Aphids (Hemiptera: Aphididae and Adelgidae) of Hawai'i: Annotated List and Key to Species of an Adventive Fauna[1]

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Abstract: We provide a comprehensive compilation of 105 species of Aphidoidea adventive to the Hawaiian Islands based on literature records and a taxonomic analysis of available specimens. Seventeen species are recognized as new to the Islands. For each species information on synonyms, origins, distribution, and hosts is given. The average rate of introduction has been about 0.82 species per year. Approximately 35% of the species originate in East Asia, 35% from Europe and West Asia, and 21% from North America.

Hawai'i has no known native aphid species. Although some were originally described from the Islands [e.g., *Melaphis bambusae* (Fullaway)], they subsequently have been shown to be adventive. The earliest treatments of the Hawaiian fauna (Kirkaldy 1908*a*, Fullaway 1910, 1912) recognized 23 species. Timberlake (1924) listed 37 species, of which seven were unidentified and one was a synonym of another. Knowledge then remained static until the reestablishment of an entomology unit at the Hawai'i Agricultural Experment Station in 1937. Additional impetus for study was given by the outbreak of World War II and an emphasis on making Hawai'i more self-sufficient in food production. This period ended with the appearance of Zimmerman's (1948) comprehensive work, which provided data, illustrations, and keys to the 47 aphid species known at the time. The next complete list of 68 species was compiled by Beardsley in 1979. The current online version of the checklist of terrestrial arthopods of Hawai'i (Nishida 2002*c*) lists 81 names, but removal of synonyms, species known only as interceptions, and one name of uncertain application leaves 70 species. In recent years there has been a focused survey for aphids on the five largest Hawaiian Islands (Messing et al. 2006, 2007).

Due to increasing globalization of trade there is a strong potential for introduction and establishment of additional aphid species into the Hawaiian Islands. This is in part due to their relatively small size, rapid asexual reproduction, diverse host-plant preferences, and close association with imported horticultural and agricultural commodities (Mondor et al. 2006). The moderate climate and variation in altitude provide a range of potential suitable habitats for a large number of aphid species. Aphids can have a substantial impact on various commodities, through both direct feeding and transmission of plant diseases. Effective management of these pests requires a sound knowledge of the species and their geographic distributions and host ranges. In addition, there has also been increased interest in the effects of aphids on the native flora, especially on endangered species (Messing et al. 2007).

Here, we provide an updated account of the aphid species recorded from Hawai'i. Notes on the taxonomy, current scientific name, plant hosts, and distribution are presented for each species. A comprehensive

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illustrated identification guide to the aphids of Hawai'i is in preparation (R.H.M., K.S.P., and R.G.F., unpubl. data).

MATERIALS AND METHODS

We examined specimens of aphids on slides from the following collections: University of Hawai'i at Mānoa, Bernice P. Bishop Museum, Hawai'i Department of Agriculture, Essig Museum of Entomology Collections (University of California, Berkeley), North Carolina State University Insect Collection (Raleigh), U.S. National Museum (Systematic Entomology Laboratory, Beltsville, Maryland), Washington State University (Prosser), Canadian National Collection of Insects (Ottawa), and Natural History Museum (London, England). New collections have been made by the authors and by the individuals listed in the acknowledgments. All collection records, including host information, and georeferenced locality data were compiled in a database, available as a Microsoft Excel file from the authors. Species known only from interceptions at ports of entry are excluded.

Names and classification follow Remaudière and Remaudière (1997), with updates by Nieto Nafría et al. (1998), Quednau (2003), and Eastop and Blackman (2005). For each species, an abbreviated synonymy and literature list is provided. Only references to names that pertain to Hawaiian faunal records are included. Page numbers are given for comprehensive multipage works but are omitted where species occurrences are recorded in short items in the minutes of the Hawaiian Entomological Society or in the USDA Cooperative Economic Insect Reports and other miscellaneous publications. In these cases the relevant page number may be found in the appropriate literature citation. Where available in the literature, the year of the first state record is indicated. Following a general statement on origin and world distribution (based largely on Blackman and Eastop [1994, 2000, 2006], with additions from our own records and those of colleagues listed in the acknowledgments), the Hawaiian distribution is given by island. The earliest year of occurrence based on the examination of actual specimens is indicated in parentheses for each island; if no year is given, we could not confirm occurrence on that island by examination of available slides. Host plant records are given at the species level, except in situations where the aphid is broadly polyphagous or where the host range includes a multitude of species within a broader taxonomic category. Additional plant host records taken from the literature are indicated separately. Host records based only on the presence of alates are considered "accidental" associations and are not included because they do not confirm feeding and reproduction on a plant. Clarifying notes on the taxonomic and distributional status of the aphids are provided where required.

RESULTS

Currently the recorded aphid fauna of the Hawaiian Islands consists of one species of Adelgidae and 104 species of Aphididae, including 17 species recorded here as new (but note that five of these species were previously indicated as present in Hawai'i by Mondor et al. [2006], based on a preliminary version of this list). A treatment of each species is given in Appendix 1. A key to the species is provided as Appendix 2. Areas of origin of the Hawaiian fauna through time are shown in Figure 1.

The current persistent fauna, however, may consist of somewhat fewer species. Most have been recorded over a long period of time, including relatively recent collections, or are widespread, and may be regarded as established. Twenty species, whose status is less certain, are discussed in the next section and summarized in Table 1.

DISCUSSION

Of the aphid species currently included in the the Hawaian fauna, three (*Coloradoa rufomaculata*, *Pleotrichophorus chrysanthemi*, and *Nearctaphis bakeri*) are known from one or two collections and have not been recollected for more than 65 yr. These species have likely been extirpated because they occur on common ornamental or crop plants and would likely have been encountered since the original occurrence if they had become established.

TABLE 1

Status of Hawaiian Aphid Records

Status	Number of Species
Established (includes one species of Adelgidae)	85
No recent records	
On ornamental plants	
One or two records; probably not established	4[a]
Multiple records; extirpated or repeat introduction	3[b]
Overlooked (rare or in remote habitats)	4[c]
Single collection, recently recognized (after year 2000)	
On ornamental plants	5[d]
On naturalized host plants, possibly established	3[e]
Multiple past records, identity not confirmed	1[f]

Note: Aphid species with a long history, including recent records, or with widespread distribution on the Hawaiian Islands are considered established. Species on common ornamental plants are likely to be observed if established, so those with no recent records are likely to have been extirpated or the records represent detection of multiple introductions.

[a] *Coloradoa rufomaculata*, *Nearctaphis bakeri*, *Pleotrichophorus chrysanthemi*, *Siphonatrophia cupressi*.

[b] *Macrosiphoniella sanborni*, *Sitobion anselliae*, *S. luteum*.

[c] *Illinoia borealis*, *Uroleucon pseudambrosiae*, *Acyrthosiphon malvae*, *Dysaphis aucupariae*.

[d] *Capitophorus formosartemisiae*, *Cinara cupressi*, *Coloradoa campestrella*, *Macrosiphum rosae*, *Sipha elegans*.

[e] *Glyphinaphis bambusae*, *Illinoia goldamaryae*, *Uroleucon erigeronense*.

[f] *Neotoxoptera violae*.

Two orchid-feeding aphids (*Sitobion anselliae* known from two collections rather widely separated in time, and *S. luteum* frequently recorded in the past) have not been reported in recent years. *Macrosiphoniella sanborni* has a long history of occurrence on the Hawaiian Islands but also has not been collected recently. These three pests of ornamental plants may have been extirpated, or perhaps they had been repeatedly reintroduced by the horticultural trade but never permanently established. The single occurrence of *Siphonatrophia cupressi* in a trap in 1992 may also be evidence of a nonpersistent introduction on ornamental Cupressaceae.

The only collection of *Illinoia borealis* occurred 46 yr ago, in Haleakalā National Park. *Uroleucon pseudambrosiae* was collected twice, more than 35 yr ago, also at Haleakalā, on a naturalized weed. These two species may have been overlooked by subsequent collectors due to their relatively remote habitat.

Two other species (*Acyrthosiphon malvae*, on a widespread naturalized weed; and *Dysaphis aucupariae*, collected only twice over a span of 12 yr as winged individuals unassociated with a host but on *Plantago* spp. elsewhere) are considered likely to be encountered in agricultural and urbanized habitats if well established. It is unclear if the records represent repeated introductions or if they are persistent in Hawai'i but rare.

Among the species recently recognized in the Hawaiian Islands, four (*Coloradoa campestrella*, *Capitophorus formosartemisiae*, *Cinara cupressi*, *Macrosiphum rosae*) are represented by single collections on ornamental plants and may not become established. *Sipha elegans* was collected on an ornamental grass, but it will feed on a wide range of grasses and so has a good chance of becoming entrenched on native or naturalized hosts if it finds suitable climatic conditions. Three other recent additions also are known from single collections only. However, these species (*Glyphinaphis bambusae*, *Illinoia goldamaryae*, *Uroleucon erigeronense*) were found in more or less natural settings on naturalized host plants. Thus they may have been present for some time before their discovery.

Neotoxoptera violae has been recorded on violets numerous times over a considerable span of time. However, there have been no recent records of this species, and we have seen no slides. On the other hand, we have seen several specimens, collected from 1939 to 2003, of *Neotoxoptera oliveri*, which also accepts violet as a host plant. Thus, it is not clear whether past records of *N. violae* should be attributed to *N. oliveri*. We have retained it in the list of Hawaiian aphids for the time being.

Aphis solanella has been treated in the past as a subspecies of *A. fabae* but is currently often considered a separate species. Although some Hawaiian specimens we have examined appear to fit *A. solanella*, we have elected to treat the complex as a single species pending a

more detailed analysis of the available material.

There is a single slide in USNM (G. L. Miller, pers. comm.) of a trapped aphid from Honolulu, 1961, labeled "*Periphyllus californiensis*." The identity of the specimen has not been confirmed and it is not treated here as part of the fauna. However, potential hosts (particularly Japanese maple) do occur in the state.

There are a few reports for which the identity remains unknown. Timberlake (1924) listed "*Myzaphis* sp.," noted as constantly present on rose at Honolulu from 1916 through 1923. The mention of pronounced capitate setae suggests a *Chaetosiphon* species. We have not located the specimens on which this record is based, but it is unlikely that Timberlake would have confused his material with any other rose-feeding aphid then or subsequently known to occur on the Hawaiian Islands. Several other unidentified aphids listed by Timberlake likely refer to species subsequently collected on the Hawaiian Islands. Au (1936) recorded a winged aphid with large irregular ciliate rhinaria; this specimen probably belongs to Pemphigini, of which two species are now known from the Islands. *Dysaphis tulipae* has been intercepted on incoming bulbs, but there is also a single record from carrot (Shiroma 1971*b*), apparently collected in the open. We have provisionally ascribed the record from carrot to *D. foeniculus*, but the slide has not been seen. Nishida (2002*b*,*c*) listed *Uroleucon illini* without supporting references. Mondor et al. (2006) also included this species based on the Nishida list.

There may be a substantial lag between the time of introduction, the first collection, and recognition of the occurrence of an aphid new to Hawai'i. For example *Toxoptera citricidus* was widespread in the Islands at the time of its description in 1907, and *Sitobion phyllanthi* was first collected on five different islands in the same year (2003). Previous literature records first reported *Aphis spiraecola* in 1965, but we have examined a slide of this species collected in 1939. Despite these deficiencies, the date of the earliest known collection is a reasonable indicator of the accumulation of species.

Figure 1 shows the cumulative number of aphid and adelgid species occurring in the Hawaiian Islands as indicated by earliest known collection date, classified by area of origin. Approximately equal portions (35%) of the fauna have their origin in East Asia (combined eastern Palearctic and Oriental biogeographic regions) or in Europe and adjacent parts of Asia. Aphids indigenous to North America contribute about 21% of the species. Two species probably originated in South America, two in Africa, and the remainder are of unknown origin. The early Hawaiian aphid fauna was heavily influenced by East Asia, with about 50% of the species known in 1910 originating in that area. Contributions from Europe and North America increased in the following years, but since 1960 the relative numbers of species contributed by the various regions have remained relatively constant. Note, however, that the actual route of introduction is not accurately reflected in these proportions. A number of the European species probably entered Hawai'i via North America. For example, *Dysaphis apiifolia* and *D. foeniculus* were likely introduced on produce from California. The cosmopolitan species *Myzus persicae* is here considered to be of East Asian origin but also likely arrived in Hawai'i from North America.

The average rate of introduction since 1910 has been about 0.82 species per year. However, during the Great Depression of the 1930s, there were no recognized new introductions, followed by a sudden increase after the establishment of entomological expertise at the Hawai'i Agricultural Experiment Station in 1937 and continuing through the years of World War II. The benefit of concerted collecting efforts in detection of new species is shown by the increase in number of known species in 2003 and 2004 (Messing et al. 2006). In North America, the rate of aphid introduction since 1840 has been about 1.6 species per year, with a similar drop during the Great Depression and a marked postwar increase (Foottit et al. 2006). A recent study of the adventive aphid fauna of Europe (Coeur d'acier

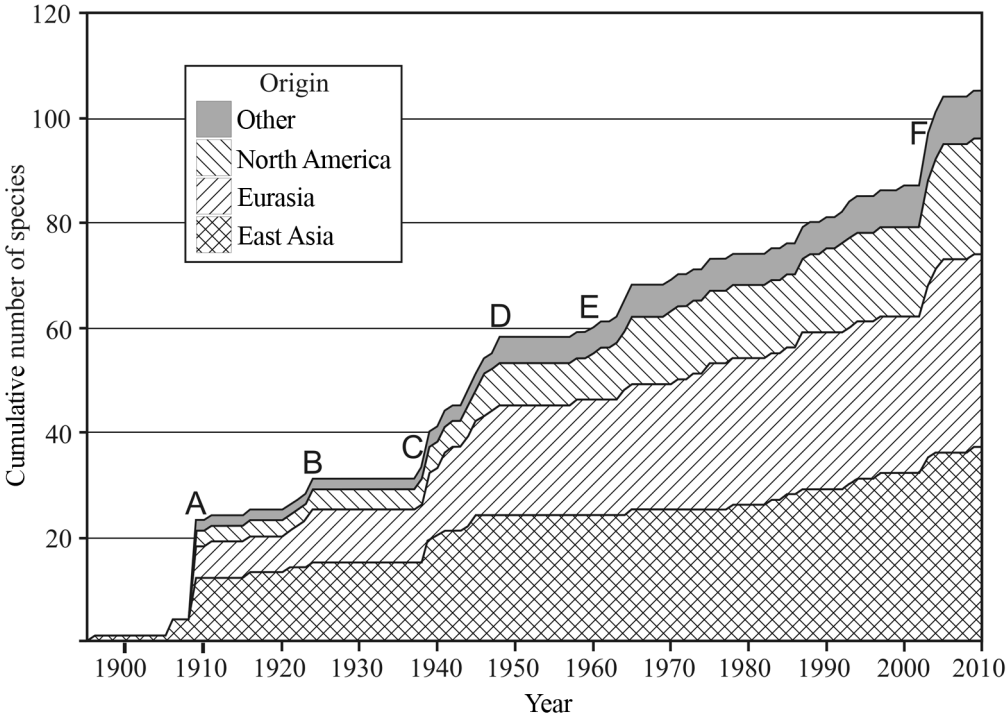

FIGURE 1. Cumulative number of aphid and adelgid species occurring in the Hawaiian Islands as indicated by earliest known collection date, classified by region of origin. "East Asia" combines both Oriental region and far East Palearctic. "Eurasia" includes Europe to central Asia and one species that may be naturally Holarctic. "Other" includes two Afrotropical species, two possibly from South America, and several species of unknown origin. Some widespread species may have actually entered the Hawaiian Islands from areas other than their ultimate region of origin. Letters indicate milestones in aphid research in the state: A, publication of Fullaway, 1910; B, publication of Timberlake, 1924; C, establishment of Entomology Department at Hawai'i Agricultural Experiment Station in 1937 (see Look and McAffee 1944*b*); D, publication of Zimmerman, 1948; E, J. W. Beardsley becomes active; F, recent active collecting by Messing et al. in 2003/2004.

et al. 2010) determined an average rate of introduction of 0.5 species per year since 1800, with an increase in rate following World War II with the expansion of global trade.

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Appendix 1

Annotated List of Aphid Species of Hawai'i

Adelgidae

Pineus pini (Macquart)
- *Pineus pini* Koch: Funasaki, 1971 (first state record 1970, Hawai'i).
- *Pineus pini* (Koch): Kawamura, 1971 (O'ahu).
- *Pineus pini* (Koch): Kawamura, 1972 (Maui).
- *Pineus pini* Koch: Fujii, 1979 (Moloka'i).
- *Pineus pini* Koch: Beardsley, 1979 (distribution summary).
- Origin: Palearctic.
- Distribution—World: Europe, North America, Australia, New Zealand.
- Distribution—Hawai'i: Hawai'i (1970), Kaua'i, Maui (1987), Moloka'i, O'ahu (1971).
- Hosts—Hawai'i: *Pinus pinaster* Aiton, *Pinus thunbergii* Parlatore.

Aphididae

Acyrthosiphon kondoi Shinji (Aphidinae Macrosiphini)
- *Acyrthosiphon kondoi* Shinji: Rethwisch, 1990 (first state record 1985, O'ahu).
- *Acyrthosiphon kondoi* Shinji: Heu and Conant, 1990 (Moloka'i).
- *Acyrthosiphon kondoi* Shinji: Ebesu, 1993*a* (Maui).
- Origin: Eastern Palearctic.
- Distribution—World: Asia, North and South America, South Africa, Australia, New Zealand.
- Distribution—Hawai'i: Maui, Moloka'i, O'ahu (1986).
- Hosts—Hawai'i: *Medicago sativa* L., *M. hispida* Gaertn.

Acyrthosiphon malvae (Mosley) (Aphidinae Macrosiphini)
- *Acyrthosiphon pelargonii* (Kaltenbach): Eastop, 1971:53 (first state record 1948, Hawai'i).
- *Acyrthosiphon pelargonii* (Kaltenbach): Beardsley, 1976 (host).
- *Acyrthosiphon malvae* (Mosley): Beardsley, 1979 (nomenclatoral update; distribution summary).
- Origin: Western Palearctic.
- Distribution—World: Cosmopolitan.
- Distribution—Hawai'i: Hawai'i (1948).
- Hosts—Hawai'i: *Erodium cicutarium* (L.) L'Hér.
- Note: *Acyrthosiphon malvae* constitutes a complex of species or subspecies with differing host preferences (three on Geraniaceae, including *Erodium*) and life cycle characteristics, and with subtle overlapping morphological differences. The insufficient Hawaiian material cannot be assigned reliably.

Acyrthosiphon pisum (Harris) (Aphidinae Macrosiphini)
- *Macrosiphum pisi* (Harris): Hardy, 1959 (first state record 1958, O'ahu).
- *Macrosiphum pisi* (Harris): Au, 1960 (host records, Kaua'i).
- *Acyrthosiphon pisum* (Harris): Beardsley, 1979 (nomenclatoral update; distribution summary).
- Origin: Palearctic.
- Distribution—World: Cosmopolitan.
- Distribution—Hawai'i: Hawai'i (1962), Kaua'i, Maui, Moloka'i, O'ahu (1959).
- Hosts—Hawai'i: *Medicago sativa* L.

Aphis coreopsidis (Thomas) (Aphidinae Aphidini Aphidina)
- *Aphis coreopsidis* (Thomas): Messing et al., 2006 (first state record 2004, Kaua'i).
- Origin: Nearctic.
- Distribution—World: North and South America.
- Distribution—Hawai'i: Kaua'i (2004), Maui (2003), Moloka'i (2003), O'ahu.
- Hosts—Hawai'i: *Bidens pilosa* L., *Phyllanthus niruri* L. [single record].
- Note: Timberlake (1924) listed an undetermined *Aphis* sp. on *Bidens macrocarpa* (Gray) Sherff (= *Campylotheca macrocarpa*) from Mt. Tantalus, O'ahu, 1917; the sparse description he gave is consistent with this species.

Aphis craccivora Koch (Aphidinae Aphidini Aphidina)
- *Aphis gossypii* Glover: Fullaway, 1910:39 (in part, misidentification, first state record 1909, O'ahu).
- *Aphis medicaginis* Koch: Higgins, 1910:54 [reference not seen].
- *Aphis medicaginis* Koch: Timberlake, 1924:453 (hosts).
- *Aphis medicaginis* Koch: Bryan and Swezey, 1926 (Northwestern Islands).
- *Aphis medicaginis* Koch: Look and McAfee, 1944*b* (hosts).
- *Aphis medicaginis* Koch: Bianchi, 1941 (Midway).
- *Aphis medicaginis* Koch: Zimmerman, 1948:81–82, fig. 42.
- *Aphis medicaginis* Koch: Suehiro, 1960 (Midway).
- *Aphis craccivora* Koch: Butler and Usinger, 1963 (Laysan).
- *Aphis craccivora* Koch: Beardsley, 1963*b* (correction of name).
- *Aphis craccivora* Koch: Beardsley, 1966*c* (Northwestern Islands).
- *Aphis craccivora* Koch: Mau, 1979 (Lāna'i).
- *Aphis craccivora* Koch: Beardsley, 1979 (distribution summary).
- *Aphis craccivora* Koch: Nishida, 2002*a*:49 (Midway).
- *Aphis craccivora*: Messing et al., 2007:603 (indigenous plant hosts).
- *Aphis craccivora*: Messing et al., 2007:604 (endemic plant host).
- Origin: Palearctic.
- Distribution—World: Worldwide, especially in warm temperate and tropical regions.
- Distribution—Hawai'i: French Frigate Shoals (1964), Hawai'i (1938), Kaua'i (1943), Lāna'i (1947), Lisianski, Laysan, Midway (1957), Maui (1939), Moloka'i (1943), Nīhoa, O'ahu (1939), Pearl and Hermes.
- Hosts—Hawai'i: Various plants, especially species of Fabaceae.
- Notes: *Aphis medicaginis* Koch is a valid species but the name has been misapplied in the past to refer to *Aphis craccivora* Koch. Fullaway (1910) included *A. craccivora* in his concept of *A. gossypii*, although he

recognized, in a footnote, the possibility that more than one species was involved. This species is an important pest of numerous crops.

Aphis eugeniae van der Goot (Aphidinae Aphidini Aphidina), new state record
Origin: Oriental.
Distribution—World: Southeast Asia, Australia.
Distribution—Hawai'i: Kaua'i (2005), O'ahu (1994).
Hosts—Hawai'i: *Calotropis gigantea* (L.) Dryand. ex Aiton, *Osteomeles anthyllidifolia* (Sm.) Lindl.
Note: Timberlake (1924) listed an orange-yellow *Aphis* species on *Waltheria indica* L. (= *W. americana* L.) from O'ahu that may be either this species or *Aphis nerii*.

Aphis fabae Scopoli (Aphidinae Aphidini Aphidina)
Aphis rumicis Linnaeus: Look and McAfee, 1944*a* (first state record 1938, O'ahu).
Aphis rumicis L.: Look and McAfee, 1944*b* (hosts).
Aphis rumicis L.: Zimmerman, 1948:84–86, figs. 45, 46.
Aphis fabae Scopoli: Hardy, 1956 (name correction).
Aphis fabae Scopoli: Beardsley, 1979 (distribution summary).
Aphis fabae (Scopoli): Ebesu, 1993*a* (Maui).
Aphis fabae: Messing et al., 2007:603 (indigenous plant host).
Aphis fabae: Messing et al., 2007:604 (endemic plant host).
Origin: Palearctic.
Distribution—World: Widespread in north temperate areas, also South Africa, South America.
Distribution—Hawai'i: Hawai'i (1945), Kaua'i (1944), Lāna'i (1944), Maui (1987), Moloka'i (1985), O'ahu (1938).
Hosts—Hawai'i: Polyphagous.
Notes: *Aphis rumicis* L. is a valid species but the name has been misapplied in the past to refer to *Aphis fabae* Scopoli. *Aphis fabae* is divided into several subspecies. One of these, *A. solanella* Theobald, the principal form in warm climates, is now often considered a separate species. Some Hawaiian specimens seem to fit *A. solanella*, and both taxa may be present. *Aphis papaveris* of Kirkaldy (1909) may be *A. fabae*.

Aphis gossypii Glover (Aphidinae Aphidini Aphidina)
Aphis gossypii Glover: Fullaway, 1910:39–40 (in part, first state record 1909, O'ahu).
Aphis gossypii Glover: Timberlake, 1924:452–453 (hosts).
Aphis gossypii Glover: Bianchi, 1941 (Midway).
Aphis gossypii Glover: Krauss, 1944*a* (hosts; Kaua'i).
Aphis gossypii Glover: Look and McAfee, 1944*b*:100–101 (hosts).
Aphis gossypii Glover: Zimmerman, 1948:76–77, fig. 36.
Aphis gossypii Glover: Suehiro, 1960 (Midway).
Aphis gossypii Glover: Butler and Usinger, 1963 (Laysan).
Aphis gossypii Glover: Nishida, 2002*a*:49 (Midway).
Aphis gossypii: Messing et al., 2007:603 (indigenous plant hosts).
Aphis gossypii: Messing et al., 2007:604 (endemic plant hosts).
Origin: Likely eastern Palearctic.
Distribution—World: Cosmopolitan, especially tropical regions.
Distribution—Hawai'i: French Frigate Shoals, Hawai'i (1938), Kaua'i (1938), Lāna'i (1947), Maui (1943), Midway (1997), Moloka'i (1939), O'ahu (1938).
Hosts—Hawai'i: Polyphagous; hosts include native species (see Messing et al. 2007).
Note: Fullaway (1910) confounded *Aphis gossypii* and *A. craccivora*.

Aphis middletonii Thomas (Aphidinae Aphidini Aphidina)
Aphis swezeyi Fullaway, 1910:37–38, figs. 7, 8 (original description; first state record 1909, O'ahu).
Aphis swezeyi Fullaway: Timberlake, 1924:454.
Aphis middletoni Thomas: Timberlake, 1924:452 (hosts).
Aphis swezeyi Fullaway: Au, 1936 (O'ahu, Moloka'i, Maui).
Aphis middletoni Thomas: Look and McAfee, 1944*b* (hosts).
Aphis middletoni Thomas: Zimmerman, 1948:83–84, figs. 44, 45.
Aphis middletoni Thomas: Beardsley, 1979 (distribution summary).
Origin: Nearctic.
Distribution—World: North America.
Distribution—Hawai'i: Hawai'i (1940), Kaua'i (1944), Lāna'i (1947), Maui (1943), Moloka'i, O'ahu (1939).
Hosts—Hawai'i: Roots of various plant species.

Aphis nasturtii Kaltenbach (Aphidinae Aphidini Aphidina)
Aphis nasturtii Kaltenbach: Beardsley, 1987*a* (first state record 1986, O'ahu).
Origin: Palearctic.
Distribution—World: Cosmopolitan, except Australasia.
Distribution—Hawai'i: O'ahu.
Hosts—Hawai'i: *Nasturtium officinale* R. Br.

Aphis nerii Boyer de Fonscolombe (Aphidinae Aphidini Aphidina)
Aphis nerii Boyer de Fonscolombe: Beardsley, 1966*a* (first state record 1965, O'ahu).
Aphis nerii Boyer de Fonscolombe: Nakao, 1970 (Kaua'i).
Aphis nerii Boyer de Fonscolombe: Beardsley, 1973*a* (Hawai'i).
Aphis nerii Boyer de Fonscolombe: Beardsley, 1979 (distribution summary).
Origin: Eastern Palearctic or Oriental.
Distribution—World: Tropical to warm temperate regions, with summer eruptions into temperate areas.
Distribution—Hawai'i: Hawai'i (2003), Kaua'i (1969), Maui (2003), Moloka'i (2003), O'ahu (1996).
Hosts—Hawai'i: Apocynaceae (including Asclepiadoideae).
Note: See Note under *Aphis eugeniae*.

Aphis oenotherae Oestlund (Aphidinae Aphidini Aphidina)
Aphis oenotherae Oestlund: Shiroma, 1965 (first state record 1963, Hawai'i).
Aphis oenotherae Oestlund: Beardsley, 1979 (distribution summary).
Aphis oenotherae (Oestlund): Ebesu, 1993*a* (Maui).
Origin: Nearctic.
Distribution—World: North America, Europe, Japan, Australia.
Distribution—Hawai'i: Hawai'i, Maui (1946).
Hosts—Hawai'i: *Oenothera stricta* Ledeb. ex Link.

Aphis oestlundi Gillette (Aphidinae Aphidini Aphidina)
Aphis oestlundi Gillette: Leonard, 1973 (first state record 1970, Maui).
Aphis oestlundi Gillette: Beardsley, 1975 (first state record 1960 [sic, error for 1970]).
Origin: Nearctic.
Distribution—World: North America.
Distribution—Hawai'i: [Kaua'i?], Maui (1944).
Hosts—Hawai'i: *Oenothera biennis* L., *Oenothera* sp.
Note: The Kaua'i record is based on unverified alate specimen in Essig collection collected on potato in 1944.

Aphis sedi Kaltenbach (Aphidinae Aphidini Aphidina)
Aphis sedi Kaltenbach: Kumashiro et al., 2002:175 (first state record 1997, O'ahu).
Origin: Palearctic.
Distribution—World: North temperate, South America, Australia, New Zealand.
Distribution—Hawai'i: Kaua'i (2004), O'ahu.
Hosts—Hawai'i: *Kalanchoe* sp.

Aphis spiraecola Patch (Aphidinae Aphidini Aphidina)
Aphis spiraecola Patch: Beardsley, 1966*b* (first state record 1965, Maui).
Aphis spiraecola Patch: Beardsley, 1967*b*.
Aphis spiraecola Patch: Shiroma, 1970 (Hawai'i).
Aphis citricola van der Goot: Beardsley, 1979 (nomenclatoral update; distribution summary).
Aphis spiraecola: Messing et al., 2007:604 (endemic plant hosts).
Origin: Eastern Palearctic.
Distribution—World: Cosmopolitan.
Distribution—Hawai'i: Hawai'i (1966), Kaua'i (2003), Maui (1965), Moloka'i (2003), O'ahu (1939).
Hosts—Hawai'i: Polyphagous.
Note: *Aphis citricola* was for a short time interpreted as a senior synonym of *A. spiraecola* but is now considered a synonym of *A. fabae*.

Aulacorthum solani (Kaltenbach) (Aphidinae Macrosiphini)
Myzus convolvuli (Kaltenbach): Look and McAfee, 1944*a* (first state record 1941, O'ahu).
Myzus convolvuli (Kaltenbach): Look and McAfee, 1944*b* (hosts).
Myzus convolvuli (Kaltenbach): Zimmerman, 1948:115–116, fig. 72.
Aulacorthum solani (Kaltenbach): Beardsley, 1979 (nomenclatoral update; distribution summary).
Aulacorthum solani (Kaltenbach): Ebesu, 1993*a* (Maui).
Origin: Probably western Palearctic.
Distribution—World: Cosmopolitan.
Distribution—Hawai'i: Hawai'i (1945), Kaua'i (2003), Maui (1943), Moloka'i, O'ahu (1939).
Hosts—Hawai'i: Polyphagous.
Note: *Aphis convolvuli* Kaltenbach is a synonym of *Myzus persicae*, but the combination *Myzus convolvuli* (Kaltenbach) was formerly used for the species now known as *Aulacorthum solani*.

Brachycaudus helichrysi (Kaltenbach) (Aphidinae Macrosiphini)
Aphis myosotidis Koch: Fullaway, 1910:42 (first state record 1909, O'ahu).
Anuraphis helichrysi (Kaltenbach): Timberlake, 1924:451 (hosts; distribution summary).
Aphis helichrysi Kaltenbach: Zimmerman, 1948:78, fig. 38.
Brachycaudus helichrysi (Kaltenbach): Beardsley, 1979 (nomenclatoral update; distribution summary).
Brachycaudus helichrysi: Messing et al., 2007:603 (indigenous plant hosts).
Origin: Palearctic.
Distribution—World: Cosmopolitan.
Distribution—Hawai'i: Hawai'i (1945), Kaua'i (2003), Maui (1945), O'ahu (1945).
Hosts—Hawai'i: Species of Asteraceae, especially Astereae, Anthemideae, and Madieae; also *Ocimum gratissimum* L., *Amsinckia* sp.

Brevicoryne brassicae (Linnaeus) (Aphidinae Macrosiphini)
L. brassicae (Linnaeus): Kirkaldy, 1908*b*:206 (presumed reference to this species).
Aphis brassicae L.: Fullaway, 1910:40–41 (first state record 1909, O'ahu).
Brevicoryne brassicae (L.): Timberlake, 1924:454 (hosts).
Brevicoryne brassicae (L.): Zimmerman, 1948:91–92, fig. 51.
Brevicoryne brassicae (L.): Beardsley, 1979 (distribution summary).
Origin: Palearctic.
Distribution—World: All temperate regions.
Distribution—Hawai'i: Hawai'i (1944), Kaua'i (2003), Maui (1943), Moloka'i, O'ahu (1939).
Hosts—Hawai'i: *Brassica* spp.
Notes: Records of this species on Apiaceae (Look and McAfee 1944*a*, on carrot; Zimmerman 1948, on celery) probably refer to a *Hyadaphis* species (or perhaps *Semiaphis heraclei*, although those authors recognized the latter as a different species). Tanada (1957) recorded *B. brassicae* from *Lonicera;* this, too, is likely a *Hyadaphis* species.

Capitophorus elaeagni (Del Guercio) (Aphidinae Macrosiphini)
Capitophorus braggii (Gillette): Timberlake, 1924:456 (first state record 1923, O'ahu).
Capitophorus braggii (Gillette): Zimmerman, 1948:106–107, fig. 63.
Capitophorus elaeagni (Del Guercio): Beardsley, 1979 (nomenclatoral update; distribution summary).

Origin: Palearctic.
Distribution—World: All temperate areas.
Distribution—Hawai‘i: Hawai‘i (1940), Maui (1944), O‘ahu.
Hosts—Hawai‘i: *Cynara scolymus* L., *Dimorphotheca* sp., *Gerbera* sp.

Capitophorus formosartemisiae (Takahashi) (Aphidinae Macrosiphini), new state record
Origin: Eastern Palearctic.
Distribution—World: East Asia.
Distribution—Hawai‘i: O‘ahu (2003).
Hosts—Hawai‘i: *Artemisia princeps* Pampan.
Note: Only one collection known (Foster Gardens, Honolulu).

Capitophorus hippophaes (Walker) (Aphidinae Macrosiphini)
Capitophorus hippophaeus [sic] (Walker): Kumashiro et al., 2002:176 (first state record 1993, O‘ahu).
Origin: Unknown.
Distribution—World: Cosmopolitan.
Distribution—Hawai‘i: O‘ahu (1993).
Hosts—Hawai‘i: *Persicaria odorata* (Lour.) Soják.
Note: Present as early as 1992 on exported produce (Kumashiro et al. 2002).

Cavariella aegopodii (Scopoli) (Aphidinae Macrosiphini)
Cavariella capreae (Fabricius): Look and McAfee, 1944*a* (misidentification, first state record 1939, O‘ahu).
Cavariella capreae (Fabricius): Look and McAfee, 1944*b* (misidentification, hosts).
Cavariella aegopodii (Scopoli): Zimmerman, 1948:93, fig. 52.
Cavariella aegopodii (Scopoli): Beardsley, 1979 (distribution summary).
Origin: Western Palearctic.
Distribution—World: Cosmopolitan.
Distribution—Hawai‘i: Hawai‘i (1939), Maui (1945), O‘ahu (1944).
Hosts—Hawai‘i: *Daucus carota* L., *Apium graviolens* L., *Foeniculum vulgare* Mill, *Anethum graviolens* L.; *Zanthoxylum dipetalum* H. Mann (= *Fagara dipetala*) (Zimmerman 1948).

Cerataphis brasiliensis (Hempel) (Hormaphidinae Cerataphidini)
Cerataphis lataniae (Boisduval): Zimmerman, 1948: 126–127 (in part, misidentification).
Cerataphis palmae (Ghesquière): Beardsley, 1979 (hosts; O‘ahu).
Cerataphis palmae (Ghesquière): Beardsley, 1980 (first state record 1974, O‘ahu).
Cerataphis fransseni: Mondor et al., 2006:96.
Origin: Oriental.
Distribution—World: Pantropical.
Distribution—Hawai‘i: Maui (2004), O‘ahu (1944).
Hosts—Hawai‘i: species of Arecaceae, and plants in various families of order Zingiberales (*Alpinia* sp., *Heliconia* sp., *Strelitzia reginae* Banks ex Dryander).
Notes: The application of names for *Cerataphis* species has been confused. *Cerataphis brasiliensis* has been listed as a synomym of *C. orchidearum* (for example, Remaudière and Remaudière 1997), and the species on palm was named *C. palmae* (Ghesquière) or *C. variabilis* Hille Ris Lambers. *Cerataphis fransseni* (Hille Ris Lambers), described from the primary host, *Styrax*, is also a synonym. To further confuse matters, *Ceratovacuna palmae* Baehr is a synonym of *C. lataniae*. Zimmerman's (1948) treatment of *C. lataniae* included specimens of *C. brasiliensis*, *C. lataniae*, and *C. orchidearum*.

Cerataphis lataniae (Boisduval) (Hormaphidinae Cerataphidini)
Cerataphis lataniae (Boisduval): Fullaway, 1910:45–46 (first state record 1909, O‘ahu).
Cerataphis lataniae (Boisduval): Zimmerman, 1948: 126–127 (in part), fig. 81.
Origin: Oriental.
Distribution—World: Pantropical.
Distribution—Hawai‘i: Hawai‘i (1976), O‘ahu (1944).
Hosts—Hawai‘i: species of Arecaceae.
Note: See Notes under *C. brasiliensis*.

Cerataphis orchidearum (Westwood) (Hormaphidinae Cerataphidini)
Cerataphis lataniae (Boisduval): Zimmerman, 1948: 126–127 (in part, misidentification), fig 82.
Cerataphis orchidearum (Westwood): Funasaki, 1967 (correction of identification, earliest record 1955, island unspecified).
Cerataphis orchidearum (Westwood): Beardsley, 1979 (distribution summary).
Origin: Oriental.
Distribution—World: Pantropical.
Distribution—Hawai‘i: Hawai‘i (1966), Kaua‘i (1962), Lāna‘i, Maui, O‘ahu (1941).
Hosts—Hawai‘i: species of Orchidaceae.
Note: See Notes under *C. brasiliensis*.

Cinara atlantica (Wilson) (Lachninae Eulachnini)
Cinara sp.: Davis, 1963*a* (first state record 1960, Maui).
Cinara sp.: Au, 1963 (Lāna‘i, Moloka‘i).
Cinara carolina Tissot: Davis, 1963*b* (identity established).
Cinara carolina Tissot: Chong, 1968 (Kaua‘i, Moloka‘i).
Cinara atlantica (Wilson): Beardsley, 1979 (nomenclatoral update; distribution summary).
Origin: Eastern Nearctic.
Distribution—World: North America, including Caribbean islands.
Distribution—Hawai‘i: Kaua‘i (2004), Lāna‘i (1962), Maui (1962), Moloka‘i (2005).
Hosts—Hawai‘i: *Pinus canariensis* C. Sm., *P. elliottii* Englem., *P. pinaster* Aiton, *P. pinea* L., *P. radiata* D. Don, *P. taeda* L., *P. thunbergii* Parlatore.

Cinara cupressi (Buckton) (Lachninae Eulachnini), new state record
Origin: Western Palearctic.

Distribution—World: Europe, Southwest Asia and India, Africa, South America.
Distribution—Hawai'i: Kaua'i (2000).
Hosts—Hawai'i: *Juniperus* sp.

Cinara fresai Blanchard (Lachninae Eulachnini)
Cupressobium maui Bradley, 1965 (original description; first state record 1964, Maui).
Cupressobium maui Bradley: Davis, 1966.
Cupressobium maui: Yamayoshi, 1968 (Hawai'i).
Cinara fresai Blanchard: Beardsley, 1979 (nomenclatoral update; distribution summary).
Origin: Uncertain.
Distribution—World: North and South America, Europe, Australia, New Zealand, Japan.
Distribution—Hawai'i: Hawai'i, Kaua'i (2005), Maui (1964).
Hosts—Hawai'i: *Cryptomeria japonica* (L.f.) D. Don, *Cupressus* sp.; *Cupressus lusitanica* Mill. (Yamayoshi 1968).

Cinara tujafilina (Del Guercio) (Lachninae Eulachnini)
Lachnus tujafilinus (Del Guercio): Timberlake, 1924:450 (first state record 1924, O'ahu).
Lachnus tujafilinus (Del Guercio): Zimmerman, 1948:63–64, fig. 26.
Cinara tujafilina: Kobayashi and Matayoshi, 1971 (Hawai'i).
Cinara tujafilina (Del Guercio): Beardsley, 1979 (nomenclatoral update; distribution summary).
Origin: Western Palearctic.
Distribution—World: Cosmopolitan.
Distribution—Hawai'i: Hawai'i, Maui (1971), O'ahu (2000).
Hosts—Hawai'i: *Cupressus* sp.; *Thuja occidentalis* L., *Platycladus orientalis* (L.) Franco, *Juniperus chinensis* L. in literature.

Cinara watsoni Tissot (Lachninae Eulachnini), new state record
Origin: Eastern Nearctic.
Distribution—World: North America.
Distribution—Hawai'i: Kaua'i (2004), Maui (2003), Moloka'i (2005).
Hosts—Hawai'i: *Pinus radiata* D. Don, *P. taeda* L.

Coloradoa campestrella Ossiannilsson (Aphidinae Macrosiphini), new state record
Origin: Palearctic.
Distribution—World: Europe, East Asia.
Distribution—Hawai'i: O'ahu (2003).
Hosts—Hawai'i: *Artemisia princeps* Pampan.
Note: Only one collection (Foster Gardens, Honolulu).

Coloradoa rufomaculata Takahashi (Aphidinae Macrosiphini)
Coloradoa rufomaculata (Wilson): Jensen, 1946*b* (first state record 1945, O'ahu).
Coloradoa rufomaculata (Wilson): Zimmerman, 1948:98, fig. 57.
Origin: Probably Palearctic.
Distribution—World: Cosmopolitan.
Distribution—Hawai'i: O'ahu (1945).
Hosts—Hawai'i: *Chrysanthemum* sp.
Notes: This species was reported from Kaua'i on *Artemisia mauiensis* (A. Gray) Skottsb. by Messing et al. (2007). However, slides supporting that record have not been located, and the species involved could not be confirmed. Jensen's collection in 1945 is the only confirmed occurrence in the Hawaiian Islands.

Dysaphis aucupariae (Buckton) (Aphidinae Macrosiphini)
Dysaphis aucupariae Buckton: Ebesu, 1993*a*:12 (first state record 1987, Maui).
Origin: Eastern Palearctic.
Distribution—World: Europe, Australia, New Zealand.
Distribution—Hawai'i: Maui, Hawai'i (2005).
Hosts—Hawai'i: Unknown.
Notes: Known only from flying or trapped alates. The usual secondary hosts are *Plantago* species.

Dysaphis apiifolia (Theobald) (Aphidinae Macrosiphini)
Dysaphis apiifolia (Theobald): Beardsley, 1979 (in part; nomenclatoral update).
Origin: Western Palearctic.
Distribution—World: North and South America, Middle East, Central Asia and Africa, Mauritius, Australia.
Distribution—Hawai'i: Hawai'i (1963), [Maui?, see Notes].
Hosts—Hawai'i: *Apium graveolens* L., *Foeniculum vulgare* Mill.
Notes: *Aphis ferrugineastriata* Essig is a synonym of *D. apiifolia*. However, all examined specimens under this name taken from carrot (including those referred to by Zimmerman 1944, 1948) are *D. foeniculus*. A collection in Essig Museum from Maui, 1945, on celery (material not examined) may represent the earliest occurrence of *D. apiifolia* in the state.

Dysaphis foeniculus (Theobald) (Aphidinae Macrosiphini), new state record
Aphis ferruginea-striata Essig: Zimmerman, 1944:17 (misidentification; first state record 1942, O'ahu).
Aphis ferruginea-striata Essig: Zimmerman, 1948:75–76, fig. 35 (misidentification).
Dysaphis apiifolia (Theobald): Beardsley, 1979 (in part, misidentification; nomenclatoral update; distribution summary).
Origin: Palearctic.
Distribution—World: North and South America, Europe, Asia, Africa, Australia and New Zealand.
Distribution—Hawai'i: Hawai'i (1945), Kaua'i (1944), Maui (1945), O'ahu (1942).
Hosts—Hawai'i: *Daucus carota* L.; also one collection from *Leucospermum cordifolium* (Salisb. ex Knight) Rourke.
Notes: See Notes under *D. apiifolia*. A collection of winged aphids on carrot leaves at Hilo, 1965, was recorded by Shiroma (1971*b*) as *Disaphis* [sic] *tuli-*

pae, with no indication that it was an interception. However, supporting material for that record has not been seen; it may be *D. foeniculus*. *Dysaphis tulipae* is otherwise known only from import interceptions.

Ericaphis scammelli (Mason) group (Aphidinae Macrosiphini)
Ericaphis fimbriata (Richards): Messing et al., 2006 (first state record 2003, Maui).
Ericaphis fimbriata: Messing et al., 2007:604 (endemic plant host).
Origin: Nearctic.
Distribution—World: North America, Europe.
Distribution—Hawai'i: Maui (2003).
Hosts—Hawai'i: *Vaccinium reticulatum* Sm.
Notes: *Ericaphis scammelli* and *E. fimbriata* are not clearly distinct. *Ericaphis scammelli* is usually associated with *Vaccinium* spp. and *E. fimbriata* with *Fragaria* spp. Until the correct application of these two names is resolved, we prefer to refer the Hawaiian specimens to the "*scammelli* group."

Eriosoma lanigerum (Hausmann) (Eriosomatinae Eriosomatini)
Eriosoma mali Samouelle: Fullaway, 1910:44 (first state record 1909, O'ahu).
"woolly-aphis": Ehrhorn, 1922 (Hawai'i).
Eriosoma lanigerum Hausmann: Timberlake, 1924:459.
Eriosoma lanigera (Hausmann): Pelot, 1951 (Maui).
Eriosoma lanigera (Hausmann): Beardsley, 1963*c* (native host).
Eriosoma lanigera (Hausmann): Zimmerman, 1948:125, fig. 80.
Eriosoma lanigera (Hausmann): Beardsley, 1979 (distribution summary).
Origin: Probably Nearctic.
Distribution—World: Temperate regions of the world where apples are grown.
Distribution—Hawai'i: Hawai'i, Maui (1965), O'ahu.
Hosts—Hawai'i: *Malus domestica* Borkh., *Osteomeles anthyllidifolia* (Sm.) Lindl., *Syzygium jambos* (L.) Alston.

Eulachnus rileyi (Williams) (Lachninae Eulachnini)
Eulachnus sp.: Funasaki, 1975 (first state record 1973, O'ahu).
Eulachnus sp.: Kashiwamura and Yoshioka, 1975 (Hawai'i).
Eulachnus sp.: Beardsley, 1979 (distribution summary).
Eulachnus rileyi: Mondor et al., 2006:94.
Origin: Western Palearctic.
Distribution—World: North and South America, Europe, Southwest Asia, southern Africa.
Distribution—Hawai'i: Hawai'i, Kaua'i (2004), O'ahu (1973).
Hosts—Hawai'i: *Pinus thunbergii* Parlatore.

Glyphinaphis bambusae van der Goot (Hormaphidinae Cerataphidini), new state record
Origin: Oriental.
Distribution—World: East Asia.
Distribution—Hawai'i: Kaua'i (2009).
Hosts—Hawai'i: species of Bambuseae (bamboo).
Note: Occurring in large numbers at a single site in a natural setting.

Greenidea psidii van der Goot (Greenideinae Greenideini)
Greenidea formosana (Maki): Beardsley, 1995 (first state record 1993, O'ahu).
Greenidea psidii: Messing et al., 2007:604 (endemic plant hosts).
Origin: Oriental.
Distribution—World: Southeast Asia, Southern USA (California, Florida), Costa Rica, Brazil.
Distribution—Hawai'i: Hawai'i (2003), Kaua'i (2003), Maui (1999), Moloka'i (1994), O'ahu (1993).
Hosts—Hawai'i: various Myrtaceae [*Metrosideros macropus* A. Gray, *M. polymorpha* Gaudich., *Pimenta dioica* (L.) Merr., *Psidium guajava* L., *Syzygium aromaticum* (L.) Merrill & Perry], *Chrysophyllum cainito* L., *Sterculia foetida* L., *Theobroma cacao* L.

Hayhurstia atriplicis (Linnaeus) (Aphidinae Macrosiphini)
Hayhurstia atriplicis (L.): Ebesu, 1993*a* (first state record 1987, Maui).
Hayhurstia atriplicis (L.): Beardsley, 1993*a* (O'ahu).
Hayhurstia atriplicis: Messing et al., 2007:604 (endemic plant host).
Origin: Palearctic.
Distribution—World: North America, Europe, Asia, Africa.
Distribution—Hawai'i: Maui (2003), Moloka'i (2003), O'ahu (1991).
Hosts—Hawai'i: *Atriplex semibaccata* R. Br., *Chenopodium oahuense* (Meyen) Aellen.

Hyadaphis coriandri (Das) (Aphidinae Macrosiphini)
Hyadaphis coriandri (Das): Messing et al., 2006 (first state record 2003, O'ahu).
Origin: Central Palearctic.
Distribution—World: Europe, Asia, Africa, Florida, California, Peru.
Distribution—Hawai'i: Hawai'i, Maui (2003), O'ahu (2003).
Hosts—Hawai'i: *Anethum graveolens* L., *Coriandrum sativum* L.
Note: Records of *Brevicoryne brassicae* on Apiaceae (Look and McAfee 1944*b*, Zimmerman 1948) and *Lonicera* (Tanada 1957) are probably references to *Hyadaphis* species (most likely *H. coriandri*, based on greater similarity in siphuncular shape).

Hyadaphis foeniculi (Passerini) (Aphidinae Macrosiphini), new state record
Origin: West Palearctic.
Distribution—World: Europe, North America.
Distribution—Hawai'i: Hawai'i (2003), Kaua'i (2003).
Hosts—Hawai'i: *Petroselinum crispum* (Mill.) Fuss.
Note: World distribution would include South Asia, southern Africa, Australia, New Zealand, and South America, if taxonomic analysis shows that *H. passerini* (Del Guercio) is a synonym.

Hyperomyzus carduellinus (Theobald) (Aphidinae Macrosiphini)
Hyperomyzus carduellinus (Theobald): Messing et al., 2006 (first state record 2004, Maui, Hawai'i).
Origin: Probably East Asia.
Distribution—World: Africa, East Asia, Australia, New Zealand, Fiji, Florida, Texas, Argentina.
Distribution—Hawai'i: Hawai'i (2004), Kaua'i (2003), Maui (2004), Moloka'i (2005), O'ahu (1975).
Hosts—Hawai'i: *Sonchus oleraceus* L., *Sonchus* sp.

Hyperomyzus lactucae (Linnaeus) (Aphidinae Macrosiphini)
Amphorophora lactucae (Kaltenbach): Timberlake, 1924:456 (first state record 1922, O'ahu).
Amphorophora sonchi (Oestlund): Holdaway et al., 1941.
Amphorophora sonchi (Oestlund): Look and McAfee, 1944*a*.
Amphorophora sonchi (Oestlund): Zimmerman, 1948:103, fig. 61.
Hyperomyza [sic] *lactucae* (L.): Beardsley, 1979 (nomenclatoral update; distribution summary).
Hyperomyzus lactucae (L.): Nishida, 2002*a*:49 (Midway).
Origin: Palearctic.
Distribution—World: Cosmopolitan, except southern Africa.
Distribution—Hawai'i: Hawai'i (1945), Kaua'i (1946), Lāna'i (1947), Maui (1978), Midway (1997), Moloka'i (2005), O'ahu (1939).
Hosts—Hawai'i: *Crepis japonica* (L.) Benth., *Hypochaeris radicata* L., *Sonchus oleraceus* L.

Hysteroneura setariae (Thomas) (Aphidinae Aphidini Rhopalosiphina)
Hysteroneura setariae (Thomas): Beardsley, 1962 (first state record 1961, O'ahu).
Hysteroneura setariae (Thomas): Beardsley, 1963*a* (Moloka'i).
Hysteroneura sp.: Beardsley, 1966*c*:177 (Lisianski).
Hysteroneura setariae (Thomas): Nishida, 2002*a*:49 (Midway).
Hysteroneura setariae: Messing et al., 2007:603 (indigenous plant host).
Hysteroneura setariae: Messing et al., 2007:604 (endemic plant hosts).
Origin: Nearctic.
Distribution—World: Widespread in tropics, subtropics, North America.
Distribution—Hawai'i: Hawai'i (1962), Kaua'i (1962), Lisianski, Maui (1964), Midway (1998), Moloka'i (1994), O'ahu (1961).
Hosts—Hawai'i: various species of Poaceae, including crops and native grasses, *Carex wahuensis* C. A. Mey.

Idiopterus nephrelepidis Davis (Aphidinae Macrosiphini)
Macrosiphum kirkaldyi Fullaway, 1910:22–23, fig. 1 (original description; first state record [before 1909], O'ahu).
Idiopterus nephrelepidis Davis: Timberlake, 1924:458–459 (hosts; O'ahu, Hawai'i).
Idiopterus nephrelepidis Davis: Zimmerman, 1948:123–124, fig. 79.
Idiopterus nephrelepidis Davis: Beardsley, 1979 (distribution summary).
Origin: Possibly Neotropical.
Distribution—World: Pantropical.
Distribution—Hawai'i: Hawai'i (1974), Maui (1976), O'ahu.
Hosts—Hawai'i: *Polystichum* sp., *Elaphoglossum crassifolium* (Gaud.) Anderson & Crosby (= *Acrostichum reticulatum*), undetermined species of Pteridophyta.

Illinoia azaleae (Mason) (Aphidinae Macrosiphini)
Amphorophora vaccinii Mason: Davis, 1947*b* (first state record 1946, Hawai'i).
Amphorophora vaccinii Mason: Zimmerman, 1948:104, fig. 62.
Masonaphis azaleae (Mason): Beardsley, 1967*a* (nomenclatoral update; first record for Maui).
Illinoia azaleae (Mason): Beardsley, 1979 (nomenclatoral update; distribution summary).
Origin: Nearctic.
Distribution—World: North America, Europe, southern Africa, Australia, New Zealand.
Distribution—Hawai'i: Hawai'i (1966), Maui (1965).
Hosts—Hawai'i: *Vaccinium reticulatum* Sm., *Vaccinium* sp.

Illinoia borealis (Mason) (Aphidinae Macrosiphini), new state record
Origin: Nearctic.
Distribution—World: North America.
Distribution—Hawai'i: Maui (1965).
Hosts—Hawai'i: *Vaccinium* sp. (presumably *V. reticulatum*).
Note: A single known collection, Haleakalā National Park.

Illinoia goldamaryae (Knowlton) (Aphidinae Macrosiphini), new state record
Origin: Nearctic.
Distribution—World: North America.
Distribution—Hawai'i: Moloka'i (2005).
Hosts—Hawai'i: *Conyza* sp.
Note: A single known collection.

Lipaphis pseudobrassicae (Davis) (Aphidinae Macrosiphini)
Rhopalosiphum pseudobrassicae Davis: Holdaway et al., 1941 (first state record 1939, O'ahu).
Rhopalosiphum pseudobrassicae Davis: Look and McAfee, 1944*a*.
Rhopalosiphum pseudobrassicae Davis: Zimmerman, 1948:96–97, fig. 56.
Lipaphis erysimi (Kaltenbach): Beardsley, 1979 (nomenclatoral update; distribution summary).
Lipaphis erysimi (Kaltenbach): Ebesu, 1993*a* (Maui).
Lipaphis erysimi (Kaltenbach): Nishida, 2002*a*:49 (Midway).
Origin: Western Palearctic.
Distribution—World: Cosmopolitan.
Distribution—Hawai'i: Hawai'i (1938), Kaua'i (1944), Maui (2003), Midway (1997), Moloka'i (2003), O'ahu (1939).
Hosts—Hawai'i: *Raphanus sativus* L., *Brassica* spp.

Note: *Lipaphis erysimi* and *L. pseudobrassicae* are currently considered to be different species (see Blackman and Eastop 2000), with *L. erysimi* being restricted to Europe.

Macrosiphoniella sanborni (Gillette) (Aphidinae Macrosiphini)
Macrosiphum sanborni Gillette: Fullaway, 1910:26 (first state record 1909, O'ahu).
Macrosiphoniella sanborni (Gillette): Timberlake, 1924:458.
Macrosiphum sanborni Gillette: Zimmerman, 1948:111–113, fig. 69.
Macrosiphoniella sanborni (Gillette): Beardsley, 1979 (nomenclatoral update; distribution summary).
Origin: Probably eastern Palearctic.
Distribution—World: Cosmopolitan.
Distribution—Hawai'i: Hawai'i (1962), Kaua'i (1962), O'ahu (1950).
Hosts—Hawai'i: *Chrysanthemum* sp.

Macrosiphum euphorbiae (Thomas) (Aphidinae Macrosiphini)
Macrosiphum trifolii Pergande: Fullaway, 1910:23 (misidentification, first state record 1909, O'ahu).
Macrosiphum solanifolii (Ashmead): Timberlake, 1924:458 (hosts).
Macrosiphum solanifolii (Ashmead): Look and McAfee, 1944*b* (hosts).
Macrosiphum solanifolii (Ashmead): Zimmerman, 1948:112–113, fig. 70.
Macrosiphum euphorbiae (Thomas): Beardsley, 1979 (nomenclatoral update; distribution summary).
Origin: Nearctic.
Distribution—World: Cosmopolitan.
Distribution—Hawai'i: Hawai'i (1944), Kaua'i (1944), Maui (1943), O'ahu (1938).
Hosts—Hawai'i: Polyphagous.

Macrosiphum rosae (Linnaeus) (Aphidinae Macrosiphini), new state record
Origin: Western Palearctic.
Distribution—World: Cosmopolitan, except East Asia and Southeast Asia.
Distribution—Hawai'i: Kaua'i (2004).
Hosts—Hawai'i: *Rosa* sp.
Note: Previous records of this species (Kirkaldy 1908*a*, Zimmerman 1948) in Hawai'i refer to *Sitobion ibarae*.

Melanaphis bambusae (Fullaway) (Aphidinae Aphidini Rhopalosiphina)
Aphis bambusae Fullaway, 1910:35–36, figs. 5, 6 (original description; first state record 1909, O'ahu).
Aphis bambusae Fullaway: Zimmerman, 1948:72–74, fig. 32.
Melanaphis bambusae (Fullaway): Beardsley, 1979 (nomenclatoral update; distribution summary).
Origin: Eastern Palearctic.
Distribution—World: southern USA, Mediterranean, East and Southeast Asia, India, Australia.
Distribution—Hawai'i: Hawai'i (1994), Maui (2004), O'ahu (1978).
Hosts—Hawai'i: *Arundinaria*? sp., *Phyllostachys nigra* (Lodd.) Munro.

Melanaphis sacchari (Zehntner) (Aphidinae Aphidini Rhopalosiphina)
Aphis sp.: Koebele, 1896:596–598 (first state record, before 1896, Kaua'i, Maui).
Aphis sacchari Zehntner: Kirkaldy, 1908*a*.
Loxerates sacchari (Zehntner): Kirkaldy, 1908*b*:206.
Aphis sacchari Zehntner: Timberlake, 1924:451.
Aphis sacchari Zehntner: Look and McAfee, 1944*b* (hosts).
Aphis sacchari Zehntner: Zimmerman, 1948:86–89, figs. 47–49.
Longiunguis sacchari (Zehntner): Pemberton, 1964:704 (history).
Melanaphis sacchari (Zehntner): Beardsley, 1979 (nomenclatoral update; distribution summary).
Origin: Probably Oriental.
Distribution—World: Central and South America, South Asia, Southeast Asia, Australia, Florida.
Distribution—Hawai'i: Hawai'i (1965), Kaua'i (2006), Maui, Moloka'i (1943), O'ahu (1936).
Hosts—Hawai'i: *Saccharum officinarum* L. (sugarcane); rarely on *Sorghum bicolor* (L.) Moench.
Note: A pest on sugarcane since the 1890s (Koebele 1896).

Metopolophium dirhodum (Walker) (Aphidinae Macrosiphini)
Metopolophium dirhodum (Walker): Messing et al., 2006 (first state record 2003, Kaua'i, Maui).
Origin: Western Palearctic.
Distribution—World: Temperate areas of the world.
Distribution—Hawai'i: Kaua'i (2003), Maui (2003).
Hosts—Hawai'i: *Rosa* sp.

Micromyzus katoi (Takahashi) group (Aphidinae Macrosiphini), new state record
Origin: Eastern Palearctic or Oriental.
Distribution—World: Taiwan, Indonesia, Australia.
Distribution—Hawai'i: Hawai'i (2003), Kaua'i (1983), O'ahu (2003).
Hosts—Hawai'i: species of Pteridophyta.
Notes: *Micromyzus katoi* outside Taiwan differs in several respects from Taiwanese material and may represent a different species (Blackman and Eastop 2006). We thus refer Hawaiian material to the "*katoi* group." A slide (not examined) in Essig Museum of "*Pentalonia nigronervosa*" on ferns, March 1916, Honolulu, and a mention by Timberlake (1924) of a collection of "*Pentalonia nigronervosa*" made by Fullaway, 1922, at Honolulu on ferns, may be this species.

Myzus hemerocallis Takahashi (Aphidinae Macrosiphini)
Myzus hemerocallis Takahashi: Messing et al., 2006 (first state record 2003, Kaua'i).
Origin: Eastern Palearctic.
Distribution—World: North and South America, France, southern Africa, South and East Asia, Australia, New Zealand.

Distribution—Hawai'i: Kaua'i (2003), O'ahu (2003).
Hosts—Hawai'i: *Hemerocallis* sp.

Myzus ornatus Laing (Aphidinae Macrosiphini)
Myzus ornatus Laing: Krauss, 1945 (first state record 1944, Hawai'i).
Myzus ornatus Laing: Zimmerman, 1945 (O'ahu).
Myzus ornatus Laing: Zimmerman, 1948:116–117, fig. 73.
Myzus ornatus Laing: Beardsley, 1979 (distribution summary).
Origin: Unknown, possibly Palearctic.
Distribution—World: Cosmopolitan, except Southeast Asia.
Distribution—Hawai'i: Hawai'i (1945), Kaua'i (2004), Maui (1936), O'ahu.
Hosts—Hawai'i: Polyphagous.

Myzus persicae (Sulzer) (Aphidinae Macrosiphini)
Myzus persicae (Sulzer): Fullaway, 1910:28–29 (first state record 1909, O'ahu).
Myzus persicae (Sulzer): Timberlake, 1924:456 (hosts).
Myzus persicae (Sulzer): Look and McAfee, 1944*b* (hosts).
Myzus persicae (Sulzer): Zimmerman, 1948:116–118, fig. 74.
Myzus persicae (Sulzer): Beardsley, 1979 (distribution summary).
Myzus persicae: Messing et al., 2007:603 (indigenous plant host).
Myzus persicae: Messing et al., 2007:604 (endemic plant hosts).
Origin: Probably eastern Palearctic.
Distribution—World: Cosmopolitan.
Distribution—Hawai'i: Hawai'i (1938), Kaua'i (1944), Maui (1945), Moloka'i (2003), O'ahu (1939).
Hosts—Hawai'i: Polyphagous.

Nasonovia ribisnigri (Mosley) (Aphidinae Macrosiphini)
Nasonovia ribisnigri (Mosley): Shiroma, 1971*a* (first state record 1964, Hawai'i).
Nasonovia ribisnigri (Mosley) Beardsley, 1979 (distribution summary).
Origin: Western Palearctic.
Distribution—World: North and South America, Europe to central Asia, Australia, New Zealand.
Distribution—Hawai'i: Hawai'i, Maui (2003).
Hosts—Hawai'i: *Lactuca sativa* L.; in literature: *Crepis japonica* (L.) Benth.

Nearctaphis bakeri (Cowen) (Aphidinae Macrosiphini), new state record
Origin: Nearctic.
Distribution—World: North and South America, Europe, central Asia, India, Japan.
Distribution—Hawai'i: Hawai'i (1938).
Hosts—Hawai'i: "tarweed."
Notes: Known in Hawai'i from only a single slide at North Carolina State University and probably has not persisted. In other areas of the world, this species is common on various legume forage and cover crops, especially red clover, so it would likely have been found since 1938 had it become established.

Neomyzus circumflexus (Buckton) (Aphidinae Macrosiphini)
Macrosiphum circumflexum (Buckton): Fullaway, 1910:26–27 (first state record 1909, O'ahu).
Aulacorthum circumflexum (Buckton): Timberlake, 1924:457 (hosts).
Myzus circumflexus (Buckton): Look and McAfee, 1944*b* (hosts).
Myzus circumflexus (Buckton): Zimmerman, 1948:115, fig 71.
Aulacorthum (*Neomyzus*) *circumflexum* (Buckton): Beardsley, 1979 (nomenclatoral update; distribution summary).
Aulacorthum circumflexum (Buckton): Messing et al., 2007 (endemic plant host).
Origin: Unknown.
Distribution—World: Tropical and subtropical regions.
Distribution—Hawai'i: Hawai'i (2005), Kaua'i (2003), Maui (1965), O'ahu (1950).
Hosts—Hawai'i: Polyphagous.

Neophyllaphis araucariae Takahashi (Neophyllaphidinae)
"Araucaria aphid": Timberlake, 1917 (first state record 1916, O'ahu).
"Araucaria aphid": Timberlake, 1924:460.
Neophyllaphis araucariae Takahashi: Krauss, 1944*b* (identity; Moloka'i).
Neophyllaphis araucariae Takahashi: Zimmerman, 1948:66–67, figs. 28–29.
Neophyllaphis araucariae Takahashi: Beardsley, 1979 (distribution summary).
Origin: Oriental or Australasian.
Distribution—World: New Guinea, Java, Mauritius, Australia, USA (Florida), Mexico, Costa Rica.
Distribution—Hawai'i: Hawai'i (1964), Kaua'i (1944), Lāna'i (1947), Maui, Moloka'i, O'ahu (1944).
Hosts—Hawai'i: *Araucaria heterophylla* (Salisb.) Franco (= *A. excelsa*).

Neophyllaphis podocarpi Takahashi (Neophyllaphidinae)
Neophyllaphis podocarpi Takahashi: Russell, 1982:563 (first state record 1978, O'ahu).
Neophyllaphis podocarpi Takahashi: Beardsley, 1985.
Origin: Oriental.
Distribution—World: Southeast Asia, Australia, southern USA.
Distribution—Hawai'i: Maui (2004), O'ahu (1983).
Hosts—Hawai'i: *Podocarpus macrophyllus*, *Podocarpus* sp.

Neotoxoptera formosana (Takahashi) (Aphidinae Macrosiphini)
Micromyzus formosanus (Takahashi): Fullaway, 1943.
Micromyzus formosanus (Takahashi): Look and McAfee, 1944*a* (first state record 1939, O'ahu, Kaua'i).
Micromyzus formosanus (Takahashi): Look, 1945 (Hawai'i).
Micromyzus formosanus (Takahashi): Zimmerman, 1948:120–121, fig. 76.

Neotoxoptera formosana (Takahashi): Beardsley, 1979 (nomenclatoral update; distribution summary).
Origin: Probably eastern Palearctic.
Distribution—World: North America, northern Europe, East and Southeast Asia, Brazil, Australia, New Zealand.
Distribution—Hawai'i: Hawai'i (1944), Kaua'i (1944), Maui (1945), Moloka'i (1962), O'ahu (1939).
Hosts—Hawai'i: *Allium* spp.

Neotoxoptera oliveri (Essig) (Aphidinae Macrosiphini), new state record
Origin: Unknown.
Distribution—World: Western USA to Brazil, Portugal, Africa, Pakistan, Korea, Austalia, New Zealand.
Distribution—Hawai'i: Kaua'i (2003), Maui (1939).
Hosts—Hawai'i: *Dianthus* sp.
Note: see Notes under *N. violae*.

Neotoxoptera violae Pergande (Aphidinae Macrosiphini)
Rhopalosiphum violae Pergande: Fullaway, 1910:30–31 (first state record 1909, O'ahu).
Neotoxoptera violae (Pergande): Timberlake, 1924:458.
Micromyzus violae (Pergande): Zimmerman, 1948:121–122, fig. 77.
Neotoxoptera violae (Pergande): Beardsley, 1979 (nomenclatoral update; distribution summary).
Origin: Unknown.
Distribution—World: North America, South America, East Asia, Australia, New Zealand.
Distribution—Hawai'i: O'ahu.
Hosts—Hawai'i: *Viola* sp.
Notes: We have seen no slides of *N. violae* from the Hawaiian Islands. The species recorded under this name may in fact be *N. oliveri*. Zimmerman's (1948) fig. 77 seems to illustrate *N. violae*, but it is not clear if the drawing made by Abernathy is based on Hawaiian material.

Ovatus crataegarius (Walker) (Aphidinae Macrosiphini)
Phorodon menthae (Buckton): Davis, 1947*b* (first state record 1946, Hawai'i).
Phorodon menthae (Buckton): Zimmerman, 1948:119, fig. 75.
Ovatus crataegarius (Walker): Beardsley, 1979.
Origin: Western Palearctic.
Distribution—World: Cosmopolitan.
Distribution—Hawai'i: Hawai'i (1946), Kaua'i (2003), Maui (2006).
Hosts—Hawai'i: *Mentha piperata* L., *Mentha* sp.

Patchiella reaumuri (Kaltenbach) (Eriosomatinae Pemphigini)
Pemphigus sp.: Beardsley, 1973*b* (first state record 1971, Hawai'i).
Patchiella reaumuri (Kaltenbach): Beardsley, 1987*b* (correct identity).
Patchiella reaumuri (Kaltenbach): Kumashiro, 1998 (O'ahu).
Patchiella reaumuri (Kaltenbach): Sato and Hara, 1997 (Lāna'i, O'ahu).
Origin: Western Palearctic.
Distribution—World: Europe, Solomon Islands.
Distribution—Hawai'i: Hawai'i (1976), Lāna'i, O'ahu (1995).
Hosts—Hawai'i: *Colocasia esculenta* (L.) Schott.

Pemphigus populitransversus Riley (Eriosomatinae Pemphigini)
Pemphigus sp.: Kumashiro et al., 2002 (first state record 1990, Hawai'i).
Pemphigus populitransversus: Mondor et al., 2006:96.
Origin: Nearctic.
Distribution—World: North America, South America, England, South Africa, Azores, Australia, New Zealand.
Distribution—Hawai'i: Hawai'i (1990), Maui (1993).
Hosts—Hawai'i: *Barbarea verna* (Mill.) Asch., *Brassica oleracea* L.

Pentalonia caladii van der Goot (Aphidinae Macrosiphini)
Pentalonia nigronervosa Coquerel: Look and McAfee, 1944*b* (hosts).
Pentalonia nigronervosa Coquerel: Zimmerman, 1948:122–123, fig. 78 (in part).
Pentalonia caladii van der Goot: Foottit et al., 2010 (species status).
Origin: Oriental.
Distribution—World: Pantropical.
Distribution—Hawai'i: Hawai'i (1940), Kaua'i (1944), Maui (1947), Moloka'i (1947), O'ahu (1939).
Hosts—Hawai'i: Araceae [*Alocasia* sp., *Colocasia esculenta* (L.) Schott, *Xanthosoma brasiliense* (Desf.) Engl.] and Zingiberaceae (*Alpina purpurata* K. Schum, *Hedychium coronarium* J. Koenig, *Zingiber* sp.).
Note: Specimens of "*Pentalonia nigronervosa*" (material not examined) in the Essig Museum collected at Honolulu in 1915 on taro likely belong to this species.

Pentalonia nigronervosa Coquerel (Aphidinae Macrosiphini)
Pentalonia nigronervosa Coquerel: Fullaway, 1910:29–30 (first state record 1909, O'ahu).
Pentalonia nigronervosa Coquerel: Zimmerman, 1948:122–123, fig. 78 (in part).
Pentalonia nigronervosa Coquerel: Foottit et al., 2010 (separation from *P. caladii*).
Origin: Oriental.
Distribution—World: Pantropical.
Distribution—Hawai'i: Hawai'i (1940), Kaua'i (1993), Maui (1987), Moloka'i (1985), O'ahu (1939).
Hosts—Hawai'i: *Musa* sp.
Notes: Foottit et al. (2010) elevated "form" *caladii* to species status. All examined Hawaiian collections of *Pentalonia* from hosts other than banana are *P. caladii*.

Pleotrichophorus chrysanthemi (Theobald) (Aphidinae Macrosiphini)
Capitophorus chrysanthemi Theobald: Jensen, 1946*a* (first state record 1945, O'ahu).

Capitophorus chrysanthemi Theobald: Zimmerman, 1948:107, fig. 65.
Pleotrichophorus chrysanthemi (Theobald): Beardsley, 1979 (nomenclatoral update; distribution summary).
Origin: Eastern Palearctic.
Distribution—World: Almost cosmopolitan.
Distribution—Hawai'i: O'ahu (1941).
Hosts—Hawai'i: *Chrysanthemum* sp.
Notes: We have seen no specimens of this species collected after 1945. Mondor et al. (2006) listed *Pleotrichophorus glandulosus* as also present in Hawai'i. We have seen no specimens indicating that this species is present. However, *P. chrysanthemi* has been considered a subspecies or synonym of *P. glandulosus*.

Reticulaphis distylii (van der Goot) (Hormaphidinae Nipponaphidini)
Thoracaphis fici van der Goot: Fullaway, 1921 (first state record 1921, [assume O'ahu]).
Thoracaphis ficus Baker: Timberlake, 1924:459.
Thoracaphis fici Baker: Swezey, 1929:273 (Kaua'i).
Thoracaphis fici (Takahashi): Zimmerman, 1948:128–131, figs. 83–85 (first occurrence in Hawaiian Islands "before 1910").
Reticulaphis distylii (van der Goot) ssp. *fici* (Takahashi): Beardsley, 1979 (nomenclatoral update; distribution summary).
Origin: Oriental.
Distribution—World: Nepal, China, Taiwan, Japan, Java.
Distribution—Hawai'i: Kaua'i, O'ahu (1944).
Hosts—Hawai'i: *Ficus benghalensis* L., *Ficus retusa* L.

Rhodobium porosum (Sanderson) (Aphidinae Macrosiphini)
Aulacorthum sp.: Timberlake, 1924:456 (Maui, O'ahu).
Macrosiphum rosaefolium Theobald: Look and McAfee, 1944*a* (first state record 1940, O'ahu).
Macrosiphum rosaefolium Theobald: Look and McAfee, 1944*b* (hosts).
Macrosiphum rosaefolium Theobald: Zimmerman, 1948:110, 112, fig. 68 (earliest state record 1916, O'ahu).
Rhodobium porosum (Sanderson): Beardsley, 1979 (nomenclatoral update; distribution summary).
Origin: Eastern Nearctic.
Distribution—World: Cosmopolitan.
Distribution—Hawai'i: Hawai'i (1997), Kaua'i (1944), Maui, O'ahu (1916).
Hosts—Hawai'i: *Rosa* sp.

Rhopalosiphoninus latysiphon (Davidson) (Aphidinae Aphidini Rhopalosiphina)
Rhopalosiphoninus latysiphon (Davidson): Krauss, 1949 (first state record 1947, Maui, Hawai'i).
Rhopalosiphoninus latysiphon (Davidson): Beardsley, 1979 (distribution summary).
Rhopalosiphoninus latysiphon (Davidson): Howarth, 1980 (host).
Rhopalosiphoninus latysiphon (Davidson): Beardsley, 1993*b* (O'ahu).
Origin: Eastern Palearctic.
Distribution—World: Cosmopolitan.
Distribution—Hawai'i: Hawai'i (1976), Maui (1947), O'ahu (1977).
Hosts—Hawai'i: Roots of *Metrosideros collina* (J. R. Forst. & G. Forst.) A. Gray, *Nasturtium officinale* R. Br.

Rhopalosiphum maidis (Fitch) (Aphidinae Aphidini Rhopalosiphina)
Aphis maidis Fitch: Fullaway, 1910:41–42 (first state record 1909, O'ahu).
Aphis maidis Fitch: Timberlake, 1924:451–452 (hosts).
Aphis maidis Fitch: Look and McAfee, 1944*b* (hosts).
Aphis maidis Fitch: Zimmerman, 1948:78–81, figs. 39–41.
Rhopalosiphum maidis (Fitch): Butler and Usinger, 1963 (Laysan).
Rhopalosiphum maidis (Fitch): Beardsley, 1979 (nomenclatoral update; distribution summary).
Rhopalosiphum maidis (Fitch): Nishida, 2002*a*:49 (Midway).
Rhopalosiphum maidis: Messing et al., 2007:603 (indigenous plant hosts).
Origin: Central Palearctic.
Distribution—World: Cosmopolitan.
Distribution—Hawai'i: Hawai'i (1944), Kaua'i (1962), Maui (2004), Moloka'i (1943), O'ahu (1914).
Hosts—Hawai'i: Poaceae species, including *Saccharum officinarum* L., *Zea mays* L.
Note: Alates found incidentally on a wide range of plant species.

Rhopalosiphum nymphaeae (Linnaeus) (Aphidinae Aphidini Rhopalosiphina)
Rhopalosiphum nymphae [sic] (L.): Fullaway, 1939 (first state record, but see Notes).
Rhopalosiphum nymphaeae (L.): Zimmerman, 1948:95, 97, fig. 54.
Rhopalosiphum nymphaeae (L.): Beardsley, 1979 (distribution summary).
Origin: Palearctic.
Distribution—World: Almost cosmopolitan.
Distribution—Hawai'i: Hawai'i (1944), Kaua'i (1944), Maui (1944), Moloka'i (1943), O'ahu (1939).
Hosts—Hawai'i: On emergent aquatic vegetation, such as *Azolla* spp., *Monochoria hastata* (L.) Solms, *Nelumbo* spp., *Nymphaea* spp.
Notes: Fullaway (1939) reported the opinion of P. W. Mason that "our common taro aphis was *Rhopalosiphum nymphae*" rather than *Aphis gossypii*. We have seen only one collection of wingless *R. nymphaeae* on taro grown in a greenhouse, but *A. gossypii* is common on this plant. Slides we have seen from other nonaquatic hosts recorded by Zimmerman (1948) have contained winged individuals only.

Rhopalosiphum padi (Linnaeus) (Aphidinae Aphidini Rhopalosiphina)
Rhopalosiphum prunifoliae (Fitch): Davis, 1947*a* (first state record 1945, Hawai'i).

Rhopalosiphum prunifoliae (Fitch): Zimmerman, 1948:96–97, fig. 55.
Rhopalosiphum prunifoliae (Fitch): Beardsley, 1979 (distribution summary).
Rhopalosiphum padi (L.): Ebesu, 1993*a* (Maui).
Rhopalosiphum padi: Messing et al., 2007:604 (endemic plant host).
Origin: Palearctic or Nearctic.
Distribution—World: Cosmopolitan.
Distribution—Hawai'i: Hawai'i, Kaua'i, Maui, O'ahu (1960).
Hosts—Hawai'i: Poaceae; *Pittosporum* sp.

Rhopalosiphum rufiabdominale (Sasaki) (Aphidinae Aphidini Rhopalosiphina)
Yamataphis oryzae Matsumura: Timberlake, 1924:455 (first state record 1924, O'ahu).
Yamataphis oryzae Mats.: Pemberton, 1940.
Cerosipha subterranea (Mason): Zimmerman, 1948:93–94, fig. 53.
Cerosipha subterranea (Mason): Beardsley, 1964 (Hawai'i).
Rhopalosiphum rufiabdominalis (Sasaki): Beardsley, 1979 (nomenclatoral update; distribution summary).
Origin: Eastern Palearctic.
Distribution—World: Cosmopolitan.
Distribution—Hawai'i: Hawai'i (1963), Kaua'i (2003), Maui (1976), O'ahu (1924).
Hosts—Hawai'i: *Anthoxanthum odoratum* L., *Cyperus esculentus* L., *Oryza sativa* L., *Saccharum officinarum* L.

Sarucallis kahawaluokalani (Kirkaldy) (Calaphidinae Panaphidini)
Myzocallis kahawaluokalani Kirkaldy, 1908*a*:101 (original description, first state record, before 1906, O'ahu).
Myzocallis kahawaluokalani Kirkaldy: Kirkaldy, 1908*b*: 206.
Myzocallis kahawaluokalani Kirkaldy: Fullaway, 1910: 42–43.
Myzocallis kahawaluokalani Kirkaldy: Timberlake, 1924:451.
Myzocallis kahawaluokalani Kirkaldy: Zimmerman, 1948:67–69, fig. 30.
Sarucallis kahawaluokalani (Kirkaldy): Beardsley, 1979 (nomenclatoral update; distribution summary).
Tinocallis kahawaluokalani: Mondor et al., 2006:97.
Origin: East Palearctic.
Distribution—World: Southern USA, Puerto Rico, Italy, East and Southeast Asia.
Distribution—Hawai'i: O'ahu (1927).
Hosts—Hawai'i: *Lagerstroemia indica* L.

Schizaphis rotundiventris (Signoret) (Aphidinae Aphidini Rhopalosiphina)
Toxoptera cyperi van der Goot: Zimmerman, 1948:100–101 (first state record 1939, O'ahu; Maui).
Schizaphis cyperi (van der Goot): Beardsley, 1979 (nomenclatoral update; distribution summary).
Schizaphis rotundiventris (Signoret): Nishida, 2002*a*:49 (Midway).
Origin: Possibly Oriental.
Distribution—World: Southeast USA, southern Europe, Africa, East and Southeast Asia, Australia and New Zealand.
Distribution—Hawai'i: Hawai'i (1963), Kaua'i (2004), Maui (2003), Midway (1998), O'ahu (1939).
Hosts—Hawai'i: *Acorus gramineus* Sol. ex Aiton, *Cyperus* sp., *Fimbristylis cymosa* R. Br., *Sisyrinchium acre* Mann; in literature: *Santalum haleakalae* Hbd.

Semiaphis heraclei (Takahashi) (Aphidinae Macrosiphini)
Brachycolus heraclei Takahashi: Look and McAfee, 1944*a* (first state record 1940, O'ahu).
Brachycolus heraclei Takahashi: Look and McAfee, 1944*b* (hosts).
Brachycolus heraclei Takahashi: Zimmerman, 1948:90–91, fig. 50.
Semiaphis heraclei (Takahashi): Beardsley, 1979 (nomenclatoral update; distribution summary).
Origin: Eastern Palearctic.
Distribution—World: East and South Asia.
Distribution—Hawai'i: Kaua'i, O'ahu (1940).
Hosts—Hawai'i: *Apium graveolens* L., *Daucus carota* L., *Petroselinum crispum* (Mill.) Fuss.

Sipha elegans Del Guercio (Chaitophorinae Siphini), new state record
Origin: Palearctic.
Distribution—World: North America, Europe, Asia.
Distribution—Hawai'i: Moloka'i (2005).
Hosts—Hawai'i: *Paspalum conjugatum* Berg.

Sipha flava (Forbes) (Chaitophorinae Siphini)
Sipha flava (Forbes): Beardsley et al., 1993 (first state record 1988, Hawai'i).
Sipha flava (Forbes): Tsuda et al., 1993 (Kauai, O'ahu).
Origin: Nearctic.
Distribution—World: North and South America, Azores.
Distribution—Hawai'i: Hawai'i (1991), Kaua'i (1993), Maui (2004), Moloka'i (1994), O'ahu (1988).
Hosts—Hawai'i: *Cymbopogon citratus* (DC. ex Nees) Stapf, *Pennisetum clandestinum* Hochst. ex Chiov., *Saccharum officinarum* L., *Sorghum bicolor* (L.) Moench.

Siphonatrophia cupressi (Swain) (Aphidinae Aphidini Aphidina)
Siphonatrophia cupressi (Swain): Ebesu, 1993*b* (first state record 1992, Maui).
Origin: Possibly Nearctic.
Distribution—World: Western USA to Central America.
Distribution—Hawai'i: Maui.
Hosts—Hawai'i: None.
Note: Known only from trapped alates identified by D. Voegtlin, Illinois Natural History Survey. We have not examined the material.

Sitobion anselliae (Hall) (Aphidinae Macrosiphini), new state record
Origin: Afrotropical.

Distribution—World: Africa.
Distribution—Hawai'i: Hawai'i (1976), O'ahu (1948).
Hosts—Hawai'i: *Dendrobium* sp.

Sitobion fragariae (Walker) (Aphidinae Macrosiphini)
Sitobion fragariae (Walker): Messing et al., 2006 (first state record 2003, Maui).
Sitobion fragariae: Messing et al., 2007:604 (endemic plant hosts).
Origin: Palearctic.
Distribution—World: North and South America, Europe, South Africa, Australia, New Zealand.
Distribution—Hawai'i: Hawai'i (1962), Kaua'i (1991), Maui (1964).
Hosts—Hawai'i: *Vaccinium* sp., *Luzula hawaiiensis* Buchenau, various species of Poaceae.

Sitobion ibarae (Matsumura) (Aphidinae Macrosiphini)
Macrosiphum rosae (Linnaeus): Kirkaldy, 1908*a*:100 (misidentification, first state record, present before 1906).
Aphis rosae L.: Kirkaldy, 1908*b*:206.
Macrosiphum rosae (L.): Fullaway, 1910:25 (misidentification).
Macrosiphum rosae (L.): Zimmerman, 1948:109, 111, fig. 67 (misidentification).
Macrosiphum ibarae Matsumura: Hardy, 1960 (corrected identification).
Sitobion ibarae (Matsumura): Beardsley, 1979 (nomenclatoral update; distribution summary).
Origin: Eastern Palearctic.
Distribution—World: East and Southeast Asia.
Distribution—Hawai'i: Hawai'i (1940), Kaua'i, Maui, O'ahu.
Hosts—Hawai'i: *Rosa* sp.
Note: True *Macrosiphum rosae* has recently been collected on Kaua'i.

Sitobion luteum (Buckton) (Aphidinae Macrosiphini)
Macrosiphum luteum (Buckton): Look and Krauss, 1949 (first state record 1948, Hawai'i).
Macrosiphum luteum (Buckton): Look, 1953 (Maui).
Sitobion luteum (Buckton): Beardsley, 1979 (nomenclatoral update; distribution summary).
Origin: Possibly Neotropical.
Distribution—World: North America, Central and South America, Europe, Madagascar, Mauritius, India, Southeast Asia, Australia, Fiji, Tahiti.
Distribution—Hawai'i: Hawai'i (1948), Maui, O'ahu (1948).
Hosts—Hawai'i: *Cattleya* sp., *Vapodes phalaenopsis* (Fitzg.) M. A. Clem & D. L. Jones (= *Dendrobium phalaenopsis*), *Epidendrum burtonii* D. E. Benn. & Christenson.

Sitobion miscanthi (Takahashi) (Aphidinae Macrosiphini)
Macrosiphum granarium (Kirby): Davis, 1947*a* (first state record 1945, Maui).
Macrosiphum granarium (Kirby): Zimmerman, 1948:110, fig. 66.
Macrosiphum granarium (Kirby): Zimmerman, 1953 (Hawai'i).
Macrosiphum granarium ssp. *miscanthi*: Hardy, 1960 (correct identity).
Sitobion miscanthi (Takahashi): Beardsley, 1979 (nomenclatoral update; distribution summary).
Origin: Eastern Palearctic
Distribution—World: India, Southeast Asia, Australia, Pacific islands.
Distribution—Hawai'i: Maui (1945).
Hosts—Hawai'i: species of Poaceae.

Sitobion phyllanthi (Takahashi) (Aphidinae Macrosiphini)
Sitobion phyllanthi (Takahashi): Messing et al., 2006 (first state record 2003, O'ahu and Hawai'i).
Origin: Afrotropical.
Distribution—World: Africa, Mauritius.
Distribution—Hawai'i: Hawai'i (2003), Kaua'i (2003), Maui (2003), Moloka'i (2003), O'ahu (2003).
Hosts—Hawai'i: *Chamaesyce* sp., *Euphorbia* sp.

Takecallis arundinariae (Essig) (Calaphidinae Panaphidini)
Takecallis arundinariae (Essig): Kumashiro et al., 2002:176 (first state record 1997, Hawai'i).
Origin: Eastern Palearctic.
Distribution—World: North America, England, India, East Asia, New Zealand.
Distribution—Hawai'i: Hawai'i (2007).
Hosts—Hawai'i: *Arundinaria* sp.

Tetraneura fusiformis Matsumura (Eriosomatinae Eriosomatini)
Tetraneura nigriabdominalis Sakaki: Ebesu, 1993*a* (first state record 1987, Maui).
Tetraneura nigriabdominalis Sakaki: Kumashiro, 1998 (Kaua'i).
Origin: Eastern Palearctic.
Distribution—World: North America, Central and South America, Middle East, Africa, South and East Asia, Australia, Fiji, Tonga.
Distribution—Hawai'i: Lāna'i, Maui (1988), Moloka'i (1994), O'ahu (1991).
Hosts—Hawai'i: Roots of Poaceae.
Note: *Tetraneura nigriabdominalis* is a valid species, but the name has been incorrectly applied to the widespread species *T. fusiformis* (Eastop and Blackman 2005).

Therioaphis trifolii (Monell) (Calaphidinae Panaphidini)
Therioaphis maculata (Buckton): Beardsley, 1977*a* (first state record 1975, O'ahu).
Therioaphis trifolii (Monell): Ebesu, 1993*a* (Maui).
Origin: Palearctic.
Distribution—World: North and South America, Europe, North Africa, Asia, Australia.
Distribution—Hawai'i: Maui, O'ahu (1975).
Hosts—Hawai'i: *Medicago polymorpha* L. var. *denticulata* (Willd.) Kerguélen; *Medicago lupulina* L., *Meliotus alba* Medik. (Beardsley 1977*a*).

Toxoptera aurantii (Boyer de Fonscolombe) (Aphidinae Aphidini Aphidina)
Toxoptera aurantiae Koch: Fullaway, 1910:31–32 (first state record 1909, O'ahu).
Toxoptera aurantiae: Timberlake, 1921 (host record).

Toxoptera aurantii (Fonscolombe): Timberlake, 1924:454–455 (hosts).
Toxoptera aurantii (Fons.): Fullaway, 1925 (Hawai'i).
Toxoptera aurantii (Boyer de Fonscolombe): Zimmerman, 1948:99–100, fig. 58.
Toxoptera aurantii (Boyer de Fonscolombe): Beardsley, 1979 (distribution summary).
Toxoptera aurantii (Boyer de Fonscolombe): Heu and Funasaki, 1988 (hosts).
Toxoptera aurantii: Messing et al., 2007:603 (indigenous plant host).
Toxoptera aurantii: Messing et al., 2007:604 (endemic plant host).
Origin: Probably Oriental.
Distribution—World: Tropical and subtropical.
Distribution—Hawai'i: Hawai'i (1938), Kaua'i (1944), Maui (1943), Moloka'i (1943), O'ahu (1941).
Hosts—Hawai'i: *Citrus* spp. and various species of shrubs in numerous families, including native plants.

Toxoptera citricidus (Kirkaldy) (Aphidinae Aphidini Aphidina)
Myzus citricidus Kirkaldy, 1908*a*:100 (original description; first state record, throughout Hawaiian Islands before 1906).
Myzus citricidus Kirkaldy: Kirkaldy, 1908*b*:206.
Myzus citricidus Kirkaldy: Fullaway, 1910:27–28.
Myzus citricidus Kirkaldy: Timberlake, 1924:456.
Aphis tavaresi Del Guercio: Krauss, 1944*b*:17 (Maui).
Aphis citricidus: Zimmerman, 1948:74–75, fig. 34.
Toxoptera citricidus (Kirkaldy): Beardsley, 1979 (nomenclatoral update; distribution summary).
Toxoptera citricidus (Kirkaldy): Ebesu, 1993*a* (Maui).
Toxoptera odinae: Messing et al., 2006 (misidentification).
Origin: Probably Oriental.
Distribution—World: Citrus-growing areas except for the eastern Mediterranean region and California.
Distribution—Hawai'i: Hawai'i (1940), Kaua'i (1940), Maui (1943), O'ahu (1938).
Hosts—Hawai'i: *Citrus* spp.; *Azalea* sp. (in literature).

Tuberolachnus salignus (Gmelin) (Lachninae Lachnini)
Pterochlorus saligna (Gmelin): Davis, 1947*b* (first state record 1911, Hawai'i).
Tuberolachnus salignus (Gmelin): Zimmerman, 1948: 64–65, fig. 27.
Lachnus salignus: Davis, 1971 (host).
Tuberolachnus salignus (Gmelin): Beardsley, 1979 (distribution summary).
Origin: Unknown.
Distribution—World: Where *Salix* occurs, except Australasia.
Distribution—Hawai'i: Hawai'i (1946), Maui (1965).
Hosts—Hawai'i: *Osteomeles anthyllidifolia* (Sm.) Lindl.; in literature (Davis 1971) *Salix* sp.
Notes: *Osteomeles* (Rosaceae) is an unusual host for this species (several separate collections from this plant). Records of this species on plants other than Salicaceae are extremely rare, but Theobald (1929) reported infestations on apple adjacent to willow in Wales and Ireland. *Tuberolachnus sclerata* Hille Ris Lambers & Basu feeds on another rosaceous host, *Eriobotrya*, in India. However, the Hawaiian specimens are clearly not that species and, although smaller than average, fit within the range of variation seen among *T. salignus* specimens from North America, Europe, and Korea.

Uroleucon erigeronense (Thomas) (Aphidinae Macrosiphini), new state record
Origin: Nearctic.
Distribution—World: North, Central, and South America, Europe, Korea.
Distribution—Hawai'i: Maui (2003).
Hosts—Hawai'i: *Conyza canadensis* (L.) Cronquist.
Note: Known from a single collection.

Uroleucon pseudambrosiae (Olive) (Aphidinae Macrosiphini)
Dactynotus pseudambrosia [sic] Olive: Leonard, 1973 (first state record 1970, Maui).
Dactynotus pseudambrosia [sic]: Beardsley, 1975 (first record 1960 [sic, error for 1970]).
Uroleucon pseudambrosiae: Beardsley, 1979 (nomenclatoral update; distribution summary).
Origin: Nearctic.
Distribution—World: North America.
Distribution—Hawai'i: Maui (1975).
Notes: The orginal collection was determined as *U. pseudambrosiae* by M. D. Leonard; we have not seen this material. The specimen collected in 1975 is not of sufficient quality for definitive identification, but its characters are consistent with *U. pseudambrosiae*, and it clearly does not belong to either *U. erigeronense* or *U. sonchi*.

Uroleucon sonchi (Linnaeus) (Aphidinae Macrosiphini)
Dactynotus sonchi (Geoffroy): Mau, 1977 (first state record 1975, O'ahu).
Uroleucon sonchi (L.): Beardsley, 1979 (nomenclatoral update; distribution summary).
Uroleucon sonchi (L.): Ebesu, 1993*a* (Maui).
Origin: Palearctic.
Distribution—World: Cosmopolitan.
Distribution—Hawai'i: Hawai'i (2004), Maui (2003), O'ahu (1975).
Hosts—Hawai'i: *Lactuca serriola* L., *Sonchus oleraceus* L.

Vesiculaphis caricis (Fullaway) (Aphidinae Macrosiphini)
Toxoptera caricis Fullaway, 1910:32–33, figs. 3, 4 (original description; first state record [before 1909], O'ahu).
Vesiculaphis caricis (Fullaway): Timberlake, 1924:455.
Vesiculaphis caricis (Fullaway): Zimmerman, 1948:102, fig. 60.
Vesiculaphis caricis (Fullaway): Beardsley, 1979 (distribution).
Vesiculaphis caricis (Fullaway): Ebesu, 1993*a* (Maui).
Origin: Eastern Palearctic.
Distribution—World: North America, East and Southeast Asia.
Distribution—Hawai'i: Maui, O'ahu (1907).
Hosts—Hawai'i: *Carex* spp.

Wahlgreniella nervata (Gillette) (Aphidinae Macrosiphini)
Wahlgreniella nervata (Gillette): Beardsley, 1977*b* (first state record 1973, Hawai'i; Maui).
Wahlgreniella nervata (Gillette): Beardsley, 1979 (distribution summary).
Origin: Nearctic.
Distribution—World: South America, Europe, Burundi, Pakistan.
Distribution—Hawai'i: Hawai'i, Maui (1965).
Hosts—Hawai'i: *Rosa* sp., *Vaccinium* sp.

Appendix 2

Key to the Hawaiian Aphids

Key is for the adult wingless form (exception: species without wingless adults, namely *Takecallis arundinariae* on bamboo and *Sarucallis kahawaluokalani* on crape myrtle) but will usually work with winged individuals as well.

Explanation of Abbreviations and Symbols:

ABD	Abdomen or abdominal
ABDI, ABDII, etc.	Abdominal segment I, abdominal segment II, etc.
ANT	Antenna
ASIII, ASIV, etc.	Antennal segment III, antennal segment IV, etc.
B	Base of ultimate antennal segment (part up to and including primary rhinarium)
HTI, HTII	Hind tarsal segment I, hind tarsal segment II
PT	Processus terminalis of ultimate antennal segment (part beyond primary rhinarium)
SIPH	Siphunculus or siphuncular
URS	Ultimate rostral segment (IV+V)

1 Sclerotized ovipositor well developed; dorsum with numerous fields of circular wax-pores; ANT 3-segmented; SIPH and cauda absent; abdomen with 4 pairs of spiracles . . . . . (superfamily Phylloxeroidea; family Adelgidae) *Pineus pini*
— Sclerotized ovipositor absent; without the above combination of characters . . . . . (Aphididae) 2

2(1) SIPH elongate, with numerous long setae . . . . . (subfamily Greenideinae) *Greenidea psidii*
— SIPH poriform, conical, cylindrical, or absent; if elongate then without setae 3

3(2) Body almost round to oval, dorsal-ventrally flattened, body margined by distinct wax glands (in life body fringed by a ring of wax) . . . . . (subfamily Hormaphidinae in part) 4
— Aphid not as above 7

4(3) SIPH present, porelike; head with two hornlike processes projecting forward (*Cerataphis*) 5
— SIPH absent, head without hornlike processes . . . . . *Reticulaphis distylii*

5(4) Head underside with at least one pair of short, stout spines on strongly tuberculate bases positioned ventrolateral of frontal horns . . . . . *Cerataphis brasiliensis*
— Head underside without stout spines, but with elongate slender setae on flat or slightly raised bases positioned ventrolateral of frontal horns 6

6(5) Larger subcircular aphids (1.0–1.75 mm in length, 0.9–1.25 mm in width); ANT usually 5-segmented (sometimes 4-segmented); URS ≈ HTII; cauda with 10–17 setae: subgenital plate with 18–24 setae (after Russell 1996); on orchids . . . . . *Cerataphis orchidearum*
— Smaller, ovoid aphids (1.0–1.35 mm in length, 0.7–1.10 mm in width); ANT usually 4-segmented (sometimes 5-segmented); URS = 0.67–0.75 × HTII; cauda with 7–12 setae: subgenital plate with 7–14 setae (after Russell 1996); on palm . . . . . *Cerataphis lataniae*

7(3) Body with conspicuous dorsal and marginal long, stout, spinelike hairs; PT/B < 0.5; on bamboo . . . . . (subfamily Hormaphidinae in part) *Glyphinaphis bambusae*
— Body without spinelike marginal setae and/or PT/B > 1.0 8

8(3) PT/B < 0.5 *and* cauda knobbed; on *Araucaria* or *Podocarpus* . . . . . (Neophyllaphidinae, *Neophyllaphis*) 9
— Not with the above combination of characters 10

9(8) ANT 5-segmented; color of living aphids yellow to yellow orange; on *Araucaria* spp. . . . . *Neophyllaphis araucariae*
— ANT usually 6-segmented; color of living aphids reddish purple; on *Podocarpus* spp. . . . . *Neophyllaphis podocarpi*

10(8) PT/B < 0.5, cauda broadly rounded 11
— PT/B > 0.5, cauda rounded, knobbed, or elongate 21

11(10) Basal tarsal segments trapezoidal; on aerial parts (occasionally roots in association with ants) of conifers, *Osteomeles* or *Salix* . . . . . (Lachninae) 12

— Basal tarsal segment triangular; on roots of various plants, not on conifers in Hawai'i . . .(Eriosomatinae) 18

12(11) ABD with conical process on center of dorsum of abdomen; on *Osteomeles* or *Salix* . . . *Tuberolachnus salignus*
— ABD without conical abdominal process; on conifers 13

13(12) Body elongate; SIPH porelike; URS rounded at apex . . . . . *Eulachnus rileyi*
— Body not elongate; SIPH broadly conical, with setae; URS with apex elongate and acute . . . . . (*Cinara*) 14

14(13) HTI with dorsal length equal to or slightly greater than basal width; PT with 4–5 subapical setae . . . . . (subgenus *Cinara*) 15
— HTI with dorsal length distinctly shorter than (0.5–0.8 ×) basal width; PT with 3 subapical setae; on Cupressaceae . . . . . (subgenus *Cupressobium*) 16

15(14) Eyes on short stalk, usually with ocular tubercle indistinct; HTI more than half as long as HTII; SIPH with setae of two types, some distinctly thicker and longer . . . . . *Cinara watsoni*
— Eyes not stalked, with distinct ocular tubercle; HTI less than half length of HTII; setae on SIPH all similar in form . . . . . *Cinara altantica*

16(14) Femur completely pale except at point of articulation with tibia; tibia pale except at apex . . *Cinara tujafilina*
— Femur dark distally; tibia dark basally and/or distally 17

17(16) ASVI B with 4–7 setae restricted to basal half (after Blackman and Eastop 1994) . . . . . *Cinara cupressi*
— ASVI B with 7–15 setae not restricted to basal half (after Blackman and Eastop 1994) . . . . . *Cinara fresai*

18(11) Tarsi 1-segmented . . . . . *Tetraneura fusiformis*
— Tarsi 2-segmented 19

19(18) HTII basal sensorium located from base of segment a distance equal to its diameter; most wax gland plates in form of a rosette or ring of cells around a differentiated central area . . . . . *Eriosoma lanigerum*
— HTII basal sensorium located from base of segment a distance much greater than its diameter; wax gland plates formed from a cluster of cells not arranged in a ring 20

20(19) On roots of taro . . . . . *Patchiella reaumuri*
— On roots of cruciferous plants . . . . . *Pemphigus populitransversus*

21(10) ANT 5-segmented; dorsal setae spinelike; on grass (subfamily Chaitophorinae) 22
— ANT usually 6-segmented; if 5-segmented than dorsal setae not obviously spinelike 23

22(21) Cauda with apical part in form of a circular knob . . . . . *Sipha flava*
— Cauda broadly rounded . . . . . *Sipha elegans*

23(21) Cauda knobbed (distinctly constricted before the apex, part beyond constriction forming abrupt transverse, circular, or elongate knob) . . . . . (subfamily Calaphidinae) 24
— Cauda elongate to semicircular, apex not forming a knob . . . . . (subfamily Aphidinae) 26

24(22) Adults all winged; ABDI–VI dorsum with paired black elongate spots; cauda pale; on bamboo . . . . . *Takecallis arundinariae*
— Not with the above combination of characters 25

25(24) Adults all winged; ABDII tergum with a pair of large, dark, and basally merged middorsal projections; on crape myrtle . . . . . *Sarucallis kahawaluokalani*
— Adults comprised of both winged and wingless forms; setae of abdomen on pigmented sclerotic spots; on legumes . . . . . *Therioaphis trifolii*

26(21) Aphids small (1.1–1.3 mm), dorsally convex or dome-shaped, ventrally flat; lateral frontal tubercles weakly developed; antennae not longer than half the body in length; SIPH porelike, on a small, slightly raised cone; cauda pale with > 10 setae; rare . . . . . *Siphonatrophia cupressi*
— Not with the above combination of characters 27

27(26) ABD I and VII with marginal small circular or domelike tubercles that are no smaller than those on II–V (which may be absent or difficult to see), or marginal tubercles absent from all ABD segments; distance between spiracles of ABDI and II usually > 0.5 × distance between spiracles of ABDII and III . . . . . (tribe Aphidini) 28
— ABD lateral tubercles often present on II–V, but rarely on I and VII, and then the latter are smaller than those on II–V; distance between ABDI and II spiracles usually < 0.5 × distance between spiracles of ABDII and III . . . . . (tribe Macrosiphini) 51

28(27) ABDVII lateral tubercle posteroventral of spiracle; SIPH cylindrical or tapering 29
— ABDVII lateral tubercle posterodorsal of spiracle; SIPH cylindrical, tapering, or swollen subapically . . . 44

29(28) ABD with strongly developed lateroventral ridges (stridulatory mechanism) and postsiphuncular sclerites; hind tibia with row of peglike setae; SIPH and cauda uniformly pigmented 30
— ABDVII without lateroventral ridges (rows of small spinules may be present); tibia without a well-developed row of peglike setae (present in *Aphis eugeniae* but few in number) 31

30(29) ASIII–V apically darkened (ANT appears banded); ABD ventrolateral serrate ridges coarse; ASIII setae length < segment width at base; cauda usually with < 20 setae . . . . . *Toxoptera aurantii*
— ASII–IV entirely pale; ABD ventrolateral serrate ridges fine; ASIII setae length often ≥ segment width at base; cauda with > 20 setae . . . . . *Toxoptera citricidus*

31(29) ABD dorsum with a patch . . . . . (part) *Aphis craccivora*
— ABD dorsum without a patch (if questionable, continue to couplet 32) 32

32(31) Hind tibia with some short peglike setae, particularly on basal half . . . . . *Aphis eugeniae*
— Hind tibia without peglike setae 33

33(32) URS with 6–10 accessory setae; SIPH light, cauda dark; cauda with 10–15 setae . . . . . *Aphis oenotherae*
— URS with 2–4 accessory setae; SIPH pigmentation and number of caudal setae variable 34

34(33) SIPH < URS in length; cauda short, < 0.14 mm, < URS in length, ~ equal to HTII in length; tibia with pale middle section; ABDI and VII marginal tubercles large; SIPH 0.13–0.28 mm; root-feeding aphid . . . . . *Aphis middletonii*
— SIPH > URS in length, not with combination of characters above 35

35(34) SIPH pale to dusky, slightly darker toward apices; cauda pale to dusky . . . . . *Aphis nasturtii*
— SIPH uniformly dark or dusky (occasionally entirely pale) 36

36(35) Cauda usually with >10 setae 37
— Cauda with 4–9 setae (commonly 4–6) 39

37(36) SIPH > 0.40 mm; color in life bright yellow orange . . . . . *Aphis nerii*
— SIPH < 0.37 mm (usually < 0.30 mm) 38

38(37) ABD dorsum with variably developed pigmentation, at least intersegmental muscle sclerites dark; overall color in life blackish . . . . . *Aphis fabae*
— ABD dorsum without sclerites or dark markings; color in life yellow to green . . . . . *Aphis spiraecola*

39(36) PT long, > 0.35 mm; PT/B ≈ 4.0; SIPH long, ≥ 0.24 × body, approx. 2 × cauda; ANT III–VI all dark except basal part of III; SIPH dark, cauda pale . . . . . *Aphis coreopsidis*
— PT < 0.35 (usually 0.30 mm); PT/B usually < 3.5; SIPH usually < 0.2 × body; other features variable . . . 40

40(39) ANTIV+V > 0.35 mm; rostrum extending beyond hind coxae . . . . . *Aphis sedi*
— ANTIV+V usually < 0.35 mm; if longer, then rostrum not extending beyond hind coxae 41

41(40) ABD dorsocentral area membranous, ABDVII–VIII with some small sclerites or narrow transverse stripes; SIPH and cauda usually equally pigmented; URS > cauda in length, and > 1.5 × HTII; on *Fragaria* (rare, single unconfirmed collection from Maui, 1944) . . . . . *Aphis forbesi*
— Not with the combination of characters above 42

42(41) ABD dorsocentral area pigmented (sometimes faint); cauda and SIPH both dark . . . . (part) *Aphis craccivora*
— ABD dorsocentral area membranous; cauda pale or dusky, usually lighter than SIPH 43

43(42) PT/B ≤ 1.9; URS 0.12–0.015 mm; URS/HTII usually ≥ 1.4; anterior half of subgenital plate with 4–6 setae (Blackman and Eastop 2006); on *Oenothera* . . . . . *Aphis oestlundi*
— PT/B ≥ 1.9; URS 0.11–0.12 mm; URS/HTII ≤ 1.4; anterior half of subgenital plate with 2 setae (Blackman and Eastop 2006); on a wide range of plants (including *Oenothera*) . . . . . *Aphis gossypii*

44(28) ABD dorsum microsculpture with fine spinules forming polygons, and with most polygons enclosing one or more central spinules . . . . . (*Rhopalosiphum*) 45
— ABD dorsum microsculpture without polygons or polygons not enclosing spinules 48

45(44) SIPH distinctly swollen (narrowed on basal half), more than twice as long as cauda . . . . . *Rhopalosiphum nymphaeae*
— SIPH at most two times as long as cauda, distinctly or obscurely swollen 46

46(45) PT/B usually < 2.5; SIPH short, 0.07–0.08 × body; body elongate . . . . . *Rhopalosiphum maidis*
— PT/B > 2.5 (usually > 3.0); SIPH 0.08–0.15 × body; body more oval 47

47(46) ABDVIII dorsum with usually 2 setae; ASIII setae 0.4–1.0 × basal diameter of antennal segment III (after Blackman and Eastop 2006) . . . . . *Rhopalosiphum padi*

— ABDVIII dorsum with 4–8 setae; ASIII setae 3.0–5.0 × basal diameter of antennal segment III (after Blackman and Eastop 2006) . . . . . *Rhopalosiphum rufiabdominale*

48(44) SIPH slightly swollen on basal half; cauda very long and pale . . . . . *Hysteroneura setariae*
— SIPH cylindrical or tapering 49

49(48) SIPH/body length > 0.15; on *Cyperus* . . . . . *Schizaphis rotundiventris*
— SIPH/body length ≤ 0.10; not on *Cyperus* . . . . . (*Melanaphis*) 50

50(51) Coxae dark; on bamboo . . . . . *Melanaphis bambusae*
— Coxae pale; on surgarcane, sorghum, and other grasses (but not bamboos) . . . . . *Melanaphis sacchari*

51(27) ABD tergum VIII with prominent median tubercle (supracaudal process) . . . . . *Cavariella aegopodii*
— ABD tergum VIII without median tubercle 52

52(51) SIPH short, ≤ 0.5 × cauda in length, inward curved, and flangeless . . . . . *Semiaphis heraclei*
— Not with the combination of characters above 53

53(52) SIPH with 3 or more rows of apical reticulation 54
— SIPH with 0–2 rows of apical reticulation 69

54(53) SIPH abruptly inflated below reticulate region . . . . . *Rhopalosiphoninus latysiphon*
— SIPH cylindrical or swollen, but not abruptly inflated 55

55(54) Cauda black; SIPH black, short (< cauda in length), ≥ 40% reticulated; URS elongate (narrow and conical), and with subbasal setae longer than subapical setae; on *Chrysanthemum* . . . . . *Macrosiphoniella sanborni*
— Not with the combination of characters above 56

56(55) ABD setae commonly set on minute sclerites (dorsum otherwise membranous); SIPH reticulation fine, with average diameter of cell < 2/5 of width of SIPH, arrayed in 6 or more transverse rows; ASIII with secondary rhinaria often scattered, not in a single row; tarsal I chaetotaxy 3-3-3 or 5-5-5; cauda pointed . . . . . (*Uroleucon*) 57
— Not with the combination of characters above 59

57(56) SIPH dark with pale base; live aphids yellow green . . . . . *Uroleucon erigeronense*
— SIPH uniformly dark; live aphids dark reddish brown 58

58(57) Coxae pale, unicolorous with bases of femora; ABD lateral tubercles absent . . . . . *Uroleucon pseudambrosiae*
— Coxae darker than bases of femora; ABD lateral tubercles present on at least some segments . . . . . *Uroleucon sonchi*

59(56) SIPH swollen; HTI with 3–5 setae . . . . . (*Illinoia*) 60
— SIPH not swollen; HTI with 3 setae 62

60(59) SIPH polygonal reticulation distally on 3%–5% of total length; HTI with 3 setae (rarely 4) . . . . . *Illinoia goldamaryae*
— SIPH polygonal reticulation on 6%–12%; HTI with 3, 4, or 5 setae 61

61(60) HTI with 5 setae (rarely 4); URS/HTII = 1.1–1.4; SIPH/cauda = 2.2–2.5 (after Blackman and Eastop 2006) . . . . . *Illinoia azaleae*
— HTI with 3 setae (rarely 4); URS/HTII = 1.4–1.8; SIPH/cauda = 1.7–2.3 (after Blackman and Eastop 2006) . . . . . *Illinoia borealis*

62(59) ABDVIII tergum with 4 setae . . . . . (*Sitobion*) 63
— ABDVIII tergum with 5 or more setae . . . . . (*Macrosiphum*) 68

63(62) On orchids 64
— Not on orchids 65

64(63) ABD dorsum with black oval sclerotic patch; metathorax with narrow transverse band . . . . . *Sitobion luteum*
— ABD membranous . . . . . *Sitobion anselliae*

65(63) On Euphorbiaceae (*Euphorbia*, *Breynia*, *Phyllanthus*) . . . . . (part) *Sitobion phyllanthi*
— On Gramineae and Rosaceae 66

66(65) Femora dark on distal 0.25; on *Rosa* . . . . . *Sitobion ibarae*
— Mainly on Gramineae; if on *Rosa*, then femora pale except distal apices 67

67(66) SIPH/cauda = 1.8–2.7; SIPH/ASIII = 0.95–1.3 (after Blackman and Eastop 2006) . . . . . *Sitobion fragariae*
— SIPH/cauda = 1.4–1.9; SIPH/ASIII = 0.75–1.05 (after Blackman and Eastop 2006) . . . . . *Sitobion miscanthi*

68(62) SIPH dark except extreme base . . . . . *Macrosiphum rosae*
— SIPH pale, at least basal half . . . . . *Macrosiphum euphorbiae*

69(53) SIPH black, stout, scabrous, swollen over much of length but strongly narrowed apically, and with apex curved slightly outward; ANT short, approx. 0.33 × body; on *Carex* . . . . . *Vesiculaphis caricis*
— SIPH not as above, and not on *Carex* 70

70(69) Lateral frontal tubercles of head developed 71
— Lateral frontal tubercles weakly developed, not or only slightly exceeding front of head 98

71(70) Thoracic spiracles much larger than ABD spiracles 72
— Thoracic spiracles not much larger than ABD spiracles 74

72(71) SIPH cylindrical . . . . . *Nasonovia ribisnigri*
— SIPH distinctly swollen 73

73(72) SIPH swollen, widest width = 1.1–1.3 × narrowest; dorsal abdominal setae short, those on tergum VIII about as long as diameter of abdominal spiracles . . . . . *Hyperomyzus carduellinus*
— SIPH swollen, widest width = 1.5–1.6 × narrowest; dorsal abdominal setae longer, those on tergum VIII at least twice the diameter of abdominal spiracles . . . . . *Hyperomyzus lactucae*

74(71) Lateral frontal tubercles smooth, diverging, rarely with a few obscure spicules ventrally 75
— Lateral frontal tubercles scabrous at least near anterior margin or with spicules and nodules ventrally (or both) 84

75(74) Dorsum with conspicuous capitate or flabellate (expanded and flattened at apex) setae 76
— Dorsum with acute, blunt, or inconspicuous capitate setae 79

76(75) ASIII with 1–2 rhinaria; dorsal setae flabellate . . . . . *Pleotrichophorus chrysanthemi*
— ASIII without rhinaria; dorsal setae capitate 77

77(76) SIPH swollen . . . . . *Capitophorus hippophaes*
— SIPH not swollen 78

78(77) ABD tergites each with 4 spinal and 4 pleural setae; ASIII setae 0.7–1.2 mm; cauda < 0.15 mm; on *Artemisia* . . . . . *Capitophorus formosartemisiae*
— ABD tergites each with 2 spinal and 2 pleural setae; ASIII setae usually < 0.3 mm; cauda > 0.18 mm; on artichoke and other thistles . . . . . *Capitophorus elaeagni*

79(75) SIPH swollen . . . . . *Wahlgreniella nervata*
— SIPH not swollen 80

80(79) URS/HTII > 1.1 . . . . . *Acyrthosiphon malvae*
— URS/HTII < 0.95 81

81(80) ABD tergites with more or less pigmented blotches or crossbars; on Euphorbiaceae (*Euphorbia*, *Breynia*, *Phyllanthus*) . . . . . (part) *Sitobion phyllanthi*
— ABD tergites unpigmented 82

82(81) Cauda bluntly rounded at apex; SIPH length < 0.2 times body length; URS/HTII 0.6 to 0.7; front of head between lateral frontal tubercles distinctly convex; on grasses . . . . . *Metopolophium dirhodum*
— Cauda long and tapered; SIPH length > 0.22 times body length; URS/HTII usually > 0.7; front of head between lateral frontal tubercles concave; on legumes 82

83(82) SIPH width ≥ hind tibia width (measure at midlengths); ANTI with fewer than 11 setae; ANT segments not conspicuously darkened at apices . . . . . *Acyrthosiphon kondoi*
— SIPH width ≥ hind tibia width (measure at midlengths); ANTI with more than 11 setae; ANT segments dark at apices . . . . . *Acyrthosiphon pisum*

84(74) SIPH slightly to distinctly swollen 85
— SIPH cylindrical throughout 91

85(84) SIPH length > head width 86
— SIPH length < head width 87

86(85) Lateral frontal tubercles diverging; SIPH dark, body pale; on laua'e fern (*Phymatosorus scolopendrium*) . . . . . *Micromyzus katoi* group
— Lateral frontal tubercles converging; SIPH and body similarly pale . . . . . *Myzus persicae*

87(85) Lateral frontal tubercles widely separated (distance between greater than 2 × height of tubercles); PT/B > 5.5 88
— Lateral frontal tubercles not widely separated (distance between less than height of tubercles); PT/B < 5.0 89

88(87) URS = 0.14–0.16 mm; on banana, rarely taro . . . . . *Pentalonia nigronervosa*
— URS = 0.11–0.13 mm; on *Alpinia*, *Hedychium*, *Heliconia*, *Zingiber*, and taro . . . . . *Pentalonia caladii*

89(87) Lateral frontal tubercles diverging to parallel; SIPH length/width (narrowest diameter) 6–9; URS/HTII 1.0–1.2; on *Allium* . . . . . *Neotoxoptera formosana*
— Lateral frontal tubercles converging; SIPH length/width (narrowest diameter) 7–15; URS/HTII 1.2–1.6 90

90(89) SIPH length/width (narrowest diameter) 7–9; URS/HTII 1.2–1.4; known from *Allium*, *Stellaria*, *Viola*, *Calendula* . . . . . *Neotoxoptera oliveri*
— SIPH length/width (narrowest diameter) 10–15; URS/HTII 1.4–1.6; on *Viola* . . . . . *Neotoxoptera violae*

91(84) Lateral frontal tubercles converging 92
— Lateral frontal tubercles parallel or diverging 93

92(91) Dorsum membranous; SIPH straight . . . . . *Ovatus crataegarius*
— Dorsum with spots and transverse streaks; SIPH somewhat s-shaped . . . . . *Myzus ornatus*

93(91) SIPH black on basal 0.25–0.33, pale distally; on ferns . . . . . *Idiopterus nephrelepidis*
— Not with combination of characters above 94

94(93) ABD dorsum with horseshoe-shaped pigmentation . . . . . *Neomyzus circumflexus*
— ABD dorsum without horseshoe-shaped pigmentation 95

95(94) Cauda with 2 basal pairs of long pointed setae, and 2–4 short blunt distal setae; ASIII of aptera with 2 or more rhinaria; on *Rosa* . . . . . *Rhodobium porosum*
— Cauda with basal and distal setae similar in length; ASIII of aptera with 0 or 1 rhinarium 96

96(95) SIPH < PT in length; ANT > body in length; ASIII of aptera usually with 1 rhinarium; SIPH with conspicuous dark flange . . . . . *Aulacorthum solani*
— SIPH > PT in length; ANT < body in length; ASIII of aptera without rhinaria 97

97(96) ABD dorsum surface relatively smooth . . . . . *Ericaphis scammelli* group
— ABD dorsum surface rugose . . . . . *Myzus hemerocallis*

98(70) Ocular tubercle conspicuous, projecting from posterior margin of eye 99
— Ocular tubercle indistinct, reduced, placed below compound eye 109

99(98) SIPH with close-set transverse rows of spinules; head nodulose or spiculose . . . . . *Nearctaphis bakeri*
— SIPH smooth or with imbrications or spinules, but spinules not arranged in transverse rows 100

100(99) ABD usually with paired dorsal tubercles, usually at least on ABDVIII; cauda short, triangular or pentangular, not longer than its basal width 101
— ABD usually without paired dorsal tubercles; cauda shape variable 104

101(100) Mesothoracic furca arms united (inside body, viewable with cleared and slide-mounted specimens); SIPH with dark apices; on *Plantago* and *Sorbus* . . . . . *Dysaphis aucupariae*
— Mesothoracic furca arms separated; not on *Plantago* or *Sorbus* 102

102(101) On monocots (e.g., *Crocus*, *Gladiolus*, *Iris*, *Lilium*, *Tulipa*) (bulbs, subterranean stems, shoots, and leaves; in Hawai'i currently confirmed as port interceptions only) . . . . . *Dysaphis tulipae*
— On dicots, mainly umbellifers (e.g., *Anethum*, *Apium*, *Daucus*) 103

103(102) Setae on front of head short and blunt (< 0.1 × SIPH); SIPH length/width ≥ 2.5 . . . . . *Dysaphis apiifolia*
— Setae on front of head long, fine, and pointed (0.2–0.4 × SIPH); SIPH length/width ≤ 2.3 (usually < 2) . . . . . *Dysaphis foeniculus*

104(100) ABD dorsum sculpturing reticulate on at least some areas . . . . . *Lipaphis pseudobrassicae*
— ABD dorsum without reticulate sculpturing 105

105(104) Cauda short, bluntly rounded or pentangular; spiracles circular and relatively distinctive (larger than in most species); SIPH nearly smooth, with pale area proximal to the rim . . . . . *Brachycaudus helichrysi*
— Not with the above combination of characters 106

106(105) ABD dorsum with spots, generally coalescing into distinct transverse dashes . . . . . *Brevicoryne brassicae*
— ABD dorsum membranous 107

107(106) SIPH width at base about equal to width at apex, flange weak; URS long and slender, about 3 times as long as basal width; on *Chenopodium* . . . . . *Hayhurstia atriplicis*
— SIPH width at base about twice width at apex, with a distinct flange; URS less than twice as long as its basal width; on umbellifers or *Lonicera* 108

108(107) SIPH/cauda = 0.6–1.4; SIPH/URS = 0.9–1.6 (after Blackman and Eastop 2006); SIPH 3.5–5 times as long as wide and markedly swollen on the distal half . . . . . *Hyadaphis foeniculi*
— SIPH/cauda = 0.85–1.4; SIPH/URS = 1.7–3.1 (after Blackman and Eastop 2006); SIPH about 3 times as long as wide and only slightly swollen . . . . . *Hyadaphis coriandri*

109(98) SIPH surface imbricate or squamous from base to apex; ANT length ≤ 0.5 × body; PT/B 1.4–1.7; on *Artemisia* . . . . . *Coloradoa campestrella*
— SIPH surface nearly smooth on basal half, squamous on distal half; ANT length ≥ 0.5 × body; PT/B 1.3–2.0; on *Chrysanthemum* . . . . . *Coloradoa rufomaculata*