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## Aphid Fauna (Hemiptera: Aphididae) and Associated Flora of Guam

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**Abstract**—The aphid species of Guam, together with their associated island host plants are documented, based on 744 collections of aphids taken from throughout the island from 1997-1999, and earlier collectors' records. Guam is not the original home for any of the aphid species. In total, 18 species have been detected on the island: *Aphis craccivora* Koch, *A. gossypii* Glover, *A. helianthi* Monell, *A. nerii* Boyer de Fonscolombe, *A. rumicis* L., *A. spiraecola* Patch, *Brevicoryne brassicae* (L.), *Cerataphis* sp., *Hyalopterus pruni* (Geoffroy), *Hysteroneura setariae* (Thomas), *Lipaphis erysimi* (Kaltenbach), *Myzus persicae* (Sulzer), *Pentalonia nigronervosa* Coquerel, *Rhopalosiphum maidis* (Fitch), *R. rufiabdominale* (Sasaki), *Tetraneura akinire* Sasaki, *Toxoptera aurantii* (Boyer de Fonscolombe), and *T. citricida* (Kirkaldy). Collectively, the species were found on a diversity of island flora, 103 plant species (8 indigenous) in 34 plant families. The aphids' abundance, economic importance and host plant range are discussed, and a key to their identification is provided.

### Introduction

The known aphids of Guam, all exotic species inadvertently introduced over the years, are today of variable environmental and economic importance. Some species are clearly pestiferous, adversely impacting plant health through direct feeding and/or transmission of plant viruses. Banana, bean, citrus, eggplant, melon, okra, and taro are among crops commonly infested. The island's farmers are frequently forced either to accept high levels of damage or to apply expensive,

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Table 1. Common and scientific names of plants associated with aphids on Guam

acacia	Fabaceae: <i>Acacia confusa</i>
amaranth, spiny	Amaranthaceae: <i>Amaranthus spinosus</i>
banana	Musaceae: <i>Musa</i> sp.
banyan	Moraceae: <i>Ficus prolixa</i>
basil	Lamiaceae: <i>Ocimum basilicum</i>
bean,	
common	Fabaceae: <i>Phaseolus vulgaris</i>
hyacinth	Fabaceae: <i>Dolichos lablab</i>
long	Fabaceae: <i>Vigna unguiculata</i>
mung	Fabaceae: <i>Vigna mungo</i>
scarlet-runner	Fabaceae: <i>Phaseolus coccineus</i>
bluestem	Poaceae: <i>Dichanthium bladhii</i>
bougainvillea	Nyctaginaceae: <i>Bougainvillea spectabilis</i>
breadfruit	Moraceae: <i>Artocarpus incisa</i>
broom corn	Poaceae: <i>Sorghum bicolor</i>
butterflyweed	Asclepiadaceae: <i>Asclepias curassavica</i>
cabbage, Chinese	Brassicaceae: <i>Brassica napus</i>
caladium	Araceae: <i>Caladium</i> sp.
calamansi	Rutaceae: <i>Citrus madurensis</i>
candlebush	Fabaceae: <i>Senna alata</i>
cantaloupe	Cucurbitaceae: <i>Cucurbita melo</i>
cestrum	Solanaceae: <i>Cestrum</i> sp.
cherry, Barbados	Malpighiaceae: <i>Malpighia glabra</i>
citrus	Rutaceae: <i>Citrus</i> sp.
coat-buttons	Asteraceae: <i>Tridax procumbens</i>
coffee	Rubiaceae: <i>Coffea arabica</i>
corn	Poaceae: <i>Zea mays</i>
cotton	Malvaceae: <i>Gossypium</i> sp.
cowpea	Fabaceae: <i>Vigna unguiculata</i>
crabgrass	Poaceae: <i>Digitaria</i> sp.
cucumber	Cucurbitaceae: <i>Cucumis sativa</i>
dahlia	Asteraceae: <i>Dahlia x Hybrida</i>
day jessamine	Solanaceae: <i>Cestrum diurnum</i>
eggplant	Solanaceae: <i>Solanum melongena</i>
elder, yellow	Bignoniaceae: <i>Tecoma stans</i>
elm, Japanese	Ulmaceae: <i>Ulmus japonica</i>
fingergrass,	
radiate	Poaceae: <i>Chloris radiata</i>
swollen	Poaceae: <i>Chloris inflata</i>
gardenia	Rubiaceae: <i>Gardenia</i> sp.
ginger, red	Zingiberaceae: <i>Alpinia purpurata</i>
ginseng	Araliaceae: <i>Panax</i> sp.
goldenrod	Asteraceae: <i>Solidago</i> sp.
gourd, snake	Cucurbitaceae: <i>Trichosanthes cucumerina</i>
grass, crowfoot	Poaceae: <i>Dactyloctenium aegyptium</i>
grass, galmarra	Poaceae: <i>Paspalum paniculatum</i>
grass, goose	Poaceae: <i>Eleusine indica</i>
grass, mission	Poaceae: <i>Pennisetum polystachion</i>
grass, para	Poaceae: <i>Panicum muticum</i>
half-flower	Goodeniaceae: <i>Scaevola sericea</i>
heliconia	Heliconiaceae: <i>Heliconia stricta</i>

hibiscus	Malvaceae: <i>Hibiscus rosa-sinensis</i>
horseradish-tree	Moringaceae: <i>Moringa oleifera</i>
imbe	Clusiaceae: <i>Garcinia livingstonei</i>
indigo	Fabaceae: <i>Indigofera teysmannii</i>
John-bush	Acanthaceae: <i>Blechnum pyramidatum</i>
laurel, Alexandrian	Clusiaceae: <i>Calophyllum inophyllum</i>
leadtree	Fabaceae: <i>Leucaena leucocephala</i>
lemon	Rutaceae: <i>Citrus limon</i>
luffa	Cucurbitaceae: <i>Luffa cylindrica</i>
melon	Cucurbitaceae: <i>Cucurbita melo</i>
mikania	Asteraceae: <i>Mikania micranthum</i>
mimosa	Fabaceae: <i>Mimosa pudica</i>
mustard	Brassicaceae: <i>Brassica rapa</i>
nightshade, black	Solanaceae: <i>Solanum nigrum</i>
nutsedge, purple	Cyperaceae: <i>Cyperus rotundus</i>
octopus-tree	Araliaceae: <i>Schefflera actinophylla</i>
okra	Malvaceae: <i>Hibiscus esculentus</i>
oleander	Apocynaceae: <i>Nerium oleander</i>
onion	Liliaceae: <i>Allium cepa</i>
orange	Rutaceae: <i>Citrus sinensis</i>
pago	Malvaceae: <i>Hibiscus tiliaceus</i>
parda	Fabaceae: <i>Pueraria phaseoloides</i>
pepper	Solanaceae: <i>Capsicum annuum</i>
philodendron	Araceae: <i>Philodendron</i> sp.
pigweed	Portulacaceae: <i>Portulaca oleracea</i>
pisonia	Nyctaginaceae: <i>Pisonia grandis</i>
potato	Solanaceae: <i>Solanum tuberosum</i>
quick-stick	Fabaceae: <i>Gliricidia sepium</i>
radish	Brassicaceae: <i>Raphanus sativus</i>
reed	Poaceae: <i>Phragmites karka</i>
rice	Poaceae: <i>Oryza sativa</i>
rice, jungle	Poaceae: <i>Echinochloa colonum</i>
sandbur, southern	Poaceae: <i>Cenchrus echinatus</i>
Siam-weed	Asteraceae: <i>Chromolaena odorata</i>
sissoo-tree	Fabaceae: <i>Dalbergia sissoo</i>
sorghum	Poaceae: <i>Sorghum bicolor</i>
soursop	Annonaceae: <i>Annona muricata</i>
spinach	Chenopodiaceae: <i>Spinacia oleracea</i>
spurge, garden	Euphorbiaceae: <i>Chamaesyce hirta</i>
squash	Cucurbitaceae: <i>Cucurbita pepo</i>
sunflower, annual	Asteraceae: <i>Helianthus annuus</i>
sunflower, beach	Asteraceae: <i>Wollastonia biflora</i>
sweetpea	Fabaceae: <i>Lathyrus odoratus</i>
swordgrass	Poaceae: <i>Miscanthus floridulus</i>
tangerine	Rutaceae: <i>Citrus reticulata</i>
taro	Araceae: <i>Colocasia esculenta</i>
teak	Verbenaceae: <i>Tectona grandis</i>
umumu	Nyctaginaceae: <i>Pisonia grandis</i>
watermelon	Cucurbitaceae: <i>Citrullus lanatus</i>
wisteria	Fabaceae: <i>Wisteria</i> sp.
zucchini	Cucurbitaceae: <i>Cucurbita pepo</i>

environmentally hazardous insecticides to safeguard crops against the aphids. The objectives of this work are twofold: (1) to define the spectrum of aphid species on Guam, their associated host plants and economic importance, and (2) to develop a key to the aphid species. Meeting these objectives is also intended to lay a foundation for establishing aphid-specific, bioregulatory parasitic Hymenoptera to control aphids and reduce pesticide use on the island. Recognizing the aphid species and knowing something about their preferred environments on Guam are requisite to selecting appropriate biocontrol agents for introduction.

### Materials & Methods

Aphids were extensively collected from across both cultivated and uncultivated habitats using the “see and sample” strategy described in Pike et al. (2000).

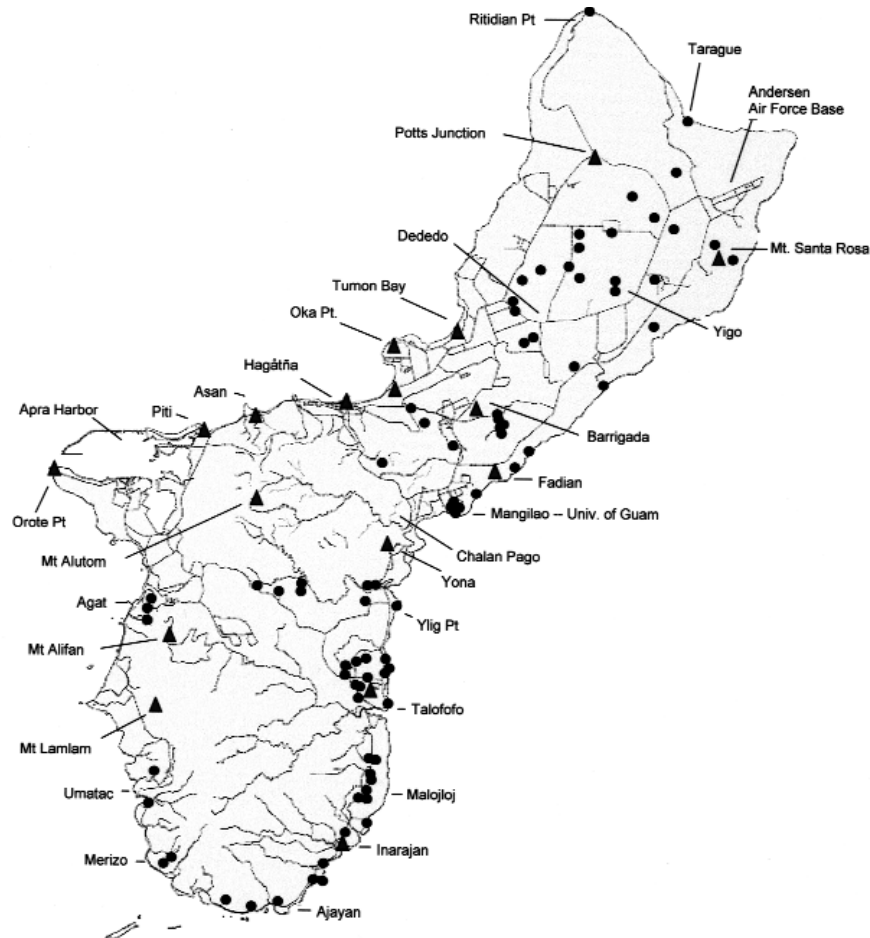


Fig. 1. Aphid collection sites of authors [●] and others [▲].

Most of the island's crops were sampled, as were most ornamentals and many plants in uncultivated settings, which are predominately introduced but include some native species. The number of aphids collected per sample varied, but where possible 20 to >200 aphids were collected per infested plant and preserved in 70% ethanol for subsequent identification. Out of approximately 3000 sampling episodes, a total of 744 collections of aphids were taken between 1997 and 1999 by the authors and support staff; determinations were by the same. The plants from which aphids were taken were identified by the authors or by C. L. Raulerson of the Division of Natural Sciences, University of Guam [for reference information on the plants of Guam, see Stone (1970)]. Voucher specimens of collected aphids were deposited in collections at the University of Guam, Mangilao and Washington State University, Prosser. Aphid nomenclature generally follows Remaudière and Remaudière (1997).

### Results

The present review of Guam aphids combines authors' records with records of previous collectors, organized alphabetically by aphid (Aphid x Plant Index) and by plant (Plant x Aphid Index) using scientific names. A separate listing of plant common names is provided in Table 1. The aphid collection sites are shown in Fig. 1.

#### Aphid x Plant Index

LEGEND FOR LISTINGS						
[Example]						
<b><i>Hysteroneura setariae</i></b> (Thomas)						
<i>Cyperus rotundus</i> : Mangilao – 13°25'48"N 144°48'0"E, 5-III-99 (99R578); Yigo, 29-XII-1977, coll. Muniappan.						
PLANT HOST OF APHID	COLLECTION SITE	COORDINATES FOR SITE	DATE COLLECTED	AUTHORS' CODE	ANOTHER COLLECTION	
Abbreviations: AAFB = Andersen Air Force Base; coll. = collector; GNWR = Guam National Wildlife Refuge; UOG = University of Guam.						

#### Genus *APHIS* Linnaeus

##### *Aphis craccivora* Koch

- Acacia confusa*: Mangilao, 13°27'15"N 144°49'59"E, 8III99 (99R589).
- Amaranthus spinosus*: Yigo, 13°31'53"N 144°53'25"E, 21V98 (98R262).
- Bougainvillea spectabilis*: Agat, 13°22'59"N 144°39'36"E, 17III98 (99R623).
- Dededo, 13°31'2"N 144°49'37"E, 14I99 (99R514).

- Capsicum annum*: Yigo, 13°31'53"N 144°53'25"E, 18VI97 (97R023), 19VI98 (98R282); 13°34'10"N 144°52'48"E, 24III98 (99R664).
- Cestrum* sp: Potts Junction, X-1952, coll. Krauss (Essig 1956).
- Citrullus lanatus*: Talofoto, 13°20'33"N 144°45'23"E, 2VII98 (98R298).
- Citrus limon*: Barrigada, 13°27'56"N 144°49'13"E, 27XII98 (98R497), 4XI98 (98R423); 13°27'59"N 144°47'10"E, 29XII98 (98R503); 13°27'59"N 144°49'17"E, 20IX98 (98R354).
- Citrus* sp: Barrigada, 13°27'56"N 144°49'17"E, 11XII97 (97R116). Dededo, 13°32'45"N 144°51'20"E, 10X97 (97R094).
- Colocasia esculenta*: Barrigada, 13°28'16"N 144°49'8"E, 27IX98 (98R360). Yigo, 13°31'53"N 144°53'25"E, 22VII98 (98R317), 8VII98 (98R306).
- Cucumis sativa*: Yigo, 13°31'35"N 144°52'21"E, 30VII97 (97R042).
- Dahlia x Hybrida*: Barrigada, 13°28'16"N 144°49'8"E, 27IX98 (98R365).
- Dalbergia sissoo*: Barrigada, 13°28'16"N 144°49'8"E, 20IX98 (98R353), 23VIII98 (98R338), 4VIII98 (98R327).
- Dolichos lablab*: Coll. Oakley (Beller 1948, aphid listed as *A. laburni*).
- Gliricidia sepium*: Barrigada, 13°28'16"N 144°49'8"E, 17II99 (99R525).
- Hibiscus esculentus*: Malojloj, 13°18'54"N 144°45'38"E, 14IV98 (98R218). Talofoto, 13°20'33"N 144°45'23"E, 8VII98 (98R303); 13°20'52"N 144°45'23"E, 2XII98 (98R474).
- Hibiscus tiliaceus*: Mt. Lamlam, X-1952, coll. Krauss (Essig 1956).
- Indigofera teysmannii*: Barrigada, 13°28'16"N 144°49'8"E, 15III98 (99R597), 23III98 (99R650), 24III98 (99R658), 5IV99 (99R684).
- Malpighia glabra*: Yona, 13°23'11"N 144°45'33"E, 1XII98 (98R469), 13X98 (98R384), 21X98 (98R395), 6X98 (98R373).
- Mimosa pudica*: Barrigada, 13°27'59"N 144°49'17"E, 2III99 (99R586). Yona, 13°21'6"N 144°45'36"E, 27II99 (99R565); 13°23'11"N 144°45'33"E, 23II99 (99R550).
- Moringa oleifera*: UOG, 13°25'49"N 144°48'0"E, 31III98 (99R677, 99R678).
- Phaseolus vulgaris*: Barrigada, VI-1936, coll. Usinger (Essig 1956, aphid listed as *A. medicaginis* Koch). 13°27'58"N 144°49'17"E, 9VI97 (97R017); 13°27'59"N 144°47'10"E, 16III98 (99R607), 16VIII98 (98R332), 20IX98 (98R356), 21III98 (99R632), 23XI98 (98R457), 25I99 (99R521), 26X98 (98R403), 29XI98 (98R465), 29XII98 (98R502), 30VIII98 (98R343, 98R344), 6XII98 (98R479), 9VIII98 (98R328); 13°27'59"N 144°49'17"E, 1VII98 (98R292), 11V98 (98R249), 12VI99 (99R743), 12XI98 (98R439), 13IV98 (98R215), 14III98 (99R590), 15III98 (99R595, 99R605), 15V98 (98R254), 15XII97 (97R127), 16XI98 (98R442), 17IV98 (98R227), 20IV98 (98R228), 23VII97 (97R030), 23VIII98 (98R336), 25VII97 (97R034), 3VIII98 (98R326), 30VII98 (98R325), 4VI99 (99R741), 4XI98 (98R422), 6IV98 (98R201), 6VII98 (98R300), 7V98 (98R245), 8IV98 (98R209), 8XI98 (98R429), 9VII98 (98R307); 13°28'16"N 144°49'8"E, 22XI98 (98R456), 27IX98 (98R361). Dededo, 13°33'12"N

144°52'15"E, 14IV98 (98R216), 15I98 (98R138), 20I98 (98R140), 21IV98 (98R230), 27I98 (98R150), 3II98 (98R163), 8IV98 (98R211). Inarajan, 13°17'49"N 144°45'36"E, 13IV99 (99R697), 6IV99 (99R686); 13°18'0"N 144°45'36"E, 10V99 (99R729), 30IV99 (99R711), 6V99 (99R728); 13°18'21"N 144°45'44"E, 14V97 (97R005). Mangilao, 13°27'59"N 144°47'10"E, 12IV99 (99R693), 20IV99 (99R702), 28IV99 (99R716), 29IV99 (99R708), 4VI99 (99R742), 5IV99 (99R681). Talofoto, 13°20'50"N 144°45'22"E, 12III98 (98R189), 15VII98 (98R310), 16IV98 (98R221), 22VII98 (98R315), 4VI98 (98R269), 8VII98 (98R305), 9IV98 (98R214); 13°20'52"N 144°45'23"E, 11VI98 (98R271), 11XI98 (98R436), 12VI98 (98R275), 15VII98 (98R311), 16IX98 (98R350), 19VI98 (98R279), 25VI98 (98R286), 28XII98 (98R500), 4XI98 (98R419), 5IV99 (99R682); 13°21'35"N 144°46'7"E, 12V98 (98R252), 14VII98 (98R308), 20V98 (98R255); 13°21'51"N 144°45'32"E, 22II99 (99R543). UOG, 13°25'44"N 144°47'54"E, 6IV99 (99R685); 13°25'45"N 144°47'52"E, 29V97 (97R013); 13°25'47"N 144°48'0"E, 18I99 (99R516), 20I99 (99R520), 24III98 (99R655). Yigo, 13°31'35"N 144°52'21"E, 11VIII97 (97R046), 14X97 (97R095), 21VIII97 (97R050), 23IX97 (97R074), 23VII98 (98R318), 26VIII97 (97R057), 26VIII98 (98R342), 29IX97 (97R079), 6X97 (97R086); 13°31'53"N 144°53'25"E, 16IV98 (98R223), 18VI97 (97R021), 19VI98 (98R281), 2VII98 (98R295), 21V98 (98R257), 22VII98 (98R316), 23IV98 (98R239), 25VI98 (98R287), 6IV98 (98R202); 13°32'26"N 144°55'32"E, 26VII98 (98R319); 13°33'36"N 144°53'24"E, 11XII97 (97R115), 18VI97 (97R020), 25VIII97 (97R054), 4XII97 (97R109); 13°34'10"N 144°52'48"E, 30IV99 (99R715). Yona, 13°23'3"N 144°46'24"E, 12VI98 (98R277), 4VI98 (98R270).

*Portulaca oleracea*: Yona, 13°23'11"N 144°45'33"E, 23II99 (99R558).

*Pueraria phaseoloides*: Dededo, 13°31'19"N 144°49'33"E, 1XII98 (98R468), 13XII98 (98R487), 20XII98 (98R494), 27XII98 (98R499), 8XII98 (98R481). Talofoto, 13°21'51"N 144°45'32"E, 22III98 (99R640), 26V99 (99R736), 30III98 (99R672), 4VI99 (99R739).

*Senna alata*: Chalan Pago, 13°26'24"N 144°46'12"E, 30IV99 (99R720). Yona, 13°23'11"N 144°45'33"E, 12V99 (99R733), 17XI98 (98R445), 22II99 (99R546), 24XI98 (98R459), 3XI98 (98R415), 9XI98 (98R432).

*Solanum melongena*: Dededo, 13°32'13"N 144°51'5"E, 27V97 (97R008A). Talofoto, 13°20'33"N 144°45'23"E, 2XII98 (98R473). Yigo, 13°31'53"N 144°53'25"E, 16IV98 (98R225), 5IX97 (97R064).

*Solidago* sp: Yona, 13°23'11"N 144°45'33"E, 21X98 (98R393), 27X98 (98R406).

*Spinacia oleracea*: Dededo, 13°33'12"N 144°52'15"E, 21IV98 (98R231).

*Vigna mungo*: Coll. Oakley (Beller 1948, aphid listed as *A. medicaginis* Koch; plant listed as *Phaseolus mungo*).



*Vigna unguiculata*: Coll. Oakley (Beller 1948, aphid listed as *A. medicaginis* Koch; plant listed as *V. sinensis*).  
*Wisteria* sp: Yona, 13°23'11"N 144°45'33"E, 23II99 (99R551).

### ***Aphis gossypii* Glover**

*Artocarpus incisa*: 1911, coll. Fullaway (Fullaway 1912, aphid believed to be *A. gossypii*). Coll. Vandenburg (Beller 1948). VIII-1945, coll. Bohart (Essig 1956).

*Blechnum pyramidatum*: Mt. Alutom, VI-1946, coll. Townes (Essig 1956). Merizo, 13°16'12"N 144°40'17"E, 29III98 (99R669); 13°16'14"N 144°40'16"E, 28III98 (99R667).

*Brassica* sp: Dededo, 13°30'20"N 144°50'7"E, 2II98 (98R156).

*Calophyllum inophyllum*: UOG, 13°25'44"N 144°48'0"E, 22II99 (99R538).

*Capsicum annum*: Dededo, 13°30'20"N 144°50'7"E, 2II98 (98R155). Talofofu, 13°20'33"N 144°45'23"E, 14V98 (98R253). UOG, 13°25'44"N 144°47'54"E, 11VIII97 (97R047). Yigo, 13°31'53"N 144°53'25"E, 18VI97 (97R023), 19VI98 (98R282), 2VI98 (98R266), 2VII98 (98R294), 21V98 (98R259, 98R260), 23IX98 (98R359), 25VI98 (98R288).

*Capsicum* sp: Coll. Oakley (Beller 1948).

*Cestrum diurnum*: Coll. Oakley (Beller 1948).

*Chamaesyce hirta*: Barrigada, 13°28'10"N 144°49'8"E, 15III98 (99R604). UOG, 13°25'46"N 144°47'53"E, 24III98 (99R652).

*Chromolaena odorata*: Barrigada, 13°26'49"N 144°49'37"E, 4II98 (98R166); 13°27'25"N 144°47'57"E, 26I98 (98R144); 13°27'59"N 144°49'17"E, 14IX98 (98R347), 2III99 (99R585), 20IX98 (98R355), 27IX98 (98R362); 13°28'10"N 144°49'8"E, 21II99 (99R528). GNWR, 13°39'9"N 144°51'40"E, 3XII98 (98R478). Mangilao, 13°26'5"N 144°48'32"E, 12XII97 (97R124); 13°26'5"N 144°48'32"E, 26I98 (98R147), 28I98 (98R152), 4II98 (98R165). Talofofu, 13°23'39"N 144°43'48"E, 28II99 (99R572). UOG, 13°25'37"N 144°47'57"E, 25VII97 (97R038); 13°25'53"N 144°47'58"E, 12XII97 (97R123), 15XII97 (97R129, 97R130), 26I98 (98R142). Yigo, 13°30'37"N 144°53'23"E, 11XII97 (97R120); 13°31'35"N 144°52'21"E, 17IX98 (98R351), 29XII98 (98R506); 13°32'52"N 144°55'4"E, 11XII97 (97R121); 13°33'17"N 144°53'57"E, 28I98 (98R151); 13°34'10"N 144°52'48"E, 5XI98 (98R427). Yona, 13°23'11"N 144°45'33"E, 21III98 (99R635), 23II99 (99R557, 99R560), 6IV99 (99R687); 13°23'35"N 144°42'36"E, 25III98 (99R666).

*Citrullus lanatus*: 1911, coll. Fullaway (Fullaway 1912, aphid reported as probably *A. gossypii*). Coll. Oakley, (Beller 1948, plant listed as *C. vulgaris*). Barrigada, 13°27'45"N 144°49'15"E, 28V97 (97R011). Talofofu, 13°20'33"N 144°45'23"E, 2VII98 (98R298); 13°20'52"N 144°45'23"E, 5II98 (98R169).



- Citrus limon*: Barrigada, 13°27'59"N 144°47'10"E, 20IX98 (98R357). Talofoyo, 13°21'51"N 144°45'32"E, 30III98 (99R673).
- Citrus* sp: Barrigada, 13°27'56"N 144°49'13"E, 30I98 (98R153).
- Colocasia esculenta*: Coll. Oakley (Beller 1948). Barrigada, 13°27'53"N 144°49'13"E, 25VII97 (97R035), 28V97 (97R012), 3II98 (98R159); 13°27'59"N 144°49'17"E, 12X98 (98R378), 18X98 (98R391), 22XI98 (98R455), 26X98 (98R402); 13°28'10"N 144°49'8"E, 15III98 (99R602), 21II99 (99R527), 26IV99 (99R705); 13°28'16"N 144°49'8"E, 12XI98 (98R440), 14IX98 (98R345), 20IX98 (98R358), 22XI98 (98R453), 23VIII98 (98R337), 27IX98 (98R360), 29XI98 (98R464), 4XI98 (98R421), 8XI98 (98R430). Chalan Pago, 13°26'55"N 144°46'1"E, 20V97 (97R006). Dededo, 13°30'11"N 144°49'52"E, 17II98 (98R180), 9II98 (98R171); 13°30'20"N 144°50'7"E, 2II98 (98R157), 22II98 (98R183); 13°32'13"N 144°51'5"E, 27V97 (97R008); 13°33'12"N 144°52'15"E, 3II98 (98R162). Inarajan, 14-V-36, coll. Swezey (Swezey, 1942); 13°18'30"N 144°45'43"E, 28VII98 (98R321), 28X98 (98R409). Malojloj, 13°18'52"N 144°45'50"E, 14III98 (99R593). Mangilao, 13°25'44"N 144°47'54"E, 10II98 (98R175), 16X97 (97R098), 21X97 (97R099), 4XII97 (97R110), 9XII97 (97R111); 13°29'32"N 144°51'13"E, 12I98 (98R134). Piti, 28-V-36, coll. Usinger (Swezey 1946). Talofoyo, 13°20'33"N 144°45'23"E, 11VI98 (98R273), 2VI98 (98R268); 13°20'50"N 144°45'22"E, 11XI98 (98R437), 12VI98 (98R276), 14XII98 (98R490), 16IX98 (98R349), 16XII98 (98R491), 18XI98 (98R448), 2XII98 (98R476), 20I99 (99R519), 22X98 (98R398), 24XI98 (98R463), 25VI98 (98R284), 26VIII98 (98R340), 29VII98 (98R324), 29X98 (98R410), 4XI98 (98R417), 7X98 (98R376); 13°21'38"N 144°46'7"E, 25IX97 (97R077). UOG, 13°25'44"N 144°47'54"E, 12V98 (98R250), 22IV98 (98R235), 23I98 (98R141), 23V97 (97R007), 24III98 (99R654), 25VIII97 (97R052), 26VI98 (98R290), 27V98 (98R263), 3IV98 (98R200), 30VII97 (97R041), 30X97 (97R107), 4IX97 (97R059), 8X97 (97R089); 13°25'46"N 144°47'53"E, 10II98 (98R174), 12X98 (98R380), 12XII97 (97R122), 13V97 (97R004), 15VI98 (98R278), 15VII98 (98R312), 22III98 (99R644), 22IV98 (98R234), 24III98 (99R653, 99R657), 26I98 (98R143), 27I98 (98R148), 27VII98 (98R320), 3IV98 (98R199), 3XII97 (97R108), 30IX97 (97R082), 5VI97 (97R014), 6I98 (98R131), 9XII97 (97R112). Yigo, 13°31'35"N 144°52'21"E, 18X98 (98R388); 13°31'53"N 144°53'25"E, 16IV98 (98R226), 16VII98 (98R313), 18XI98 (98R451), 19VI98 (98R280), 2VI98 (98R265), 2VII98 (98R293), 21V98 (98R258), 23IV98 (98R237), 25VI98 (98R289), 30IV98 (98R244), 6IV98 (98R203), 7V98 (98R247), 8VII98 (98R306); 13°34'10"N 144°52'48"E, 23X98 (98R401), 30X98 (98R412), 5XI98 (98R425).
- Cucumis sativa*: 1911, coll. Fullaway (Fullaway 1912, aphid reported as resembling *A. gossypii*). Barrigada, 13°27'59"N 144°49'17"E, 25VII97

- (97R033). Dededo, 13°32'13"N 144°51'4"E, 5IX97 (97R065); 13°33'12"N 144°52'15"E, 11VI98 (98R274). Inarajan, 13°16'54"N 144°45'0"E, 14III98 (99R591). Malojloj, 13°20'33"N 144°45'23"E, 21V98 (98R256). Mangilao, 13°25'44"N 144°47'54"E, 21X97 (97R100). Merizo, 13°14'54"N 144°42'29"E, 18III98 (99R631), 22III98 (99R642). Talofof, 13°20'33"N 144°45'23"E, 16IV98 (98R222), 2IV98 (98R197), 9IV98 (98R212); 13°20'50"N 144°45'22"E, 12III98 (98R188), 18XI98 (98R449), 19III98 (98R192), 21IV99 (99R706), 22X98 (98R399), 24XI98 (98R462), 26VIII98 (98R339), 29VII98 (98R323), 3VII98 (98R299), 4XI98 (98R418), 5II98 (98R170); 13°20'52"N 144°45'23"E, 2XII98 (98R475); 13°21'32"N 144°45'20"E, 30X98 (98R411), 5XI98 (98R428); 13°21'35"N 144°46'7"E, 17XI98 (98R444), 21III98 (99R639), 24XI98 (98R461), 30III98 (99R671), 30IV99 (99R718), 7IV99 (99R689). UOG, 13°25'44"N 144°47'54"E, 12V98 (98R251), 25VIII97 (97R053), 4IX97 (97R060), 8X97 (97R091). Yigo, 13°31'35"N 144°52'21"E, 11IX97 (97R069), 11VIII97 (97R045), 16IX97 (97R070), 21VIII97 (97R049), 23IX97 (97R073), 25VII97 (97R036), 26VIII97 (97R056), 29IX97 (97R078), 3IX97 (97R058), 6X97 (97R084), 8X97 (97R090); 13°31'53"N 144°53'25"E, 16IV98 (98R224), 21VIII97 (97R051), 23IV98 (98R240), 27V99 (99R735), 30IV98 (98R243), 4V99 (99R723), 7V98 (98R246). Yona, 13°23'36"N 144°45'51"E, 11VIII98 (98R331).
- Cucurbita melo*: Barrigada, 13°27'59"N 144°49'17"E, 25VII97 (97R032). Inarajan, 13°16'54"N 144°45'0"E, 14III98 (99R592). Talofof, 13°20'23"N 144°46'10"E, 22IV98 (98R236). Yigo, 13°31'35"N 144°52'21"E, 11VIII97 (97R044), 25VII97 (97R037).
- Cucurbita pepo*: Dededo, 13°33'12"N 144°52'15"E, 3II98 (98R161), 15I98 (98R136), 20I98 (98R139), 27I98 (98R149), 3II98 (98R164).
- Cucurbita* sp: Coll. Oakley (Beller 1948).
- Ficus prolixa*: Mangilao, 13X1976, coll. Muniappan.
- Garcinia livingstonei*: Inarajan, 13°18'30"N 144°45'43"E, 23II99 (99R554).
- Gossypium* sp: 1911, coll. Fullaway (Fullaway 1912). Coll. Oakley (Beller 1948, Oakley 1953). Yona, 13°23'11"N 144°45'33"E, 21X98 (98R394).
- Hibiscus esculentus*: Coll. Oakley (Beller 1948). Barrigada, 13°28'16"N 144°49'8"E, 22XI98 (98R454). Dededo, 13°33'12"N 144°52'15"E, 15I98 (98R137). Inarajan, 13°18'30"N 144°45'43"E, 23II99 (99R552). Malojloj, 13°18'54"N 144°45'38"E, 14IV98 (98R218), 22IV98 (98R232). Talofof, 13°20'33"N 144°45'23"E, 15VII98 (98R309), 2IV98 (98R198), 2VII98 (98R297), 27V98 (98R264), 8VII98 (98R303, 98R304), 9IV98 (98R213); 13°20'50"N 144°45'22"E, 5II98 (98R168); 13°20'52"N 144°45'23"E, 2XII98 (98R474), 5IV99 (99R683); 13°20'53"N 144°45'17"E, 12II98 (98R179); 13°21'35"N 144°46'7"E, 11V98 (98R195), 12II98 (98R177), 13X98 (98R383), 15IV98 (98R219), 17XI98 (98R443), 18II98 (98R182), 18III98 (98R191),

21III98 (99R637), 22IV98 (98R233), 26III98 (98R194), 27X98 (98R407), 29IV98 (98R242), 29IX98 (98R369), 3V99 (99R722), 30IV99 (99R719), 6X98 (98R374), 7IV99 (99R690), 8IV98 (98R207), 8XII98 (98R482). Yigo, 13°34'10"N 144°52'48"E, 15IV99 (99R699), 17III98 (99R626), 21IV99 (99R703), 24III98 (99R663), 30IV99 (99R714), 7IV99 (99R691), 7V99 (99R727).

*Hibiscus rosa-sinensis*: Agat, 13°22'59"N 144°39'36"E, 17III98 (99R624), 23III98 (99R645). Barrigada, 13°28'16"N 144°49'8"E, 23III98 (99R648). Merizo, 13°16'3"N 144°40'5"E, 28III98 (99R668).

*Hibiscus tiliaceus*: Coll. Oakley (Beller 1948). Inarajan, 13°15'38"N 144°44'11"E, 17III98 (99R616).

*Lathyrus odoratus*: Inarajan, 13°17'51"N 144°45'23"E, 11VIII98 (98R330).

*Leucaena leucocephala*: Talofoto, 13°23'26"N 144°43'48"E, 28II99 (99R574A).

*Luffa cylindrica*: Merizo, 13°15'2"N 144°41'46"E, 17III98 (99R622).

*Mikania micranthum*: Merizo, 13°15'2"N 144°41'46"E, 17III98 (99R619).

*Ocimum basilicum*: Coll. Oakley (Beller 1948).

*Panax* sp: Mangilao, 6XI1975, coll. Muniappan.

*Phaseolus coccineus*: VIII-1945, coll. Hensil (Essig 1956, plant listed as *P. multiflorus*).

*Phaseolus vulgaris*: Barrigada, 13°27'58"N 144°49'17"E, 9VI97 (97R017). Talofoto, 13°21'35"N 144°46'7"E, 14VII98 (98R308), 7VII98 (98R301), 8VII98 (98R302). Yigo, 13°31'53"N 144°53'25"E, 21V98 (98R257); 13°33'36"N 144°53'24"E, 4XII97 (97R109).

*Raphanus sativus*: 1911, coll. Fullaway (Fullaway 1912, aphid thought to be *A. gossypii*).

*Scaevola sericea*: AAFB, 13°36'11"N 144°54'18"E, 22II99 (99R534, 99R535). Talofoto, 13°21'21"N 144°46'12"E, 23II99 (99R555). Umatac, 13°17'42"N 144°39'39"E, 17III98 (99R621).

*Schefflera actinophylla*: Agat, 13°23'13"N 144°39'45"E, 17III98 (99R625).

*Solanum lycopersicon*: Coll. Peterson (Gressitt 1954).

*Solanum melongena*: 1911, coll. Fullaway (Fullaway 1912, aphid reported as probably *A. gossypii*). Coll. Swezey (Swezey 1942). Barrigada, 13°27'59"N 144°47'10"E, 10I99 (99R509), 13I99 (99R513), 20I99 (99R518), 21III98 (99R633), 25I99 (99R522), 29XII98 (98R504), 3II99 (99R523); 13°27'59"N 144°49'17"E, 14IX98 (98R346), 20IX98 (98R352); 13°28'16"N 144°49'8"E, 23III98 (99R647). Dededo, 13°31'2"N 144°49'37"E, 12X98 (98R379), 4X98 (98R371); 13°32'45"N 144°51'20"E, 4IX97 (97R063); 13°32'46"N 144°51'22"E, 30IX97 (97R081). Mangilao, 13°25'44"N 144°47'54"E, 9XII97 (97R113); 13°27'59"N 144°47'10"E, 10V99 (99R734), 12IV99 (99R694), 12VI99 (99R744), 19V99 (99R738), 20IV99 (99R701), 28IV99 (99R717), 29IV99 (99R707), 5IV99 (99R680). Talafoto, 29XII1977, coll. Muniappan; 13°20'33"N 144°45'23"E, 11XI98 (98R438), 2XII98

(98R473), 25VI98 (98R285), 29VII98 (98R322); 13°20'52"N 144°45'23"E, 11VI98 (98R272); 13°21'35"N 144°46'7"E, 13X98 (98R382), 21X98 (98R397). UOG, 13°25'44"N 144°47'54"E, 11VIII97 (97R048), 30VII97 (97R040), 4IX97 (97R061), 8X97 (97R093). Yigo, 13°31'35"N 144°52'21"E, 18X98 (98R387); 13°31'52"N 144°52'21"E, 7IV99 (99R688); 13°31'53"N 144°53'25"E, 11IX97 (97R068), 18VI97 (97R022), 2VI98 (98R267), 21V98 (98R261), 23IV98 (98R238), 5IX97 (97R064), 6IV98 (98R204), 7V98 (98R248); 13°34'10"N 144°52'48"E, 18III98 (99R628), 23X98 (98R400), 30IV99 (99R713), 7IV99 (99R692), 7V99 (99R726).

*Solanum nigrum*: Yigo, 29XII1977, coll. Muniappan.

*Solanum tuberosum*: Coll. Oakley (Beller 1948).

*Tectona grandis*: UOG, 13°25'44"N 144°48'0"E, 22II99 (99R540).

*Trichosanthes cucumerina*: Talofof, 13°21'51"N 144°45'32"E, 22II99 (99R544).

*Tridax procumbens*: Barrigada, 13°28'10"N 144°49'8"E, 15III98 (99R598), 26IV99 (99R704). Malojloj, 13°18'3"N 144°45'36"E, 16III98 (99R614). Mangilao, 13°25'36"N 144°48'0"E, 28II99 (99R569); 13°25'48"N 144°48'0"E, 1III99 (99R579). UOG, 13°25'46"N 144°47'53"E, 22III98 (99R643), 24III98 (99R651). Yona, 13°23'36"N 144°45'36"E, 27II99 (99R563).

*Vigna unguiculata*: 1911, coll. Fullaway (Fullaway 1912). Coll. Oakley (Beller 1948, plant listed as *V. sinensis*).

Unknown [all reported in Essig (1956)]: Agana, V-1945, coll. Bohart & Gressitt. Mt. Alifan, IV-1946, coll. Krauss. Orote Pt, X-1947 and Asan, XI-1947, coll. Dybas. Yona, X-1952, coll. Krauss.

*Wollastonia biflora*: Coll. Oakley (Beller 1948).

#### ***Aphis helianthi* Monell**

*Helianthus annuus*: coll. Oakley (Beller 1948).

#### ***Aphis nerii* Boyer de Fonscolombe**

*Asclepias curassavica*: Fadian and Piti, coll. Swezey (Swezey 1942). Coll. Oakley (Beller 1948, aphid listed as *A. lutescens*)

*Asclepias* sp: Mt Alifan, IV-1946 and Yigo, VIII-1952, coll. Krauss (Essig 1956).

*Nerium oleander*: Talofof, 13°21'26"N 144°45'0"E, 27II99 (99R567). Yigo, 13°33'36"N 144°55'12"E, 10V99 (99R730), 5V99 (99R725).

#### ***Aphis rumicis* L.**

*Allium cepa*: Coll. Oakley (Beller 1948).

#### ***Aphis spiraecola* Patch**

*Chromolaena odorata*: Talofof, 13°23'39"N 144°43'48"E, 28II99 (99R572).

Yona, 13°23'11"N 144°45'33"E, 17XI98 (98R446), 22II99 (99R547), 23II99 (99R556), 3XI98 (98R416), 8XII98 (98R484), 9XI98 (98R434); 13°23'36"N 144°45'51"E, 22XI98 (98R452), 8XII98 (98R483).  
*Citrus limon*: Yigo, 13°31'35"N 144°52'21"E, 29XII98 (98R505).  
*Gardenia* sp: Coll. Oakley (Beller 1948).  
*Pisonia grandis*: Mangilao, 22III1975, coll. Muniappan.  
*Tecoma stans*: Malojloj, 13°18'3"N 144°45'36"E, 16III98 (99R615).

#### Genus *BREVICORYNE* van der Goot

##### *Brevicoryne brassicae* (L.)

*Brassica napus* var. *chinensis*: Coll. Oakley (Beller 1948, planted listed as *B. chinensis*).

#### Genus *CERATAPHIS* Lichtenstein

##### *Cerataphis* sp.

*Miscanthus floridulus*: Talafofo, 19V1974, coll. Muniappan.

#### Genus *HYALOPTERUS* Koch

##### *Hyalopterus pruni* (Geoffroy)

*Phragmites karka*: Inarajan, VI-1936, coll. Swezey (Essig 1956). Yona, 6II978, coll. Muniappan.

#### Genus *HYSTERONEURA* Davis

##### *Hysteroneura setariae* (Thomas)

*Cenchrus echinatus*: Mangilao, 13°25'48"N 144°48'0"E, 1III99 (99R575).  
*Chloris inflata*: Barrigada, 13°28'10"N 144°49'8"E, 15III98 (99R603). Inarajan, 13°17'10"N 144°45'36"E, 7III99 (99R587). Dededo, 13°32'46"N 144°51'22"E, 1III99 (99R582). Mangilao, 13°25'36"N 144°48'0"E, 28II99 (99R568). Talafofo, 13°21'13"N 144°45'0"E, 27II99 (99R561); 13°23'26"N 144°43'48"E, 28II99 (99R574B). Yona, 13°23'36"N 144°45'36"E, 27II99 (99R562).  
*Chloris radiata*: Inarajan, 13°16'3"N 144°44'24"E, 16III98 (99R612). Malojloj, 13°18'3"N 144°45'36"E, 16III98 (99R613).  
*Cyperus rotundus*: Mangilao, 13°25'48"N 144°48'0"E, 1III99 (99R578).  
*Dactyloctenium aegyptium*: Barrigada, 13°28'10"N 144°49'8"E, 15III98 (99R599). Inarajan, 13°15'1"N 144°43'12"E, 17III98 (99R618); 13°15'35"N 144°44'24"E, 18III98 (99R630); 13°16'3"N 144°44'24"E, 16III98 (99R608). Mangilao, 13°25'48"N 144°48'0"E, 1III99 (99R576); 13°29'2"N 144°52'2"E, 24III98 (99R659).  
*Dichanthium bladhii*: Barrigada, 13°27'59"N 144°49'17"E, 2III99 (99R584). Mangilao, 13°25'48"N 144°48'0"E, 1III99 (99R577).  
*Digitaria violascens*: Barrigada, 13°28'10"N 144°49'8"E, 15III98 (99R600). Inarajan, 13°16'3"N 144°44'24"E, 16III98 (99R609).  
*Digitaria* sp: Yona, 8II978, coll. Muniappan.



- Echinochloa colonum*: Inarajan, 13°15'35"N 144°44'24"E, 18III98 (99R629); 13°16'3"N 144°44'24"E, 16III98 (99R611). Yigo, 13°34'10"N 144°52'48"E, 24III98 (99R661).
- Eleusine indica*: Inarajan, 13°16'3"N 144°44'24"E, 16III98 (99R610). Yigo, 13°34'10"N 144°52'48"E, 24III98 (99R662).
- Panicum muticum*: Inarajan, 13°16'54"N 144°45'0"E, 21III98 (99R638).
- Paspalum paniculatum*: Dededo, 13°33'12"N 144°52'15"E, 1III99 (99R583).
- Pennisetum polystachion*: Talofof, 13°23'27"N 144°43'12"E, 28II99 (99R570).
- Sorghum bicolor*: Inarajan, 13XII1977, coll. Muniappan.

#### Genus *LIPAPHIS* Mordvilko

##### *Lipaphis erysimi* (Kaltenbach)

- Brassica rapa*: Coll. Oakley (Beller 1948).
- Raphanus sativus*: Coll. Oakley (Beller 1948).

#### Genus *MYZUS* Passerini

##### *Myzus persicae* (Sulzer)

- Brassica napus* var. *chinensis*: 15VIII1975, coll. T. R. Blas.

#### Genus *PENTALONIA* Coquerel

##### *Pentalonia nigronervosa* Coquerel

- Alpinia purpurata*: Barrigada, 13°28'16"N 144°49'8"E, 21II99 (99R531, 99R532, 99R533). UOG, 13°25'44"N 144°48'0"E, 22II99 (99R539). Yona, 13°23'11"N 144°45'33"E, 12V99 (99R731), 23II99 (99R549, 99R559).
- Alpinia* sp: X-1947, coll. Dybas (Essig 1956).
- Caladium* sp: Mt. Santa Rosa, V-1945, coll. Bohart & Gressitt (Essig 1956).
- Chromolaena odorata*: Yona, 13°23'11"N 144°45'33"E, 22II99 (99R547).
- Colocasia esculenta*: Barrigada, 13°27'53"N 144°49'13"E, 28X97 (97R105). Mangilao, 13°25'44"N 144°47'54"E, 21X97 (97R099). UOG, 13°25'46"N 144°47'53"E, 3III98 (98R185). Yigo, 13°31'53"N 144°53'25"E, 18VI97 (97R024).
- Cucurbita melo*: Talofof, 13°21'35"N 144°46'7"E, 8IV98 (98R206).
- Cucurbita pepo*: Dededo, 13°33'12"N 144°52'15"E, 15I98 (98R136).
- Heliconia stricta*: Yona, 13°23'11"N 144°45'33"E, 12V99 (99R732), 23II99 (99R548).
- Musa* sp: 1911, coll. Fullaway (Fullaway 1912). Agat, 13°22'56"N 144°39'35"E, 14X97 (97R096). Barrigada, 13°28'10"N 144°49'8"E, 15III98 (99R601), 17II99 (99R524). Dededo, 13°31'2"N 144°49'37"E, 10II98 (98R172), 18IX97 (97R072), 2II98 (98R158), 26I98 (98R146), 26VIII97 (97R055), 4IX97 (97R062), 6I98 (98R133), 9VI97 (97R018); 13°32'45"N 144°51'20"E, 6I98 (98R132), 8IV98 (98R210); 13°32'46"N 144°51'22"E, 1III99 (99R581). Ipan, 13°20'23"N 144°46'10"E, 3II98



(98R160). Merizo, 13°16'12"N 144°40'17"E, 29III98 (99R670). Talofof, 13°20'23"N 144°46'10"E, 1IV98 (98R196), 11III98 (98R187), 12II98 (98R178), 13I98 (98R135), 15IV98 (98R220), 18II98 (98R181), 18III98 (98R190), 24III98 (98R193), 25II98 (98R184), 26I98 (98R145), 4III98 (98R186); 13°21'51"N 144°45'32"E, 22II99 (99R545). UOG, 13°25'44"N 144°47'54"E, 30VII97 (97R039). Umatac, 13°18'33"N 144°39'49"E, 30III98 (99R674). Yigo, 13°34'10"N 144°52'48"E, 18III98 (99R627), 24III98 (99R665).

*Philodendron* sp: I-1954, coll. Liming (Essig 1956).

*Solanum melongena*: Yigo, 13°31'53"N 144°53'25"E, 6IV98 (98R204).

#### Genus *RHOPALOSIPHUM* Koch

##### *Rhopalosiphum maidis* (Fitch)

Poaceae: Agana, IV-1946, coll. Krauss (Essig 1956)

*Sorghum bicolor*: 1911 (Fullaway 1912, reported as *Aphis maidis* on broom corn and kaffir corn). Coll. Oakley (Beller 1948, Oakley 1953). Inarajan, 13XII1977, coll. Muniappan. Pt. Oka, VI-1945, coll. Bohart & Gressitt (Essig 1956).

*Zea mays*: 1911 (Fullaway 1912). Coll. Oakley; Swezey (Beller 1948, Swezey 1942, Oakley 1953).

##### *Rhopalosiphum rufiabdominale* (Sasaki)

*Oryza sativa*: Coll. Oakley (Beller 1948).

#### Genus *TETRANEURA* Hartig

##### *Tetraneura akinire* Sasaki

*Ulmus japonica*: Tumon Bay, IV-1946, coll. Krauss (Essig 1956). Orote Pt., X-1947, coll. Dybas (Essig 1956).

#### Genus *TOXOPTERA* Koch

##### *Toxoptera aurantii* (Boyer de Fonscolombe)

*Annona muricata*: Yona, 13°23'11"N 144°45'33"E, 1XII98 (98R470).

*Citrus limon*: Barrigada, 13°28'16"N 144°49'8"E, 23III98 (99R649).

*Citrus madurensis*: Dededo, 13°32'46"N 144°51'22"E, 23III98 (99R646).

*Citrus* sp: Talofof, VIII-1952, coll. Krauss (Essig 1956).

*Coffea arabica*: Coll. Oakley (Beller 1948). Talofof, 13°21'51"N 144°45'32"E, 22II99 (99R541).

Unknown: Pt. Oka, VII-1945, coll. Bohart (Essig 1956). Mt. Alifan, IV-1946, coll. Krauss (Essig 1956).

##### *Toxoptera citricida* (Kirkaldy)

*Chromolaena odorata*: Barrigada, 13°27'56"N 144°49'13"E, 30I98 (98R154).

*Citrus limon*: Barrigada, 13°27'56"N 144°49'13"E, 15III98 (99R596), 2XII98 (98R477), 27XII98 (98R497), 3I99 (99R508), 4XI98 (98R423);

13°27'59"N 144°47'10"E, 13I99 (99R512), 13XII98 (98R486), 16VIII98 (98R333), 18X98 (98R389), 20XII98 (98R495), 21III98 (99R634), 23XI98 (98R458), 26X98 (98R404), 27IX98 (98R363), 29XI98 (98R466), 29XII98 (98R503), 6XII98 (98R480); 13°27'59"N 144°49'17"E, 12X98 (98R381), 18X98 (98R390), 27XII98 (98R498); 13°28'16"N 144°49'8"E, 23III98 (99R649). Dededo, 13°32'46"N 144°51'22"E, 1III99 (99R580). Talofof, 13°20'33"N 144°45'23"E, 18XI98 (98R450); 13°21'35"N 144°46'7"E, 29IX98 (98R368), 6X98 (98R375); 13°21'51"N 144°45'32"E, 22III98 (99R641), 29V99 (99R737), 30III98 (99R673), 4VI99 (99R740). Yona, 13°23'11"N 144°45'33"E, 1XII98 (98R471), 11I99 (99R511), 13X98 (98R385), 17VIII98 (98R334), 17XI98 (98R447), 21III98 (99R636), 21X98 (98R396), 23II99 (99R553), 24XI98 (98R460), 26VIII98 (98R341), 27X98 (98R405), 28XII98 (98R501), 3XI98 (98R414), 30III98 (99R675), 6X98 (98R372), 8XII98 (98R485), 9XI98 (98R431).

*Citrus madurensis*: Barrigada, 13°27'59"N 144°49'17"E, 14IX98 (98R348). Dededo, 13°31'2"N 144°49'37"E, 1XII98 (98R472), 14I99 (99R515), 18VIII98 (98R335), 28IX98 (98R367), 3XI98 (98R413), 4V99 (99R724), 4X98 (98R370); 13°32'46"N 144°51'22"E, 10I99 (99R510), 12IV99 (99R695), 13V97 (97R003), 13XII98 (98R488), 16XI98 (98R441), 18I99 (99R517), 19IV99 (99R700), 20XII98 (98R493), 28IX98 (98R366), 28X98 (98R408), 3I99 (99R507), 3V99 (99R721), 30XI98 (98R467), 4XI98 (98R420), 5IV99 (99R679), 9V97 (97R001), 9XI98 (98R435). Talofof, 13°21'51"N 144°45'32"E, 22II99 (99R542). Yigo, 13°34'10"N 144°52'48"E, 5XI98 (98R426). Yona, 13°23'11"N 144°45'33"E, 13X98 (98R386), 21X98 (98R392), 22XII98 (98R496), 9XI98 (98R433).

*Citrus reticulata*: Barrigada, 13°27'56"N 144°49'13"E, 15III98 (99R606). Dededo, 13°31'54"N 144°49'48"E, 15III98 (99R594); 13°32'10"N 144°50'19"E, 21II99 (99R526).

*Citrus sinensis*: Barrigada, 13°28'10"N 144°49'8"E, 21II99 (99R530).

*Citrus* sp: 1911, coll. Fullaway (Fullaway 1912, aphid reported as resembling *Myzus citricidus*). Barrigada, 13°27'56"N 144°49'13"E, 1VII98 (98R291), 10II98 (98R173), 11XII97 (97R114, 97R117), 15XII97 (97R125), 20IV98 (98R229), 23IX97 (97R075), 24IV98 (98R241), 3X97 (97R083), 4II98 (98R167), 6X97 (97R085), 8IX97 (97R066); 13°27'56"N 144°49'17"E, 11IX97 (97R067), 15XII97 (97R126). Dededo, 13°32'45"N 144°51'20"E, 6X97 (97R088); 13°32'46"N 144°51'22"E, 11XII97 (97R118), 30IV99 (99R712), 30IX97 (97R080); 13°33'6"N 144°51'22"E, 16IX97 (97R071). Inarajan, 13°18'30"N 144°45'43"E, 6VI97 (97R016). Talofof, 13°21'16"N 144°46'7"E, 6VI97 (97R015); 13°21'38"N 144°46'7"E, 25IX97 (97R076); 13°21'51"N 144°45'32"E, 29IV99 (99R710). Yigo, 13°30'37"N 144°53'23"E, 11XII97 (97R119).

- Cucumis sativa*: Barrigada, 13°27'59"N 144°49'17"E, 14IV98 (98R217).  
*Hibiscus esculentus*: Talofoto, 13°21'35"N 144°46'7"E, 27X98 (98R407).  
*Phaseolus vulgaris*: Barrigada, 13°27'59"N 144°47'10"E, 30VIII98 (98R344).  
*Solanum melongena*: Dededo, 13°32'46"N 144°51'22"E, 9V97 (97R002).

### Plant x Aphid Index

(♣, indicates plant is indigenous)

#### Acanthaceae

*Blechnum pyramidatum*: *Aphis gossypii*

#### Amaranthaceae

*Amaranthus spinosus*: *Aphis craccivora*

#### Annonaceae

*Annona muricata*: *Toxoptera aurantii*

#### Apocynaceae

*Nerium oleander*: *Aphis nerii*

#### Araceae

*Caladium* sp.: *Pentalonia nigronervosa*

*Colocasia esculenta*: *Aphis craccivora*, *Aphis gossypii*, *Pentalonia nigronervosa*

*Philodendron* sp.: *Pentalonia nigronervosa*

#### Araliaceae

*Panax* sp.: *Aphis gossypii*

*Schefflera actinophylla*: *Aphis gossypii*

#### Asclepiadaceae

*Asclepias curassavica*: *Aphis nerii*

*Asclepias* sp.: *Aphis nerii*

#### Asteraceae

*Chromolaena odorata*: *Aphis gossypii*, *Aphis spiraecola*, *Pentalonia nigronervosa*, *Toxoptera citricida*

*Dahlia x Hybrida*: *Aphis craccivora*

*Helianthus annuus*: *Aphis helianthi*

*Mikania micranthum*: *Aphis gossypii*

*Solidago* sp.: *Aphis craccivora*

*Tridax procumbens*: *Aphis gossypii*

*Wollastonia biflora*♣: *Aphis gossypii*

#### Bignoniaceae

*Tecoma stans*: *Aphis spiraecola*

#### Brassicaceae

*Brassica napus* var. *chinensis*: *Brevicoryne brassicae*, *Myzus persicae*

*Brassica rapa*: *Lipaphis erysimi*

*Brassica* sp.: *Aphis gossypii*

*Raphanus sativus*: *Aphis gossypii*, *Lipaphis erysimi*

**Chenopodiaceae***Spinacia oleracea*: *Aphis craccivora***Clusiaceae***Calophyllum inophyllum*♣: *Aphis gossypii**Garcinia livingstonei*: *Aphis gossypii***Cucurbitaceae***Citrullus lanatus*: *Aphis craccivora*, *Aphis gossypii**Cucumis sativa*: *Aphis craccivora*, *Aphis gossypii*, *Toxoptera citricida**Cucurbita melo*: *Aphis gossypii*, *Pentalonia nigronervosa**Cucurbita pepo*: *Aphis gossypii*, *Pentalonia nigronervosa**Cucurbita* sp.: *Aphis gossypii**Luffa cylindrica*: *Aphis gossypii**Trichosanthes cucumerina*: *Aphis gossypii***Cyperaceae***Cyperus rotundus*: *Hysteroneura setariae***Euphorbiaceae***Chamaesyce hirta*: *Aphis gossypii***Fabaceae***Acacia confusa*: *Aphis craccivora**Dalbergia sissoo*: *Aphis craccivora**Dolichos lablab*: *Aphis craccivora**Gliricidia sepium*: *Aphis craccivora**Indigofera teysmannii*: *Aphis craccivora**Lathyrus odoratus*: *Aphis gossypii**Leucaena leucocephala*: *Aphis gossypii**Mimosa pudica*: *Aphis craccivora**Phaseolus coccineus*: *Aphis gossypii**Phaseolus vulgaris*: *Aphis craccivora*, *Aphis gossypii*, *Toxoptera citricida**Pueraria phaseoloides*: *Aphis craccivora**Senna alata*: *Aphis craccivora**Vigna mungo*: *Aphis craccivora**Vigna unguiculata*: *Aphis craccivora*, *Aphis gossypii**Wisteria* sp.: *Aphis craccivora***Goodeniaceae***Scaevola sericea*♣: *Aphis gossypii***Heliconiaceae***Heliconia stricta*: *Pentalonia nigronervosa***Lamiaceae***Ocimum basilicum*: *Aphis gossypii***Liliaceae***Allium cepa*: *Aphis rumicis***Malpighiaceae***Malpighia glabra*: *Aphis craccivora*

**Malvaceae***Gossypium* sp.: *Aphis gossypii**Hibiscus esculentus*: *Aphis craccivora*, *Aphis gossypii*, *Toxoptera citricida**Hibiscus rosa-sinensis*: *Aphis gossypii**Hibiscus tiliaceus*♣: *Aphis craccivora*, *Aphis gossypii***Moraceae***Artocarpus incisa*: *Aphis gossypii**Ficus prolixa*♣: *Aphis gossypii***Moringaceae***Moringa oleifera*: *Aphis craccivora***Musaceae***Heliconia stricta*: *Pentalonia nigronervosa**Musa* sp: *Pentalonia nigronervosa***Nyctaginaceae***Bougainvillea spectabilis*: *Aphis craccivora**Pisonia grandis*♣: *Aphis spiraecola***Poaceae***Cenchrus echinatus*: *Hysteroneura setariae**Chloris inflata*: *Hysteroneura setariae**Chloris radiata*: *Hysteroneura setariae**Dactyloctenium aegyptium*: *Hysteroneura setariae**Dichanthium bladhii*: *Hysteroneura setariae**Digitaria violascens*: *Hysteroneura setariae**Digitaria* sp: *Hysteroneura setariae**Echinochloa colonum*: *Hysteroneura setariae**Eleusine indica*: *Hysteroneura setariae**Miscanthus floridulus*♣: *Cerataphis* sp.*Oryza sativa*: *Rhopalosiphum rufiabdominale**Panicum muticum*: *Hysteroneura setariae**Paspalum paniculatum*: *Hysteroneura setariae**Pennisetum polystachion*: *Hysteroneura setariae**Phragmites karka*♣: *Hyalopterus pruni**Poaceae*: *Rhopalosiphum maidis**Sorghum bicolor*: *Hysteroneura setariae*, *Rhopalosiphum maidis**Zea mays*: *Rhopalosiphum maidis***Portulacaceae***Portulaca oleracea*: *Aphis craccivora***Rubiaceae***Coffea arabica*: *Toxoptera aurantii**Gardenia* sp.: *Aphis spiraecola***Rutaceae***Citrus limon*: *Aphis craccivora*, *Aphis gossypii*, *Aphis spiraecola*, *Toxoptera aurantii*, *Toxoptera citricida**Citrus madurensis*: *Toxoptera aurantii*, *Toxoptera citricida*

*Citrus reticulata*: *Toxoptera citricida*

*Citrus sinensis*: *Toxoptera citricida*

*Citrus* sp.: *Aphis craccivora*, *Aphis gossypii*, *Toxoptera aurantii*, *Toxoptera citricida*

#### **Solanaceae**

*Capsicum annuum*: *Aphis craccivora*, *Aphis gossypii*

*Capsicum* sp.: *Aphis gossypii*

*Cestrum diurnum*: *Aphis gossypii*

*Cestrum* sp.: *Aphis craccivora*

*Solanum lycopersicon*: *Aphis gossypii*

*Solanum melongena*: *Aphis craccivora*, *Aphis gossypii*, *Pentalonia nigronevosa*, *Toxoptera citricida*

*Solanum nigrum*: *Aphis gossypii*

*Solanum tuberosum*: *Aphis gossypii*

#### **Ulmaceae**

*Ulmus japonica*: *Tetraneura akinire*

#### **Verbenaceae**

*Tectona grandis*: *Aphis gossypii*

#### **Zingiberaceae**

*Alpinia purpurata*: *Pentalonia nigronevosa*

*Alpinia* sp.: *Pentalonia nigronevosa*

### **Discussion**

The last review of aphids on Guam was 44 years ago by Essig (1956). Essig's review and earlier reports by Fullaway (1912), Swezey (1942), Beller (1948), Oakley (1953), and Gressitt (1954), constitute a baseline against which present aphid species and host plant ranges can be compared for determining change or constancy in species composition. The earlier papers account for collections by G. E. Bohart, H. S. Dybas, T. Esaki, E. O. Essig, D. T. Fullaway, J. L. Gressitt, Hensill, N. L. H. Krauss, O. N. Liming, R. G. Oakley, G. D. Peterson, O. H. Swezey, H. K. Townes, R. L. Usinger, and S. R. Vandenburg. In total, these collectors found 15 species of aphids on Guam. Since then, three additional species have been detected, bringing the total to 18. Some of these species are quite common while others are rare, a few may no longer exist on the island.

The earliest published account of aphids on Guam was by Fullaway (1912). He reported *Aphis* sp. on beets; *Aphis gossypii* (or resembling *A. gossypii*) on breadfruit, cotton, cowpea, cucumber, eggplant, watermelon, and radish; *Rhopalosiphum maidis* on corn and sorghum; *Pentalonia nigronevosa* on banana; and *Toxoptera citricida* (report states, "resembling *Myzus citricidus*") on citrus. From 1936-1954, eleven additional species were found on the island: *Aphis craccivora* on bean, cestrum, and pago (Beller 1948, Oakley 1953, Essig 1956); *Aphis helianthi* on sunflower (Beller 1948); *Aphis nerii* on butterflyweed (Swezey 1942, Essig 1956); *Aphis rumicis* on onion (Beller 1948); *Aphis spiraecola* on



gardenia (Beller 1948); *Brevicoryne brassicae* on Chinese cabbage (Beller 1948); *Hyalopterus pruni* on reed (Essig 1956); *Lipaphis erysimi* on mustard and radish (Beller 1948); *Rhopalosiphum rufiabdominale* on rice (Beller 1948); *Tetraneura akinire* on Japanese elm (Essig 1956); and *Toxoptera aurantii* on citrus and coffee (Beller 1948, Essig 1956). Between 1974 to 1977, three more aphids were discovered: *Cerataphis* sp. on swordgrass; *Hysteroneura setariae* on crabgrass and sorghum; and *Myzus persicae* on Chinese cabbage (unpubl. records from collections of T. R. Blas and R. Muniappan, Univ. of Guam).

Of the 18 aphid species now documented, four are economically important and widely distributed on the island: *Aphis craccivora*, black legume aphid; *A. gossypii*, cotton/melon aphid; *Pentalonia nigronervosa*, banana aphid; and *Toxoptera citricida*, tropical citrus aphid. *A. craccivora* was found on 30 species of plants (13 plant families, 26 genera), 15 of which were legumes. The aphid, if left uncontrolled, regularly damages common bean. Other crops infested include okra, eggplant, pepper, cucumber, and citrus. *A. gossypii*, with the largest host range of any aphid on the island, was found on 42 species of plants (16 plant families, 34 genera). At times, this aphid was a pest on taro (observations on taro lines at University of Guam experimental nurseries at Mangilao, suggest differences in resistance to the aphid), melon, cucumber, and squash. *T. citricida* was found wherever citrus was grown. It was consistently the most abundant of any of the species found on citrus. *P. nigronervosa* was found regularly on red ginger and sometimes bananas. It is a constant threat to bananas because of its capacity to transmit bunchy top virus.

In addition to the economic species, there were two other species well adapted to island conditions, and at times abundant: *Aphis nerii* on butterflyweed and oleander, and *Hysteroneura setariae* on assorted grasses (documented on 15 species in 12 genera). Both of these aphids were widely distributed.

Nine species of aphids, taken by earlier collectors, were not found during the present study despite the island wide search over three years (1997-1999). Species not found included *Aphis helianthi* (sunflower aphid), *A. rumicis* (dock aphid), *Brevicoryne brassicae* (cabbage aphid), *Lipaphis erysimi* (turnip aphid), *R. rufiabdominale* (rice root aphid), *Tetraneura akinire*, *Cerataphis* sp. (palm aphid), *Myzus persicae* (green peach aphid), and *Rhopalosiphum maidis* (corn leaf aphid). The first six were last collected more than 50 years ago; the remaining three, not since the mid-1970s. The preferred host plants for some of these aphids are not common on Guam today, and therefore, may account for their rarity or absence; two of the species, *R. rufiabdominale* and *T. akinire*, feed largely on roots and may have been overlooked in sampling. *Cerataphis* sp., often associated with palm elsewhere, was found in a single collection on swordgrass in 1974 by R. Muniappan (unpubl. record). The absence of *R. maidis* in present collections was surprising since it was previously well documented (Fullaway 1912, Swezey 1942, Beller 1948, Oakley 1953, Essig 1956), and since there is an abundance of suitable host plants on the island. The factors contributing to the lack of population success of some of the aphids are not

entirely known. We theorize that the demise of some of the aphids might be linked to the disruption of habitats, to changes in island flora, and to periodic severe tropical storms and typhoons.

The overall evidence documents not only aphids, but also numerous aphid-plant associations. In total, 103 plant species (8 indigenous) in 34 plant families are recognized now on Guam that host one or more aphid species. Although not indigenous, the aphids have become an integral part of the island's biosystem. It is probable that there are still some species that have gone undetected, particularly in areas that have not been fully scouted, such as in the grasslands of the south-central part of the island and in the upper reaches of mountain valleys where access is difficult.

The diversity of aphid species on the island, based on past and present findings, follows a pattern of introduction and probable extinction of species. We expect that this pattern will continue, that species composition will fluctuate, that poorly adapted species will not survive, and that some new species will arrive, most probably on imported plants or plant cuttings, and on aircraft. Trade winds, which are northeasterly, are probably not a pathway for aphid transport to the island since they pass largely over open ocean.

We can expect the pest species, especially *Aphis craccivora* and *A. gossypii*, to be long-term permanent island residents because of their success in utilizing various island flora. If a host is eliminated or no longer grown, or if the aphids are chemically controlled on one crop, they are still sustained elsewhere. Crop protection via insecticides is clearly a short term solution. Improved management of aphids on Guam will require an ecological approach aimed at the target pests in their array of environments. To this end, efforts are in progress to establish aphid-specific parasitoids.

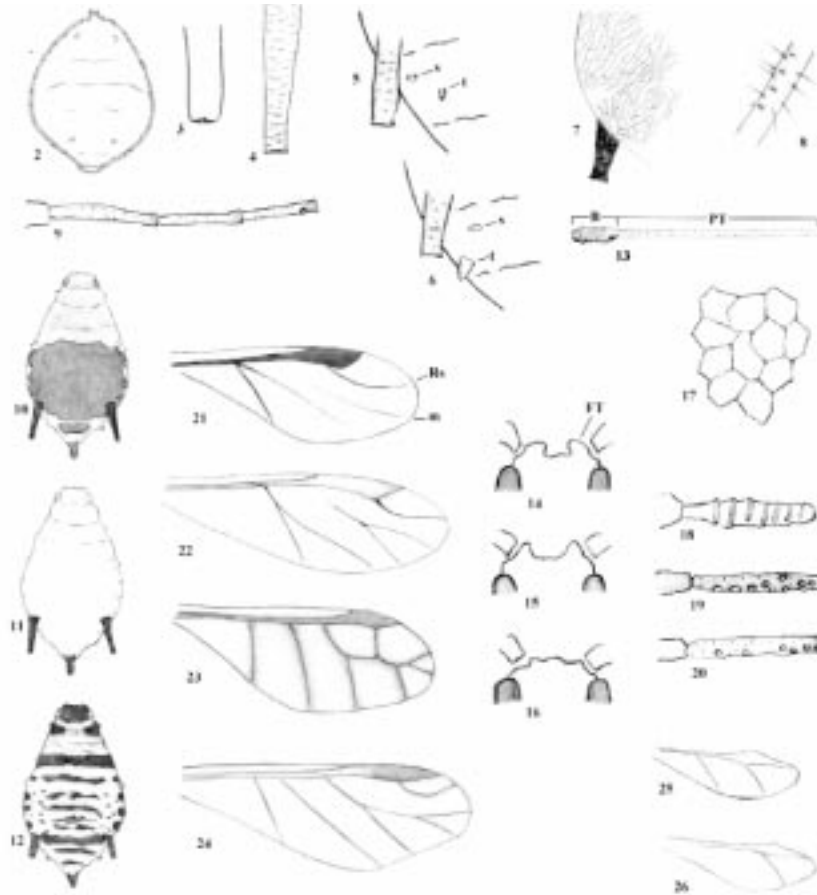
**KEY TO APHIDS OF GUAM**

**Abbreviations / Symbol Explanation**

ABD	Abdomen or abdominal
ASIII, ASIV	Antennal segment III, antennal segment VI, etc.
B	Base (includes primary rhinarium) of ultimate antennal segment
FT	Antennal or frontal tubercles
PT	Processus terminalis (section apical of primary rhinarium) of ultimate antennal segment
SIPH	Siphunculus
[ ]	Taxa in brackets key to associated couplet

1	Apterous females . . . . .	2
	Alate females . . . . .	19

- 2(1) Tarsi 1-segmented . . . . . *Tetraneura akinire* Sasaki  
 [Rare, reported from Tumon Bay, Apr-1946, and Orote Pt, Oct-1947 (Essig 1956); not found on island by authors]  
 Tarsi 2-segmented . . . . . 3  
*Aphis, Brevicoryne, Cerataphis, Hyalopterus, Hysteroneura, Lipaphis, Myzus, Pentagonia, Rhopalosiphum, Toxoptera*
- 3(2) Aphid scale-like, flattened, oval; body encircled with marginal wax glands (Fig. 2) . . . . . *Cerataphis* sp.  
 [Rare, single collection from Talafofo on swordgrass, collected by R. Muniappan, May-1974]  
 Aphid not as above . . . . . 4  
*Aphis, Brevicoryne, Hyalopterus, Hysteroneura, Lipaphis, Myzus, Pentagonia, Rhopalosiphum, Toxoptera*
- 4(3) SIPH flangeless (Fig. 3) . . . . . *Hyalopterus pruni* (Geoffroy)  
 SIPH flanged (Fig. 4) . . . . . 5  
*Aphis, Brevicoryne, Hysteroneura, Lipaphis, Myzus, Pentagonia, Rhopalosiphum, Toxoptera*
- 5(4) ABD I and VII lateral tubercles larger than those on II-VI (latter may be absent) . . . . . 6  
*Aphis, Hysteroneura, Rhopalosiphum, Toxoptera*  
 ABD I and VII lateral tubercles usually absent, if present then not larger than those on II-VI . . . . . 16  
*Brevicoryne, Lipaphis, Myzus, Pentagonia*
- 6(5) ABD lateral tubercle VII positioned posterior-dorsad of spiracle (Fig. 5); on Gramineae . . . . . 7  
*Hysteroneura, Rhopalosiphum*  
 ABD lateral tubercle VII positioned posterior-ventrad of spiracle (Fig. 6); not on Gramineae . . . . . 9  
*Aphis, Toxoptera*
- 7(6) Cauda pale . . . . . *Hysteroneura setariae* (Thomas)  
 Cauda dark . . . . . 8  
*Rhopalosiphum*
- 8(7) Antenna 6-segmented . . . . . *Rhopalosiphum maidis* (Fitch)  
 Antenna 5-segmented . . . . . *Rhopalosiphum rufiabdominale* (Sasaki)
- 9(6) ABD with ventrolateral ridges (Fig. 7); hind tibiae with peg-like setae (Fig. 8) . . . . . 10  
*Toxoptera*  
 Not as above . . . . . 11  
*Aphis*



Figs. 2-26. Aphid features (illustrations not to equal scale): 2) *Cerataphis* sp., aphid scale-like with encircling wax glands. 3) *Hyalopterus pruni*, siphuncular apex flangeless. 4) *Hysteroneura setariae*, siphuncular apex flanged. 5) *Rhopalosiphum* sp., abdominal lateral tubercle (t) positioned posterior-dorsad of spiracle (s) [after Heie 1986]. 6) *Aphis* sp., abdominal lateral tubercle positioned ventrad of spiracle [after Heie 1986]. 7) *Toxoptera aurantii*, ventrolateral serrate ridges. 8) *Toxoptera* sp., hind tibia with peg-like setae. 9) *Toxoptera aurantii*, antennal segments III-V apically darkened. 10) *Aphis craccivora*, abdomen with dorsal patch. 11) *Aphis nerii*, abdomen without dorsal patch. 12) *Aphis rumicis*, abdomen with stripes. 13) *Aphis nerii*, ultimate antennal segment (base, B; processus terminalis, PT). 14) *Myzus persicae*, frontal tubercles (FT) well developed, convergent. 15) *Pentalonia nigronervosa*, frontal tubercles well developed, divergent. 16) *Aphis* sp., frontal tubercles weakly developed. 17) *Lipaphis erysimi*, abdominal dorsal surface reticulate. 18) *Tetraneura akinire*, antennal secondary rhinaria annular. 19) *Toxoptera citricida*, antennal segment III dark. 20) *Toxoptera aurantii*, antennal segment III pale except apex. 21) *Tetraneura akinire*, fore wing median vein (m) unbranched. 22) *Cerataphis* sp., fore wing median vein once-branched. 23) *Pentalonia nigronervosa*, fore wing radial sector (Rs) fused or nearly fused with median vein, and veins bordered. 24) *Myzus persicae*, fore wing radial sector not fused, and veins not bordered. 25) *Aphis* sp., hind wing with two cross veins, 26) *Hysteroneura setariae*, hind wing with a single cross vein.

- 10(9) ASIII-V apically darkened (antenna appears banded, Fig. 9); ABD ventrolateral serrate ridges coarse; ASIII setae length < segment width at base; cauda with usually < 20 setae. . . . . *Toxoptera aurantii* (Boyer de Fonscolombe)  
 ASIII and IV not apically darkened (pale); ABD ventrolateral serrate ridges fine; ASIII setae length often ≥ segment width at base; cauda with > 20 setae . . . . . *Toxoptera citricida* (Kirkaldy)
- 11(9) ABD with large sclerotic dorsal patch (Fig. 10) *Aphis craccivora*-group  
 [Included in group is *A. cytisorum* Hartig (= *A. laburni* Kalt.) reported by Beller (1948)]  
 ABD without dorsal sclerotic patch (may have transverse stripes, Figs. 11-12). . . . . 12
- 12(11) Aphid bright yellow; PT > 3.5B (Fig. 13); on *Asclepias* and *Nerium* . . . . . *Aphis nerii* Boyer de Fonscolombe  
 Aphid color variable; but not bright yellow; PT < 3.5B; not on *Asclepias* or *Nerium* . . . . . 13
- 13(12) ABD with dorsal sclerotic irregular transverse stripes (Fig. 12) . . . . . *Aphis rumicis* L.  
 [Rare, reported on *Allium cepa* by Beller (1948); not found on island by authors]  
 ABD without dorsal sclerotic irregular transverse stripes . . . . . 14
- 14(13) SIPH darker than cauda . . . . . *Aphis gossypii* Glover  
 SIPH and cauda similarly pigmented . . . . . 15
- 15(14) ABD VII and VIII dorsum unpigmented . . . . . *Aphis spiraecola* Patch  
 ABD VII and VIII dorsum with pigmented transverse stripes or dashes . . . . . *Aphis helianthi* Monell  
 [Rare, on Guam reported on *Helianthus annuus* by Beller (1948); not found on island by authors]
- 16(5) FT well developed, distinctly exceeding median tubercle (Figs. 14-15) . . . . . 17  
*Myzus, Pentalonia*
- FT weakly to moderately developed, not or only slightly exceeding median tubercle (Fig. 16) . . . . . 18  
*Brevicoryne, Lipaphis*
- 17(16) FT convergent (Fig. 14) . . . . . *Myzus persicae* (Sulzer)  
 [Rare, single collection from Guam on Chinese cabbage, collected by T. R. Blas]  
 FT divergent (Fig. 15) . . . . . *Pentalonia nigronervosa* Coquerel  
 [On Zingiberaceae (red ginger) and Musaceae (banana)]

- 18(16) ABD dorsal surface reticulate (Fig. 17) . *Lipaphis erysimi* (Kaltenbach)  
 [Rare, reported by Beller (1948) and Essig (1956); not found on island by authors]  
 ABD dorsal surface not reticulate . . . . . *Brevicoryne brassicae* (L.)  
 [Rare, reported on *Brassica chinensis* by Beller (1948); not found on island by authors]
- 19(1) Antenna secondary rhinaria annular or transverse (Fig. 18) . . . . . 20  
*Cerataphis, Tetraneura*  
 Antenna secondary rhinaria round or oval (Fig. 19) . . . . . 21  
*Aphis, Brevicoryne, Hyalopterus, Hysteroneura, Lipaphis, Myzus, Pentalonion, Rhopalosiphum, Toxoptera*
- 20(19) Antenna 6-segmented; fore wing median vein unbranched (Fig. 21) . . .  
 . . . . . *Tetraneura akinire* Sasaki  
 [Rare, reported from Tumon Bay, Apr-1946, and Orote Pt, Oct-1947 (Essig 1956); not found on island by authors]  
 Antenna 5-segmented; fore wing median vein once-branched (Fig. 22) .  
 . . . . . *Cerataphis* sp.  
 [Rare, single collection from Talafofo on swordgrass, collected by R. Muniappan, May-1974]
- 21(19) ABD with ventrolateral ridges (Fig. 7); hind tibiae with peg-like setae  
 (Fig. 8) . . . . . 22  
*Toxoptera*  
 Not as above . . . . . 23  
*Aphis, Brevicoryne, Hyalopterus, Hysteroneura, Lipaphis, Myzus, Pentalonion, Rhopalosiphum*
- 22(21) ASIII dark (Fig. 19); fore wing median vein usually twice-branched;  
 pterostigma lightly pigmented . . . . . *Toxoptera citricida* (Kirkaldy)  
 ASIII light except apex (Fig. 20); fore wing median vein usually once-  
 branched; pterostigma dark . . . . .  
 . . . . . *Toxoptera aurantii* (Boyer de Fonscolombe)
- 23(21) Fore wing radial sector fused or nearly fused with median vein; wing  
 veins conspicuously bordered (Fig. 23) . . . . .  
 . . . . . *Pentalonion nigronevosa* Coquerel  
 [On Zingiberaceae (red ginger) and Musaceae (banana)]  
 Fore wing radial sector not fused with median vein; wing veins not  
 bordered (Fig. 24) . . . . . 24  
*Aphis, Brevicoryne, Hyalopterus, Hysteroneura, Lipaphis, Myzus, Rhopalosiphum*
- 24(23) Hind wing with one cross vein (Fig. 25) . . . . .  
 . . . . . *Hysteroneura setariae* (Thomas)  
 Hind wing with two cross veins (Fig. 26) . . . . . 24  
*Aphis, Brevicoryne, Hyalopterus, Lipaphis, Myzus, Rhopalosiphum*



- 25(24) FT convergent, well developed (Fig. 14) . . . . *Myzus persicae* (Sulzer)  
 [Rare, single collection from Guam on Chinese cabbage, collected by T. R. Blas]  
 FT divergent, weakly to moderately developed (Fig. 16) . . . . . 26  
*Aphis, Brevicoryne, Hyalopterus, Lipaphis, Rhopalosiphum*
- 26(25) SIPH flangeless (Fig. 3) . . . . . *Hyalopterus pruni* (Geoffroy)  
 SIPH flanged (Figs. 5-6) . . . . . 27  
*Aphis, Brevicoryne, Lipaphis, Rhopalosiphum*
- 27(26) ABD I and VII lateral tubercles larger than those on II-VI (latter may be  
 absent) . . . . . 28  
*Aphis, Rhopalosiphum*  
 ABD I and VII lateral tubercles usually absent, if present then not larger  
 than those II-VI . . . . . 35  
*Brevicoryne, Lipaphis*
- 28(27) ABD VII lateral tubercle positioned posterior-dorsad of spiracle; on  
 Gramineae (Fig. 5) . . . . . 29  
*Rhopalosiphum*  
 ABD VII lateral tubercle positioned posterior-ventrad of spiracle; not on  
 Gramineae (Fig. 6) . . . . . 30  
*Aphis*
- 29(28) Antenna 5- or 6-segmented; PT curved; ASIII with setae equal to or  
 exceeding segment's greatest width . . . . .  
 . . . . . *Rhopalosiphum rufiabdominale* (Sasaki)  
 Antenna 6-segmented; PT straight; ASIII with setae not exceeding  
 segment's greatest width . . . . . *Rhopalosiphum maidis* (Fitch)
- 30(28) ABD dorsum with distinct pigmented stripes or bars on part or all of  
 segments II-V . . . . . 31  
*Aphis craccivora, A. rumicis*  
 ABD dorsum without pigmentation on segments II-V . . . . . 32  
*Aphis gossypii, A. helianthi, A. spiraecola*
- 31(30) Cauda with 4-6 setae . . . . . *Aphis craccivora*-group  
 [Included in group is *A. cytisorum* Hartig (= *A. laburni* Kalt.) reported by Beller (1948)]  
 Cauda with 7-12 setae . . . . . *Aphis rumicis* L.  
 [Rare, reported on *Allium cepa* by Beller (1948); not found on island by authors]
- 32(30) ASIII with 16-30+ RHIN . . . . . *Aphis helianthi* Monell  
 [Rare, reported on *Helianthus annuus* by Beller (1948); not found on island by authors]  
 ASIII with 4-14 RHIN . . . . . 33  
*Aphis gossypii, A. nerii, A. spiraecola*

- 33(32) Cauda with 4-7 setae ..... *Aphis gossypii* Glover  
 Cauda with 8 or more. .... 34  
*Aphis nerii*, *A. spiraecola*
- 34(33) Cauda with 12-14 setae; on *Asclepias* and *Nerium* .....  
 ..... *Aphis nerii* Boyer de Fonscolombe  
 Cauda with <12; not on *Asclepias* or *Nerium* . . . *Aphis spiraecola* Patch
- 35(27) ABD with dorsal transverse stripes; SIPH somewhat barrel-shaped . . . .  
 ..... *Brevicoryne brassicae* (L.)  
 [Rare, reported on *Brassica chinensis* by Beller (1948); not found on island by authors]  
 ABD without dorsal transverse stripes; SIPH not barrel-shaped . . . . .  
 ..... *Lipaphis erysimi* (Kaltenbach)  
 [Rare, reported by Beller (1948) and Essig (1956); not found on island by authors]

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