganthus*, *C. tomentosus*.

***tardiuscula* (Bliven, 1958)**

Type locality: USA, California.

Host plant: *Ceanothus* sp.

***Craspedolepta* Enderlein**

***angustipennis* (Crawford, 1911)**

Type locality: USA, Colorado.

Additional distribution: Widespread in USA and Canada.

Host plant: *Artemisia californica* (CSCA specimens). Journet and Vickery (1979) give *Achillea millefolium*; earlier papers list *Artemisia californica*, *A. tridentata*, *A. ludoviciana*, and *Solidago* sp. (Hodkinson 1988).

***anomala* (Crawford, 1914)**

Type locality: USA, California.

Additional distribution: USA, New Mexico, Oregon, Washington

Host plant: *Artemisia tridentata*, and probably *A. vulgaris*.

***caudata* (Crawford, 1914)**

Type locality: USA, California.

Additional distribution: USA, Arizona, New Mexico; Mexico.

Host plant: Unknown.

***fumida* (Caldwell, 1938)**

Type locality: USA, Maine, Ohio, Pennsylvania.

Additional distribution: Widespread in USA and Canada.

Host plant: probably *Solidago canadensis*.

***furcata* (Caldwell, 1936)**

Type locality: USA, Pennsylvania, Virginia; Canada, Ontario.

Additional distribution: Widespread in USA and Canada.

Host plant: *Solidago graminifolia*, *S. canadensis*.

***gutierreziae* (Klyver, 1931)**

Type locality: USA, Nevada.

Additional distribution: USA, California, New Mexico, Utah; possibly Canada, Alberta

Host plant: *Gutierrezia sarothrae*.

***macula* Journet & Vickery, 1979**

Type locality: USA, California, Pennsylvania.

Additional distribution: Kansas, Maryland, Utah, Virginia.

Host plant: Uncertain, may be one of *Artemisia dracunculus*, *Erigeron canadensis* or *Echinacea angustifolia* (Hodkinson 1988).

***maculidracunculi* Journet & Vickery, 1979**

Type locality: USA, California.

Host plant: *Artemisia dracunculus*.

Parasitoids: Probably *Psyllaephagus* sp.

***martini* (Van Duzee, 1924)**

Type locality: USA, California.

Host plant: *Frankenia salina*.

***minutissima* (Crawford, 1911)**

Type locality: USA, Nevada.

Additional distribution: USA, California, Idaho, Oregon, Utah; Canada, British Columbia.

Host plant: *Artemisia californica*, *A. tridentata*.

***nebulosa* (Zetterstedt, 1840)**

Type locality: Europe.

Additional distribution: Throughout the Palaearctic region. USA, Alaska, California, Colorado, New Hampshire, Washington; Canada, Alberta, British Columbia, Manitoba, Northwest Territories, Ontario, Quebec, Yukon.

Host plant: *Chamerion angustifolium*.

***numerica* (Caldwell, 1941)**

Type locality: Mexico.

Additional distribution: USA, California, Colorado, Florida, Kansas, New Mexico.

Host plant: *Echinacea angustifolia*.

***nupera* (Van Duzee, 1923)**

Type locality: Mexico.

Additional distribution: USA, California.

Host plant: Unknown.

***pinicola* (Crawford, 1914)**

Type locality: USA, California.

Additional distribution: USA, Idaho, Oregon, Utah.

Host plant: Probably *Artemisia tridentata*.

***pulchella* (Crawford, 1911)**

Type locality: USA, California.

Additional distribution: USA, Nevada, New Mexico, Texas, Utah.

Host plant: *Salsola kali*, and possibly *Chilopsis linearis*.

***russellae* Klimaszewski, 1977**

Type locality: USA, Wyoming.

Additional distribution: USA, California, Colorado, Idaho, Oregon, Utah, Washington.

Host plant: *Chrysothamnus nauseosus*, and probably *Artemisia tridentata*.

***suaedae* (Crawford, 1914)**

Type locality: USA, California, New Mexico.

Additional distribution: USA, Arizona, Nevada, Texas, Utah.

Host plant: *Suaeda moquinii*.

Parasitoids: *Psyllaephagus* sp.

***vancouverensis* (Klyver, 1931)**

Type locality: Canada, British Columbia. Neotype designated by Journet and Vickery (1979) is from USA, Washington.

Additional distribution: USA, Arizona, California, Colorado, Idaho, Montana, New Mexico, North Dakota, Oregon, Utah; Canada, Alberta.

Host plant: Possibly *Artemisia tridentata*.

***veaziei* (Patch, 1911)**

Type locality: USA, Maine.

Additional distribution: Widespread in USA and Canada; Mexico.

Host plant: *Solidago nemoralis*, *S. graminifolia*, *S. canadensis*.

Remarks: This is probably a species complex (Journet & Vickery 1979).

***viridis* (Crawford, 1914)**

Type locality: USA, Arizona.

Additional distribution: USA, California.

Host plant: *Frankenia salina*.

***vulgaris* Journet & Vickery, 1979**

Type locality: USA, Michigan, Wyoming; Canada, Quebec, Ontario.

Additional distribution: Widespread in USA and Canada.

Host plant: *Solidago canadensis*, *S. rugosa*, *S. graminifolia*.

***Cryptoneossa* Taylor**

***triangula* Taylor, 1990**

Type locality: Australia.

Additional distribution: Introduced in New Zealand, USA.

Host plant: *Eucalyptus citriodora*, *E. maculata*.

Remarks: A minor pest on lemon-scented gum (*E. citriodora*) and spotted gum (*E. maculata*) in California, and high summer temperatures appear to limit psyllid numbers (Paine & Dreistadt 2007). First recorded in California in 1995 (Gill 1995); common name: lemon gum psyllid.

***Ctenarytaina* Ferris & Klyver**

***eucalypti* (Maskell, 1890)**

Type locality: Australia.

Additional distribution: Introduced in Europe, New Zealand, South America, USA.

Host plant: At least nine *Eucalyptus* spp. (Burckhardt 1998), including *E. pulverulenta*, *E. globulus* in California.

Remarks: First recorded in California in the 1990s (Gill 1991, 1992); common name: blue gum psyllid. This species can have four or more generations per year.

Parasitoids: *Psyllaephagus pilosus* Noyes; this introduced parasitoid is a highly effective classical biological control agent. Insecticide use for this pest was eliminated by 1994 as the parasitoids spread throughout California (Dahlsten *et al.* 1998).

***longicauda* Taylor, 1987**

Type locality: Australia.

Additional distribution: Introduced in USA.

Host plant: *Lophostemon confertus*.

Remarks: First recorded in California in 1983, with eggs, nymphs and adults collected from the host (Gill 1984; Taylor 1987).

***spatulata* Taylor, 1997**

Type locality: Australia.

Additional distribution: Introduced in Europe, New Zealand, South America, USA.

Host plant: Several different *Eucalyptus* spp., including *E. camaldulensis*, *E. globulus*, *E. grandis*, *E. parvifolia*, *E. viminalis*.

Remarks: First recorded in California in 1991 (Taylor 1997; Brennan *et al.* 2001b).

Parasitoids: Recently reared parasitoids from this species (CSCA) appear to be *Psyllaephagus* sp., and may be *P. pilosus*, which was introduced to contro *Ctenarytaina eucalypti*.

***Diaphorina* Löw**

***citri* (Kuwayama, 1908)**

Type locality: Taiwan.

Additional distribution: Broadly distributed in Asia and India. Introduced in Arabian Peninsula, South and Central America, and USA.

Host plant: Several *Citrus* spp., *Bergera* (*Murraya*) *koenigii*, *Murraya exotica*.

Remarks: Studied as a citrus pest since the 1920s in its native range in India and Pakistan (Husain & Nath 1927; Atwal 1962; Atwal *et al.* 1970). First detected in USA (Florida) in 1998 (Halbert & Manjunath 2004), and detected in southern California in 2008; common name: Asian citrus psyllid (ACP). This species transmits *Candidatus Liberibacter* spp., a bacterium responsible for citrus greening (Huanglongbing) disease that may result in considerable economic damage to citrus industries.

Parasitoids: *Tamarixia radiata*, and *Diaphorencyrtus aligarhensis* (Shafee, Alam & Agarwal). The eulophid parasitoid, *T. radiata*, controls the Asian citrus psyllid (ACP) effectively in India (Atwal 1962), and it is considered a superior biological control to the encyrtid parasitoid, *D. aligarhensis*, in Florida where both have been tested for the control of ACP. *T. radiata* exhibits high parasitization rates and rapid establishment in new areas (Aubert 1987; Skelly & Hoy 2004) and has now been introduced to many parts of the world (Halbert & Manjunath 2004; Halbert & Núñez 2004; Wenninger & Hall 2007).

***Diclidophlebia* Crawford**

***fremontiae* (Klyver, 1930)**

Type locality: USA, California.

Host plant: *Fremontodendron californicum*. Nymphs also collected from cultivated *Chiranthodendron pentadactylon* (CSCA).

Remarks: The subfamily Paurocephalinae is predominantly pantropical with *Diclidophlebia* the only genus represented in the New World (Burckhardt & Mifsud 2003).

***Eucalyptolyma* Froggatt**

***maideni* Froggatt, 1901**

Type locality: Australia.

Additional distribution: Introduced in New Zealand, USA.

Host plant: *Eucalyptus citriodora*, *E. maculata*.

Remarks: First recorded in California in 2000 (Gill 2000). This psyllid has three generations per year in its native Australian range. Populations in California tend to reach peak levels in spring and fall, but high summer temperatures appear to limit psyllid numbers for this species (Paine & Dreistadt 2007); common name: spotted gum lerp psyllid.

***Euglyptoneura* Heslop-Harrison**

***fuscipennis* (Crawford, 1914)**

Type locality: USA, California, Colorado, Nevada; Canada, British Columbia.

Additional distribution: USA, Oregon, Utah.

Host plant: *Ceanothus sanguineus*, *C. papillosus*, *C. velutinus*.

***minuta* (Crawford, 1914)**

Type locality: USA, California.

Additional distribution: USA, Utah.

Host plant: *Ceanothus cuneatus*, *C. rigidus*.

Parasitoids: *Prionomitus mitratus*, *Tamarixia triozae*.

***robusta* (Crawford, 1914)**

Type locality: USA, Arizona, California, Colorado, Washington.

Additional distribution: Idaho, Montana, Oregon, South Dakota, Utah, Wyoming; Canada, British Columbia.

Host plant: *Ceanothus fendleri*, *C. cordulatus*, *C. velutinus*, *C. integerrimus*.

Parasitoids: *Prionomitus mitratus* and *Psyllaephagus* sp.

***Euphyllura* Foerster**

***olivina* (Costa, 1839)**

Type locality: Europe.

Additional distribution: Western Mediterranean, including North Africa. Introduced in USA.

Host plant: *Olea* spp., but alternate hosts in California may include *Elaeagnus angustifolia*, and *Phillyrea latifolia* (UC Riverside, CISR).

Remarks: This species is a pest of olive trees in its native range in the Mediterranean and North Africa, and was first recorded in California in 2007 (Gill & Watson 2007). The olive psyllid aestivates during the hottest summer months resuming feeding activity after the first autumn rains. There are usually three generations per year; the second generation, around May, is associated with the flowering shoots and flower buds and may cause many flowers to abort. Large populations may retard growth of young trees. (Hodkinson 1986; Burckhardt 1989; Ksantini *et al.* 2002); common name: olive psyllid.

Parasitoids and Predators: *Apocharips eleaphila* (Silvestri), probably as a hyperparasitoid, and *Psyllaephagus euphyllurae* (Masi). These cynipoid and encyrtid parasitoids were recorded parasitizing olive psyllid in Europe in 1951 and 1911. Other potential predators of *E. olivina* are *Chrysoperla rufilabris* (Burmeister) (lacewing, Neuroptera) and *Cryptolaemus montrouzieri* Mulsant (coccinellid beetle, Coleoptera) (UC Riverside, CISR).

***Freysuila* Aleman**

***dugesii* Aleman, 1887**

Type locality: Mexico. *Additional distribution:* USA, California.

Host plant: *Haematoxylum campechianum* (Burckhardt & Wyniger 2007), and *Caesalpinia cacalaco* in California (Gill 1997).

Remarks: First recorded in California in 1997 (Gill 1997).

***phorodendri* (Tuthill, 1939)**

Type locality: USA, Arizona, California.

Host plant: Adults taken from *Phoradendron tomentosum* (Burckhardt & Wyniger 2007).

***Glycaspis* Taylor**

***brimblecombei* Moore, 1964**

Type locality: Australia.

Additional distribution: Introduced in Europe, South America, and USA (Valente & Hodkinson 2009).

Host plant: Several *Eucalyptus* spp., including *E. camaldulensis*, *E. globulus*, *E. nitens*, *E. blakelyi*, *E. brassiana*, *E. bridgesiana*, *E. camphora*, *E. dealbata*, *E. diversicolor*, *E. sideroxylon*, *E. nicholii*, *E. lehmannii*, *E. rudis*, *E. tereticornis*, *E. mannifera*, *E. maculosa*.

Remarks: First recorded in California in June 1998 (Gill 1998). This pest is a major threat to susceptible *Eucalyptus* species (in particular *E. camaldulensis*, *E. rudis*, *E. tereticornis* which can experience heavy defoliation) that are grown in urban landscapes, as wind shelters, or as commercial forest species (Brennan *et al.* 1999; Brennan *et al.* 2001a); common name: red gum lerp psyllid.

Parasitoids and Predators: *Psyllaephagus bliteus* Riek (Daane *et al.* 2005; Dahlsten *et al.* 2005) released in California as a biocontrol in 2000. Laboratory studies have demonstrated that *P. bliteus* can lay eggs in psyllid nymphs of any age, but female parasitoids prefer third and fourth instars (UC Riverside, CISR; UC Berkeley, CBC). In some cases, generalist predators (e.g., *Anthocoris nemoralis*, Hemiptera: Anthocoridae) may interfere with the effectiveness of *P. bliteus* to control psyllid populations (Erbilgin *et al.* 2004). At least four coccinellid beetles (Coleoptera) and lacewings (Neuroptera) have been recorded feeding on this psyllid (Erbilgin *et al.* 2004).

***Heteropsylla* Crawford**

***cubana* Crawford, 1914**

Type locality: Cuba.

Additional distribution: Native to Central America, this species has been introduced into many parts of the world and is now widespread throughout the tropics. Introduced in USA, California, Florida, Hawaii.

Host plant: *Leucaena glauca*, *L. leucocephala*, and other *Leucaena* species.

Remarks: First recorded in California in 1986 (Gill 1986, 1992).

***flexuosa* Muddiman, Hodkinson & Hollis, 1992**

Type locality: Mexico.

Additional distribution: Costa Rica, El Salvador; considered introduced in USA, Arizona, California.

Host plant: *Acacia farnesiana*, *Acacia* sp. (CSCA specimens).

Remarks: First recorded for California 1996 (Gill 1997). In California, *Acacia farnesiana* is introduced but has naturalized.

***texana* Crawford, 1914**

Type locality: USA, Texas.

Additional distribution: USA, Arizona, California, Colorado, Kansas, Nevada, New Mexico, Utah; Mexico; Nicaragua; Peru.

Host plant: *Prosopis juliflora*, *P. chilensis* and *P. glandulosa*. Also recorded less reliably from *Pithecellobium* sp., *Sphaeralcea angustifolia*, *Monarda citriodora*, and *Chrysopsis* sp.

Remarks: Jensen (1945) suggested that *Prosopis chilensis* may be the primary host species.

***Homotoma* Guérin-Ménéville**

***ficus* (Linnaeus, 1758)**

Type locality: Europe.

Additional distribution: Warmer regions of western Palaearctic; introduced in USA.

Host plant: *Ficus carica*.

Remarks: First recorded in California in 1970s (CSCA).

***Kuwayama* Crawford**

***medicaginis* (Crawford, 1910)**

Type locality: USA, Colorado.

Additional distribution: USA, Arizona, California, New Mexico, Texas; Mexico.

Host plant: Unknown, possibly *Medicago sativa*.

***Livia* Latreille**

***caricis* (Crawford, 1914)**

Type locality: USA, California, Colorado, Illinois, Maine, New Mexico, Oregon, Pennsylvania, Utah, Virginia; Canada, British Columbia.

Additional distribution: USA, Idaho.

Host plant: *Carex* sp.

Remarks: Hodkinson and Bird (2000) note that some Californian specimens show some unique morphological variation.

Parasitoids: A related *Livia* species in Europe is parasitized by an itonid gall midge (*Lestodiplosis liviae* Rübsaamen).

***lobata* Hodkinson & Bird, 2000**

Type locality: USA, California.

Host plant: Unknown.

***vernaliforma* Caldwell, 1940**

Type locality: USA, North Dakota.

Additional distribution: USA, California, Montana, Nevada, Utah, Wyoming.

Host plant: Unknown.

Neophyllura Loginova

***arbuti* (Schwarz, 1904)**

Type locality: USA, California.

Additional distribution: USA, Oregon; Canada, British Columbia.

Host plant: *Arbutus menziesii*.

Parasitoids: *Psyllaephagus arbuticola* Gahan & Waterston, *Pachyneuron validum* Waterston as a hyperparasitoid, and *Apocharips* sp., probably as a hyperparasitoid.

***arctostaphyli* Schwarz, 1904**

Type locality: USA, California.

Additional distribution: USA, Arizona, Colorado, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming; Canada, British Columbia, Manitoba.

Host plant: *Arctostaphylos pungens*, *A. tomentosa*, *A. patula*, *A. hookeri*, *A. glauca*, *A. canescens*, *A. viscida*.

***bicolor* (Martin, 1931)**

Type locality: USA, California.

Host plant: *Arctostaphylos glauca*, *A. manzanita*, *A. patula*, *A. glandulosa*.

***niveipennis* (Schwarz, 1904)**

Type locality: USA, California.

Host plant: *Arctostaphylos viscida*.

***pruinosa* (Martin, 1931)**

Type locality: USA, California.

Host plant: *Arctostaphylos pungens*, *A. glauca*, *A. tomentosa*

***sculptoconus* Crawford, 1914**

Type locality: USA, California.

Host plant: Unknown.

Nyctiphalerus Bliven

Hollis and Martin (1997) in their review of the genus *Euphalerus* Schwarz pointed out that the group of North American species placed in *Euphalerus* sensu lato and associated with *Ceanothus* and *Cercocarpus* host plants was not congeneric with the type species *Euphalerus nidifex* Schwarz; and Hodkinson (1988) commented on the absence of characters to differentiate *Nyctiphalerus lynceus* Bliven from this group. The *E. nidifex* group is considered to be in the Euphalerinae and the species here transferred to *Nyctiphalerus* are in the Arytaininae (Hollis & Martin 1997; Daniel Burckhardt pers. comm.). From examination of the type material (CAL) we can confirm that Bliven's original designation of *Nyctiphalerus* as a monotypic genus was superficial, and he may not have examined other congeneric taxa (even within California). In addition, some doubt surrounds the validation of Bliven's names as he published them privately with limited distribution. Since the genus name has subsequently been used in publications, we are taking advantage of the availability of this genus to transfer, from *Euphalerus* to *Nyctiphalerus*, all of the North American species that are clearly congeneric with *N. lynceus*, including two species not present in California, *Nyctiphalerus dubius* (Caldwell) **comb.n.** and *Nyctiphalerus idahoensis* (Jensen) **comb.n.**

***adustus* (Tuthill, 1937) comb.n.**

Euphalerus adustus Tuthill, 1937: 70

Type locality: USA, Colorado, Utah.

Additional distribution: USA, California.

Host plant: *Cercocarpus ledifolius*.

***cercocarpi* (Jensen, 1957) comb.n.**

Euphalerus cercocarpi Jensen, 1957: 26

Type locality: USA, California.

Host plant: *Cercocarpus ledifolius*.

***jugonervosus* (Tuthill, 1937) comb.n.**

Euphalerus jugonervosus Tuthill, 1937: 74

Type locality: USA, California.

Host plant: Unknown.

lynceus Bliven, 1955

Type locality: USA, California

Host plant: Unknown. Remarks: Bliven (1955) described this species in a monotypic genus, but it clearly belongs with other North American species previously in *Euphalerus* feeding on *Ceanothus* and *Cercocarpus*; both D.D. Jensen (in collection annotations, EMEC) and Hodkinson (1988) suggested *Nyctiphalerus* should be synonymized with this group. Bliven's specimens examined (CAL) of this species look close to *Euphalerus vermiculosus*. Bliven collected specimens from *Sequoia sempervirens*, but this is unlikely to be the host.

nepos (Bliven, 1956) comb.n.

Euphalerus nepos Bliven, 1956: 21

Type locality: USA, California.

Host plant: *Ceanothus* sp.

propinquus (Crawford, 1914) comb.n.

Euphalerus propinquus Crawford, 1914: 122

Type locality: USA, Arizona.

Additional distribution: USA, California.

Host plant: *Ceanothus* sp., and possibly *Amorpha fruticosa*.

Remarks: previously unpublished EMEC specimens were identified from California by D.D. Jensen.

rugipennis (Crawford, 1914) comb.n.

Euphalerus rugipennis Crawford, 1914: 120

Type locality: USA, Arizona, California.

Additional distribution: USA, Oregon, Utah.

Host plant: *Ceanothus cuneatus*, *C. rigidus*.

tantillus (Tuthill, 1937) comb.n.

Euphalerus tantillus Tuthill, 1937: 71

Type locality: USA, Utah.

Additional distribution: USA, California.

Host plant: Unknown.

Remarks: previously unpublished EMEC specimens were identified from California by D.D. Jensen.

vermiculosus (Crawford, 1914) comb.n.

Euphalerus vermiculosus Crawford, 1914: 121

Type locality: USA, California.

Additional distribution: USA, Idaho, Montana, Oregon, Utah.

Host plants: *Ceanothus cordulatus*, *C. velutinus*, *C. leucodermis*, *C. integerrimus*.

Parasitoids: *Tamarixia triozae*.

***Pachypsylla* Riley**

celtidismamma (Fletcher, 1883)

Type locality: USA, Iowa.

Additional distribution: USA, widely distributed in eastern and central North America; considered introduced in California.

Host plant: *Celtis occidentalis*, *C. laevigata*.

Remarks: First recorded in California in 1989 (Gill 1989); common name: hackberry nipple gall psyllid.

Parasitoids: Both *Torymus* sp, as a possible hyperparasitoid, and *Eurytoma* sp., have been reared from *Pachypsylla* sp.

celtidisvesiculum Riley, 1884

Type locality: USA.

Additional distribution: USA, widely distributed in eastern and central North America; considered introduced in California.

Host plant: *Celtis laevigata*.

Remarks: First recorded in California in 1960 (Gill 1989); common name: hackberry blister gall psyllid.

***Pexopsylla* Jensen**

***cercocarpi* Jensen, 1957**

Type locality: USA, California

Host plant: *Cercocarpus betuloides*, *C. ledifolius*.

Parasitoids: *Prionomitus mitratus*, *Psyllaephagus* sp., and *Tamarixia riozae*.

***Phylloplecta* Riley**

Phylloplecta Riley, 1884. Type species *Phylloplecta tripunctata* (Fitch, 1851)

Choricymoza Bliven, 1955. Type species *Choricymoza sequoiae* Bliven, 1955 **syn.n.**

Burckhardt and Lauterer (1997) suggested a congeneric status for *Choricymoza* and *Phylloplecta* based on the close similarity of *Choricymoza sequoiae* to *Phylloplecta rubicola* (Tuthill, 1943) according to Bliven's original descriptions of the former. From examination of the type material (CAL) we can confirm the superficial designation of this species as a monotypic genus, and as with *Nyctiphalerus* above, it seems that Bliven may not have examined related Californian species.

***occidentalis* (Tuthill, 1939)**

Type locality: USA, California; Canada, British Columbia.

Additional distribution: USA, Washington.

Host plant: *Rubus parviflorus* (Hodkinson 1988; Burckhardt & Lauterer 1997).

***sequoiae* (Bliven, 1955) comb.n.**

Choricymoza sequoiae Bliven, 1955: 12

Type locality: USA, California.

Host plant: Likely to be *Rubus* sp.

Remarks: Burckhardt and Lauterer (1997) posited that this species may be conspecific with *Phylloplecta rubicola* (recorded from Washington). Further examination and comparison of the type specimens is needed to confirm this. There is also a close resemblance to *P. occidentalis*.

***Platycorypha* Tuthill**

***nigrivirga* Burckhardt, 1987**

Type locality: Argentina.

Additional distribution: Bolivia, Brazil, Uruguay. Introduced in Europe, USA, California

Host plant: *Tipuana tipu*.

Remarks: First detected in southern California in October 2008 (Rung *et al.* 2009), this psyllid is a pest of the ornamental legume, Tipu, or rosewood tree; common name: Tipu psyllid.

Predators: Brazilian populations are partly controlled by coccinellid beetles (Coleoptera: Coccinellidae).

***Psylla* Geoffroy**

***alni* (Linnaeus, 1758)**

Type locality: Europe.

Additional distribution: Widely distributed across the Palaearctic region. USA, Arizona, California, Idaho, Nevada, Oregon, Washington; Canada, Alberta, British Columbia; Greenland.

Host plant: *Alnus rhombifolia*.

***buxi* (Linnaeus, 1758)**

Type locality: Europe.

Additional distribution: Widely distributed throughout the western Palaearctic; introduced in USA.

Host plant: *Buxus sempervirens*.

***floccosa* Patch, 1909**

Type locality: USA, Maine.

Additional distribution: Widespread in USA and Canada.

Host plant: *Alnus incana*, *A. tenuifolia*.

Parasitoids: *Prionomitus* sp.; and unidentified, possibly *Pachyneuron* sp. (as a hyperparasitoid)

***trimaculata* Crawford, 1911**

Type locality: USA, New York.

Additional distribution: USA, California, Colorado, Connecticut, Florida, Maine, Michigan, Minnesota, New

Hampshire, New York, Washington, Wisconsin; Canada, Alberta, British Columbia, Manitoba, Nova Scotia.
Host plant: *Prunus cerasus*, *P. emarginata*, *P. virginiana*.

***Psyllopsis* Löw**

***fraxinicola* (Foerster, 1848)**

Type locality: Europe.

Additional distribution: W. Palearctic region; introduced in Australia, New Zealand, South America, USA.

Host plant: *Fraxinus excelsior*, *F. dipetala*.

***Purshivora* Heslop-Harrison**

***chelifera* (Crawford, 1914)**

Type locality: USA, Arizona, Utah.

Additional distribution: USA, California.

Host plant: *Purshia tridentata*.

Remarks: previously unpublished EMEC specimens were identified from California by D.D. Jensen.

***pubescens* (Crawford, 1914)**

Type locality: USA, California, Colorado, Nevada.

Additional distribution: USA, Idaho, Oregon, Utah; Canada, British Columbia.

Host plant: *Purshia tridentata*.

***Trioza* Foerster**

***alacris* Flor, 1861**

Type locality: Europe.

Additional distribution: Native to West Palearctic region. Introduced in USA; Argentina; Brazil; Chile.

Host plant: *Laurus nobilis*.

Remarks: First recorded in California in 1911 (Crawford 1914); common name: bay sucker, or laurel psyllid.

***albifrons* Crawford, 1910**

Type locality: USA, California.

Additional distribution: USA, Alaska, Arizona, Colorado, Idaho, Minnesota, Montana, New Mexico, Oregon, Utah, Washington; Canada, Alberta, British Columbia; Mexico.

Host plant: *Urtica dioica*.

Parasitoids: *Tamarixia triozae*.

***astraea* Bliven, 1960**

Type locality: USA, California.

Host plant: Possibly *Rubus parviflorus*.

***bakeri* Crawford, 1910**

Type locality: USA, California.

Additional distribution: USA, Colorado, Nevada.

Host plant: *Rhamnus smithii*, *R. crocea*.

Parasitoids: *Psyllaephagus* sp., *Tamarixia* sp.

***beameri* Tuthill, 1939**

Type locality: USA, California.

Host plant: *Frangula* (= *Rhamnus*) *californica*.

Parasitoids: *Prionomitus mitratus*, *Psyllaephagus pachypsyllae* (Howard), and *Tamarixia triozae*.

***breviantennata* Crawford, 1914**

Type locality: USA, California.

Host plant: Unknown, possibly *Ceanothus* sp. (CSCA).

***chenopodii* Reuter, 1876**

Type locality: Europe.

Additional distribution: Widespread Palearctic distribution from Europe, North Africa, Middle East to Asia.

Introduced in USA, California, Chile.

Host plant: *Chenopodium* spp., *Atriplex* spp. CSCA specimens are from a native Californian plant species, *Atriplex lentiformis*.

***eugeniae* Froggatt, 1901**

Type locality: Australia.

Additional distribution: Introduced in USA.

Host plant: *Syzygium paniculatum*, *Syzygium smithii*, and *Metrosideros excelsus* in California.

Remarks: First recorded in California in May 1988. Psyllid damage can severely disfigure trees, which are commonly used in ornamental plantings. In cooler areas of the California coast, such as the city of San Francisco, the parasitoid populations do not increase quickly enough to respond to sudden increases in psyllid numbers (Dahlsten *et al.* 1995, 2000). This psyllid is sensitive to both frost and heat, and temperatures above 90°F are known to inhibit population growth; common name: lilypilly psyllid, or eugenia psyllid.

Parasitoids: *Tamarixia dahlsteni* Zuparko. Some native natural enemies have been noted on the eugenia psyllid in California, but their effects on psyllid populations have been negligible (UC Berkeley, CBC).

***frontalis* Crawford, 1910**

Type locality: USA, Colorado.

Additional distribution: USA, California, Minnesota, Nevada, North Dakota, South Dakota; Canada, Alberta, British Columbia, Manitoba.

Host plant: *Amelanchier alnifolia*.

***loletae* Bliven, 1958**

Type locality: USA, California.

Host plant: Unknown.

Remarks: Hodkinson (1988) noted that this species is probably synonymous with *Trioza albifrons*.

***longicornis* Crawford, 1910**

Type locality: Canada, British Columbia.

Additional distribution: USA, California.

Host plant: Unknown.

***mira* Tuthill, 1943**

Type locality: USA, Colorado, Washington

Additional distribution: USA, California, Utah.

Host plant: *Amelanchier alnifolia*.

***phoradendri* Tuthill, 1939**

Type locality: USA, Colorado.

Additional distribution: USA, California.

Host plant: Adults collected from *Phoradendron juniperinum*.

***quadripunctata* Crawford, 1910**

Type locality: USA, Colorado

Additional distribution: USA, California, Iowa, Kansas, Minnesota, Mo, Montana, New York, Ohio, Wyoming; Canada, Alberta, British Columbia.

Host plant: *Urtica* sp., probably *U. dioica*.

***stygmata* Tuthill, 1939**

Type locality: USA, California

Host plant: Unknown.

***sulcata* Crawford, 1910**

Type locality: USA, Colorado.

Additional distribution: USA, Arizona, California, Nevada, Oregon, Utah. Also possibly Canada, Alberta.

Host plant: *Amelanchier* sp.

***viridis* Crawford, 1910**

Type locality: USA, California.

Host plant: Unknown.

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