

New Host Records of Aphids in Hawaii*

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In connection with the observations which have been made by the Entomology Department of the Hawaii Agricultural Experiment Station of the insects of diversified crops, many insects have been recorded on plants which were not formerly recorded as hosts in Hawaii.

The present contribution gives new host records of aphids secured during the past few years. It includes host records of eight species only recently recorded as occurring in Hawaii (9).¹

Amphorophora sonchi (Oestlund)

This species breeds in abundance on *Sonchus oleraceus*. Up to the present, only alates have been found on sweet potato and tomato. Only further observations can determine whether this species is capable of breeding on these plants.

Aphis gossypii Glover

The melon aphid is probably the most common aphid in Hawaii. It has a wide range of hosts. It was found breeding on every host given in table 3. It breeds in great numbers on *Crotalaria mucronata*, sweet potato, and tomato.

This species is the carrier of several destructive viruses. Holmes (8) lists seven different viruses. The more important diseases are the cucumber mosaic, the bean mosaic, cauliflower mosaic, and two celery mosaics. It also transmits the yellow dwarf virus of onion and the celery calico virus (8, 12).

Aphis maidis Fitch

The corn leaf aphid was found breeding on asparagus, papaya, summer squash, and tomato. Only alates were found on pole bean and potato. Further observations may determine whether *A. maidis* is capable of breeding on these other plants also.

This species transmits the viruses of sugar cane mosaic, cucumber mosaic, yellow dwarf of onion, southern celery mosaic and maize mosaic (8).

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¹ Numbers in parentheses refer to the bibliography.

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Table 3

Key: § Observed—* Previously published (7)—† Previously published (6)—‡ Determined by Dr. H. St. John

SPECIES	HOST	DATE	LOCALITY	COLLECTOR	STAGE	IDENTIFIED BY
<i>Ampiphophora sonchi</i> (Oestlund)	<i>Ipomoea batatas</i> (L.) Poir. (sweetpotato)	Jan. 16, 1941	Poamoho, Oahu	W. C. Look	Alate	E. McAfee
	<i>Lycopersicon esculentum</i> Mill. (tomato)	Jan. 24, 1941 Dec. 15, 1939	Kipapa, Oahu Lualualei, Oahu	W. C. Look W. C. Look	Alate Alate	E. McAfee E. O. Essig
<i>Aphis gossypii</i> Glover	<i>Sonchus oleraceus</i> L. (common sow thistle)	Dec. 15, 1939 Jan. 1, 1940 Jan. 26, 1941	Kahuku, Oahu Puuoa, Oahu Koko Head, Oahu	W. C. Look W. C. Look E. McAfee	Alate Alate Alate, apterous	E. O. Essig E. O. Essig E. McAfee
	<i>Carica papaya</i> L. (papaya)	Feb. 6, 1941	Puuoa, Oahu	E. McAfee	Alate,	E. McAfee
<i>Aphis gossypii</i> Glover	<i>Carica papaya</i> L. (papaya)	Sept. 15, 1938 Jan. 17, 1940 Jan. 8, 1940 Feb. 8, 1940	Kona, Hawaii Lualualei, Oahu Kaliua, Oahu Koko Head, Oahu	M. Masuda W. C. Look W. C. Look W. C. Look	Apterous Apterous Alate	E. McAfee E. O. Essig E. O. Essig E. O. Essig
	<i>Cattleya</i> sp. (cultivated orchid)	Feb. 28, 1940 Feb. 7, 1941	Punuka, Oahu Upper Makiki, Oahu	W. C. Look A. C. Browne	Alate Apterous	E. McAfee
	<i>Crotalaria mucronata</i> Desv. (rattlebox)	Apr. 3, 1939	Poamoho, Oahu	W. C. Look	Alate,	E. McAfee
	<i>Erechtites valerianaeifolia</i> D. C. (fireweed)	Sept. 21, 1940	Kipapa, Oahu	E. McAfee	Alate,	E. McAfee
	<i>Ipomoea batatas</i> (L.) Poir. (sweetpotato)	Oct. 9, 1940	Waipahu, Oahu	W. C. Look	Alate,	E. McAfee
	<i>Ipomoea batatas</i> (L.) Poir. (sweetpotato)	Jan. 24, 1941 Jan. 29, 1941	Kipapa, Oahu Kaneohe, Oahu	W. C. Look W. C. Look	Alate Alate	E. McAfee E. McAfee

SPECIES	HOST	DATE	LOCALITY	COLLECTOR	STAGE	IDENTIFIED BY	
<i>Aphis gossypii</i> Glover	<i>Lycopersicon esculentum</i> Mill. (tomato)	Feb. 13, 1941	Kahaluu, Oahu	W. C. Look	apterous Alate,	E. McAfee	
		Sept. 12, 1939	Kahuku, Oahu	W. C. Look	apterous Alate	E. McAfee	
		Oct. 20, 1939	Koko Head, Oahu	W. C. Look	Alate	Alate	E. O. Essig
		Nov. 22, 1939	Lualualei, Oahu	W. C. Look	Alate	Alate	S. H. Au
		Sept. 25, 1940	Waipahu, Oahu	W. C. Look	apterous Alate,	E. McAfee	
		Jan. 29, 1941	Kaneohe, Oahu	W. C. Look	apterous Alate,	E. McAfee	
		Feb. 8, 1940	Pensacola, Oahu	W. C. Look	apterous Alate,	E. McAfee	
		Apr. 19, 1940	Lualualei, Oahu	W. C. Look	Alate	E. McAfee	
		Aug. 8, 1939	Waipahu, Oahu	W. C. Look	Apterous	S. H. Au	
		Sept. 12, 1939	Kahuku, Oahu	W. C. Look	Alate	Alate	S. H. Au
<i>Aphis maidis</i> Fitch	<i>Asparagus officinalis</i> L. (asparagus) * <i>Carica papaya</i> L. (papaya) <i>Cucurbita pepo</i> L. (summer squash) * <i>Lycopersicon esculentum</i> Mill. (tomato) ‡ <i>Phaseolus vulgaris</i> L. (pole bean)	Aug. 1, 1939	Waipahu, Oahu	W. C. Look	Alate, Alate,	E. McAfee	
		Apr. 7, 1939	Poamoho, Oahu	W. C. Look	apterous Apterous	E. McAfee	
		Apr. 3, 1941	Waipahu, Oahu	W. C. Look	Alate	E. McAfee	
		Sept. 6, 1939	Lualualei, Oahu	W. C. Look	Alate, apterous	E. McAfee	
		Sept. 12, 1939	Kahuku, Oahu	W. C. Look	Alate, apterous	E. McAfee	
		Oct. 20, 1939	Koko Head, Oahu	W. C. Look	apterous Alate	E. McAfee	
		Oct. 27, 1939	Waipahu, Oahu	W. C. Look	Alate	E. McAfee	
		Jan. 15, 1940	Punioa, Oahu	W. C. Look	Alate	E. O. Essig	
		Sept. 12, 1939	Kahuku, Oahu	W. C. Look	Alate	E. McAfee	

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Table 3—Continued

SPECIES	HOST	DATE	LOCALITY	COLLECTOR	STAGE	IDENTIFIED BY
<i>Aphis maidis</i> Fitch	<i>Solanum tuberosum</i> L. (potato)	Dec. 15, 1939	Poamoho, Oahu	W. C. Look	Alate	E. McAfee
<i>Aphis medicaginis</i> Koch	* <i>Asparagus officinalis</i> L. (asparagus)	Aug. 29, 1939	Waipahu, Oahu	W. C. Look	Alate, apterous	R. McAfee
	<i>Carica papaya</i> L. (papaya)	Feb. 15, 1940	Lualualei, Oahu	W. C. Look	Alate	E. McAfee
		Aug. 23, 1940	Waipahu, Oahu	W. C. Look	Alate, apterous	E. McAfee
		Mar. 7, 1941	Kailua, Oahu	W. C. Look	Alate, apterous	E. McAfee
	<i>Erechtites valerianaefolia</i> DC. (fireweed)	Sept. 21, 1940	Kipapa, Oahu	E. McAfee	Alate, apterous	E. McAfee
	<i>Ipomoea batatas</i> (L.) Poir. (sweetpotato)	Oct. 9, 1940	Waipahu, Oahu	W. C. Look	Alate, apterous	E. McAfee
		Dec. 12, 1940	Lualualei, Oahu	W. C. Look	Apterous	E. McAfee
		Jan. 4, 1941	Kipapa, Oahu	W. C. Look	Alate, apterous	E. McAfee
		Jan. 24, 1941	Wahiawa, Oahu	W. C. Look	Alate, apterous	E. McAfee
	<i>Lycopersicon esculentum</i> Mill. (tomato)	Sept. 12, 1939	Kahuku, Oahu	W. C. Look	Apterous	E. McAfee
		Nov. 22, 1939	Lualualei, Oahu	W. C. Look	Alate	E. O. Essig
	<i>Solanum tuberosum</i> L. (potato)	Mar. 13, 1940	Kaaawa, Oahu	W. C. Look	Alate	S. H. Au
		Sept. 21, 1940	Poamoho, Oahu	W. C. Look	Apterous	E. McAfee
<i>Aphis middletonii</i> Thomas	* <i>Carica papaya</i> L. (papaya)	Feb. 13, 1940	Kahaluu, Oahu	W. C. Look	Alate, apterous	E. O. Essig
		Feb. 15, 1940	Lualualei, Oahu	W. C. Look	Alate	S. H. Au

SPECIES	HOST	DATE	LOCALITY	COLLECTOR	STAGE	IDENTIFIED BY
<i>Aphis middletonii</i> Thomas	* <i>Lycopersicon esculentum</i> Mill. (tomato)	Dec. 15, 1939	Kahuku, Oahu	W. C. Look	Alate	E. O. Essig
<i>Aphis rumicis</i> Linnaeus	<i>Erechtites valerianaefolia</i> DC. † (fireweed)	March 8, 1940	Lualualei, Oahu	W. C. Look	Alate	E. O. Essig
		Jan. 23, 1938	Lower Tantalus, Oahu	E. McAfee	Alate, apterous	E. McAfee
<i>Aphis sacchari</i> Zehntner	<i>Nothopanax guilfoylei</i> (C. & M.) Merrill (panax)	March 14, 1941	Kailua, Oahu	L. C. Bishop	Alate, apterous	E. McAfee
	<i>Phaseolus limensis</i> Macf. (lima bean)	Apr. 21, 1939	Waialua, Oahu	W. C. Look	Alate, apterous	E. O. Essig
	<i>Ipomoea batatas</i> (L.) Poir. (sweetpotato)	Feb. 4, 1941	Pearl City, Oahu	W. C. Look	Alate	E. McAfee
	<i>Lycopersicon esculentum</i> Mill. (tomato)	Feb. 6, 1941	Puuloa, Oahu	W. C. Look	Alate	E. McAfee
		Oct. 20, 1939	Kaneohe, Oahu	W. C. Look	Alate	S. H. Au
	‡ <i>Phaseolus vulgaris</i> L. (pole bean)	Oct. 27, 1939	Waipahu, Oahu	W. C. Look	Alate	E. O. Essig
		Dec. 13, 1939	Lualualei, Oahu	W. C. Look	Alate	E. O. Essig
Sept. 12, 1939		Kahuku, Oahu	W. C. Look	Alate	E. O. Essig	
<i>Solanum tuberosum</i> L. (potato)		Mar. 29, 1940	Poamoho, Oahu	W. C. Look	Alate	S. H. Au
<i>Brachycolus heraclei</i> Takahashi	<i>Sonchus oleraceus</i> L. (common sow thistle)	Feb. 6, 1941	Puuloa, Oahu	E. McAfee	Alate	E. McAfee
	<i>Apium graveolens</i> L. (celery)	Dec. 6, 1940	Waialua, Oahu	F. G. Holdaway	Alate, apterous	E. O. Essig
		May 22, 1941	Lahainaluna, Maui	F. Ako	Alate, apterous	E. McAfee
<i>Cavariella capreae</i> (Fabricius)	<i>Daucus carota</i> L. (carrot)	Jan. 25, 1939	Kohala, Hawaii	G. Marvin	Alate, apterous	S. H. Au
<i>Macrosiphum solanifolii</i> (Ashmead)	<i>Brassica chinensis</i> L. (white mustard cabbage)	Mar. 27, 1940	Lualualei, Oahu	W. C. Look	Alate	E. McAfee
		March 20, 1940	Waipahu, Oahu	E. McAfee	Alate	E. McAfee
	<i>Brassica oleracea botrytis</i> L. (broccoli)					

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Table 3—Continued

SPECIES	HOST	DATE	LOCALITY	COLLECTOR	STAGE	IDENTIFIED BY
<i>Macrosiphum solanifolii</i> (Ashmead)	<i>Carica papaya</i> L. (papaya)	March 9, 1939	Poamoho, Oahu	W. C. Look§	Alate, apterous	W. C. Look
		Feb. 15, 1940	Lualualei, Oahu	W. C. Look	Alate	E. McAfee
		Feb. 28, 1940	Pupukea, Oahu	W. C. Look	Alate	E. McAfee
	<i>Ipomoea batatas</i> (L.) Poir. (sweetpotato)	Mar. 13, 1941	Lualualei, Oahu	W. C. Look§	Alate, apterous	W. C. Look
		Feb. 4, 1941	Pearl City, Oahu	W. C. Look	Alate, apterous	E. McAfee
	<i>Lactuca sativa</i> L. (lettuce)	Feb. 6, 1941	Aiea, Oahu	W. C. Look	Alate	E. McAfee
		Feb. 4, 1941	Waipahu, Oahu	W. C. Look	Alate, apterous	E. McAfee
	<i>Lycopersicon esculentum</i> Mill. (tomato)	Apr. 14, 1938	Waipahu, Oahu	F. G. Holdaway	Alate, apterous	S. H. Au
		Dec. 28, 1939	Pupukea, Oahu	W. C. Look	Alate, apterous	E. McAfee
		Jan. 15, 1940	Puuloa, Oahu	W. C. Look	Apterous	E. McAfee
		Feb. 19, 1940	Central Kona, Hawaii	T. Ihara	Alate, apterous	E. McAfee
		Mar. 13, 1940	Kaaawa, Oahu	W. C. Look	Alate, apterous	E. McAfee
		Mar. 5, 1941	Waiawa, Oahu	F. Okumura	Alate, apterous	E. McAfee
	<i>Pisum sativum</i> L. <i>macrocarpon</i> Ser. (edible-podded pea)	Mar. 20, 1940	Waipahu, Oahu	E. McAfee	Alate, apterous	E. McAfee
	<i>Solanum melongena</i> L. (eggplant)	July 13, 1939	Lualualei, Oahu	W. C. Look	Alate	E. McAfee
Apr. 10, 1940		Kailua, Oahu	M. Masuda	Apterous	E. McAfee	

SPECIES	HOST	DATE	LOCALITY	COLLECTOR	STAGE	IDENTIFIED BY				
<i>Macrosiphum solanifolii</i> (Ashmead)	<i>Solanum tuberosum</i> L. (potato)	Mar. 30, 1938	Waipahu, Oahu	F. G. Holdaway	Alate, apterous	S. H. Au				
		Feb. 6, 1939	Poamoho, Oahu	W. C. Look	Alate, apterous	S. H. Au				
	<i>Sonchus oleraceus</i> L. (common sow thistle)	Feb. 6, 1941	Puuloa, Oahu	E. McAfee	Alate	E. McAfee				
<i>Macrosiphum rosaeifolium</i> Theobald	<i>Rosa</i> sp. (rose)	Nov. 22, 1940	Manoa, Oahu	W. C. Look	Alate, apterous	E. O. Essig				
<i>Micromyzus formosanus</i> (Takahashi)	‡ <i>Phaseolus vulgaris</i> L. (pole bean)	Dec. 20, 1939	Kaneohe, Oahu	W. C. Look	Apterous	E. O. Essig				
		Dec. 20, 1939	Kaneohe, Oahu	W. C. Look	Alate, apterous	E. O. Essig				
	Mar. 25, 1940						Waipahu, Oahu	W. C. Look	Apterous	E. McAfee
	Mar. 10, 1941						Wahiawa, Oahu	F. Okumura	Apterous	E. McAfee
	Apr. 14, 1941	U. H., Manoa, Oahu	W. C. Look	Apterous	E. McAfee					
<i>Allium schoenoprasum</i> L. (chive)	Dec. 20, 1939	Kaneohe, Oahu	W. C. Look	Alate, apterous	E. O. Essig					
<i>Myzus circumflexus</i> (Buckton)	<i>Carica papaya</i> L. (papaya)	Jan. 17, 1940	Lualualei, Oahu	W. C. Look	Apterous	E. O. Essig				
		Feb. 8, 1940	Kailua, Oahu	W. C. Look	Alate, apterous	E. O. Essig				
<i>Myzus convolvuli</i> (Kaltenbach)	<i>Rosa</i> sp. (rose)	Nov. 2, 1939	Manoa, Oahu	W. C. Look	Apterous	E. O. Essig				
	<i>Euphorbia</i> sp. <i>Spathoglottis plicata</i> Bl. (wild ground orchid)	Feb. 2, 1941	Waikane-Kahana Trail, Oahu	E. McAfee	Apterous	E. O. Essig				
<i>Myzus persicae</i> (Sulzer)	<i>Arctium lappa</i> L. (gobo— great burdock)	Sept. 9, 1940	Waimea, Hawaii	E. McAfee	Alate, apterous	E. O. Essig				
	<i>Beta vulgaris</i> L. (garden beet)	Apr. 16, 1941	Kahala, Oahu	W. C. Look	Apterous	E. McAfee				
	<i>Brassica pekinensis</i> Rupr. (Chinese cabbage)	Dec. 7, 1939	Kipapa, Oahu	F. Okumura	Alate, apterous	E. McAfee				

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Table 3—Continued

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<i>Myzus persicae</i> (Sulzer)	<i>Crotalaria mucronata</i> Desv. (rattlebox)	Apr. 13, 1939	Poamoho, Oahu	W. C. Look	Alate, apterous	E. McAfee
	<i>Ipomoea batatas</i> (L.) Poir. (sweetpotato)	Oct. 9, 1940	Poamoho, Oahu	W. C. Look	Apterous	E. McAfee
<i>Pentalonia nigronervosa</i> Coquerel		Dec. 20, 1940	Lualualei, Oahu	W. C. Look	Alate	E. McAfee
		Jan. 29, 1941	Koko Head, Oahu	W. C. Look	Alate, apterous	E. McAfee
		Feb. 4, 1941	Pearl City, Oahu	W. C. Look	Alate	E. McAfee
		Feb. 6, 1941	Puuloa, Oahu	W. C. Look	Alate, apterous	E. McAfee
		Sept. 9, 1940	Waimea, Hawaii	E. McAfee	Alate, apterous	E. O. Essig
		Feb. 4, 1941	Waipahu, Oahu	W. C. Look	Alate	E. McAfee
		Oct. 20, 1939	Kaneohe, Oahu	W. C. Look	Alate	E. O. Essig
		Oct. 27, 1939	Waipahu, Oahu	W. C. Look	Alate	E. O. Essig
		Dec. 15, 1939	Kahuku, Oahu	W. C. Look	Alate	E. O. Essig
		Mar. 8, 1940	Lualualei, Oahu	W. C. Look	Alate	E. McAfee
	Mar. 13, 1940	Kaaawa, Oahu	W. C. Look	Alate	E. O. Essig	
	Mar. 27, 1943	Manoa, Oahu	W. C. Look	Apterous	W. C. Look	
	Apr. 18, 1939	Lualualei, Oahu	W. C. Look	Alate, apterous	E. O. Essig	
	Aug. 8, 1939	Waipahu, Oahu	W. C. Look	Alate	E. McAfee	
	Dec. 20, 1939	Kaneohe, Oahu	W. C. Look	Alate	E. McAfee	
	Sept. 9, 1940	Waimea, Hawaii	E. McAfee	Alate, apterous	E. O. Essig	
	Sept. 6, 1939	Manoa, Oahu	E. McAfee	Alate	E. McAfee	
	‡ <i>Phaseolus vulgaris</i> L. (pole bean)					
	<i>Raphanus sativus</i> L. <i>longi-</i> <i>pinnatus</i> Bailey (daikon)					
	<i>Colocasia esculenta</i> (L.) Schott. (taro)					

SPECIES	HOST	DATE	LOCALITY	COLLECTOR	STAGE	IDENTIFIED BY
	<i>Lycopersicon esculentum</i> Mill. (tomato)	Sept. 12, 1939	Kahuku, Oahu	W. C. Look	Alate	E. McAfee
<i>Rhopalosiphum nymphacae</i> (Linnaeus)	‡ <i>Phaseolus vulgaris</i> L. (pole bean)	Dec. 20, 1939	Kaneohe, Oahu	W. C. Look	Alate	S. H. Au
	<i>Solanum tuberosum</i> L. (potato)	Jan. 16, 1941	Poamoho, Oahu	W. C. Look	Alate	E. McAfee
<i>Rhopalosiphum pseudobrassicae</i> (Davis)	<i>Brassica oleracea botrytis</i> L. (broccoli)	Mar. 20, 1940	Waipahu, Oahu	F. G. Holdaway	Alate	E. O. Essig
	<i>Brassica pekinensis</i> Rupr. (Chinese cabbage)	Dec. 7, 1939	Kipapa, Oahu	F. Okumura	Alate, apterous	E. O. Essig
	<i>Raphanus sativus</i> L. <i>longi-</i> <i>pinnatus</i> Bailey (daikon)	Apr. 10, 1940	Lualualei, Oahu	W. C. Look	Alate, apterous	E. O. Essig
	<i>Lycopersicon esculentum</i> Mill. (tomato)	Oct. 20, 1939	Kaneohe, Oahu	W. C. Look	Alate	E. O. Essig
<i>Toxoptera aurantii</i> (Fonscolombe)	<i>Calophyllum inophyllum</i> L. (kamani)	Feb. 26, 1941	Manoa, Oahu	E. McAfee	Alate, apterous	E. O. Essig
<i>Vesiculaphis caricis</i> (Fullaway)	<i>Lycopersicon esculentum</i> Mill. (tomato)	June 12, 1940	Waipahu, Oahu	W. C. Look	Alate	E. O. Essig

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Aphis medicaginis Koch

The bean aphid generally breeds freely on legumes. On every host recorded in table 3, it was found breeding. It has been observed breeding in abundance on asparagus, firewood, papaya, and sweet-potato.

This species has been found to be one of the vectors of bean mosaic (12).

Aphis middletonii Thomas

This species has been reported elsewhere to be primarily a root feeder and has also been found at the bases of plants (2). In Hawaii, it was observed breeding on young leaves of papaya. Only alates were found on tomato.

It is one of the vectors of cauliflower mosaic and western celery mosaic (8).

Aphis rumicis Linnaeus

This aphid is an important species on beans in the United States. Adults and young have been observed on lima bean only once at Waialua, Oahu. Other host records were on fireweed and *Nothopanax guilfoylei*.

A. rumicis is a vector of bean mosaic, pea mosaic, sugar beet mosaic, western celery mosaic, and yellow dwarf disease of onion (8). It also transmits the virus of white clover mosaic (12).

Aphis sacchari Zehntner

In the records of the sugar cane aphid given in table 3, only alates were found. Only further observations can determine whether this species is capable of breeding on any of these plants.

Brachycolus heraclei Takahashi

This aphid was first recorded from the Orient. Patch (11) lists five species of food-plants of this aphid. They are *Apium graveolens*, *Coriandrum sativum*, *Cryptotaenia canadensis*, *Cryptotaenia japonica*, and *Heracleum* sp.

Cavariella capreae (Fabricius)

This species has been reported from Europe, South America, and the United States (2). It has been shown to be a vector of cauliflower mosaic and western celery mosaic diseases (8).

Macrosiphum rosaefolium Theobald

This aphid was originally described from Egypt. In 1931, it was collected on roses in California (3). Patch (11) also records *Rosa* as a food-plant of this aphid.

Macrosiphum solanifolii (Ashmead)

The potato aphid breeds freely on potato and tomato. It has been found breeding on eggplant, lettuce, Chinese pea, and papaya. Although Timberlake (13) reported an abundance of this aphid on *Sonchus*, only alates have been collected by us from this host.

M. solanifolii is second only to *Myzus persicae* in importance as a vector of plant virus diseases. Holmes (8) mentions eleven different strains of viruses which it transmits. Smith (12) records an additional three, less important viruses. Cucumber mosaic, tobacco mosaic, bean mosaic, and spindle-tuber of potato are the most important diseases. The virus of woodiness disease of passion fruit is also transmitted by the potato aphid (10).

Micromyzus formosanus (Takahashi)

Up to the present, this species has been found breeding in abundance only on onion and chives. The additional record was made on bean plants growing near a bed of chives which were heavily infested with *M. formosanus*. It would appear that these aphids were not breeding on beans.

Myzus circumflexus (Buckton)

The lily aphid has been reported to have a wide range of hosts elsewhere (2). In Hawaii, it has been found breeding freely on papaya and *Rosa*.

M. circumflexus is an important vector of cucumber mosaic, potato leaf-roll, tobacco mosaic, cauliflower mosaic, and western celery mosaic (8). Bawden (1) includes, in addition to these diseases, the mosaic of *Commelina*, *Hyoscyamus* "3" virus, potato "A" virus, and potato "Y" virus.

Myzus convolvuli (Kaltenbach)

Except for this one record made at the Waikane-Kahana trail, the foxglove aphid has not been collected by us in Hawaii.

M. convolvuli is the vector of two mosaic diseases (8) and is believed to be the vector of *Freesia* mosaic (12). Holmes (8) mentions *Myzus pseudosolani* Theobald as a vector of cucumber mosaic, potato leaf-roll, and tobacco mosaic. Essig (2) considers *M. pseudosolani* Theobald as a synonym of *M. convolvuli* (Kaltenbach).

Myzus persicae (Sulzer)

The green peach aphid is one of the most important species in Hawaii. On all of the hosts recorded in table 3, it was found breed-

ing. It has been observed breeding freely on Chinese cabbage, head cabbage, daikon, eggplant, papaya, pepper and potato.

M. persicae is the most important aphid vector of virus diseases. It is reported by Holmes (8) to be capable of transmitting 19 different strains of plant viruses. Smith (12) mentions five additional strains and Bawden (1) includes the mosaic of *Commelina*. Noble (10) has shown that it is a vector of woodiness diseases of passion fruit. The more important diseases are cucumber mosaic, tobacco mosaic, potato spindle-tuber, potato leaf-roll, bean mosaic, sugar beet mosaic, cauliflower mosaic, and turnip mosaic.

***Pentalonia nigronervosa* Coquerel**

Although the first records of banana aphid on taro are of an alate, other observations indicate that it breeds freely on this host. It also breeds freely on ginger. Only winged individuals have been recorded on tomato. These alates apparently have migrated from their normal hosts to tomato.

P. nigronervosa is the chief vector of banana bunchy-top disease and abaca bunchy-top disease (1). It also transmits the virus of southern celery mosaic (8).

***Rhopalosiphum nymphaeae* (Linnaeus)**

This species breeds readily on taro. Only alates have been recorded on potato and pole bean. Further collecting may show whether this species is capable of breeding on these plants.

***Rhopalosiphum pseudobrassicae* (Davis)**

The turnip aphid breeds in abundance on Chinese cabbage, daikon, and other crucifers. Gould (5) reported this species breeding on broccoli in Virginia in 1930. Only alates were found on tomatoes. This aphid is probably a recent introduction into the Territory.

R. pseudobrassicae transmits the viruses of bean mosaic, cauliflower mosaic and stock mosaic (8). It is also the vector of yellow dwarf of onion (12).

***Toxoptera aurantii* (Fonscolombe)**

Recently this species has been found breeding freely on the flowers of mango at Kalihi, Oahu.

Petri has suggested that the "little-leaf" disease of citrus is spread by an aphid *Toxoptera aurantis* Boyer¹ (12) : 556.

¹ Probably a misprint for *T. aurantii*; Boyer and Fonscolombe refer to the same author, whose name was Boyer de Fonscolombe. (Ed.)

Vesiculaphis caricis (Fullaway)

This aphid has been reported breeding on a species of *Carex* (4). Only alates have been found by us on tomato. These winged aphids may have flown from their natural hosts to tomato.

SUMMARY

New hosts, for Hawaii, are recorded of the following twenty species of aphids: *Amphorophora sonchi* (Oestlund), *Aphis gossypii* Glover, *Aphis maidis* Fitch, *Aphis medicaginis* Koch, *Aphis middletonii* Thomas, *Aphis rumicis* Linnaeus, *Aphis sacchari* Zehntner, *Brachycolus heraclei* Takahashi, *Cavariella capreae* (Fabricius), *Macrosiphum rosaefolium* Theobald, *Macrosiphum solanifolii* (Ashmead), *Micromyzus formosanus* (Takahashi), *Myzus circumflexus* (Buckton), *Myzus convolvuli* (Kaltenbach), *Myzus persicae* (Sulzer), *Pentalonia nigronervosa* Coquerel, *Rhopalosiphum nymphaeae* (Linnaeus), *Rhopalosiphum pseudobrassicae* (Davis), *Toxoptera aurantii* (Fonscolombe) and *Vesiculaphis caricis* (Fullaway).

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LITERATURE CITED

1. Bawden, F. C. 1939.
Plant Viruses and Virus Diseases. Leiden, Holland. 272 pp.
2. Essig, E. O. 1938.
Aphids feeding on Celery in California. *Hilgardia* 11(9): 459-492.
3. ———. 1938.
Some New and Little Known Aphididae of California. *Jour. Econ. Ent.* 31(6): 780.
4. Fullaway, David T. 1910.
Synopsis of Hawaiian Aphididae. *Hawaii Agr. Expt. Sta. Rpt.* 1909: 20-46.
5. Gould, G. E. 1930.
Further Studies of Truck Crop Aphids. *Va. Truck Expt. Sta. Bul.* 71: 811-833.
6. Holdaway, F. G., and Look, W. C. 1942.
Insects of the Garden Bean in Hawaii. *Haw. Ent. Soc. Proc.* 11(2): 249-260.
7. ———, Look, W. C., and McAfee, E. (Lucas, E.). 1941.
New Host Records for Hawaii. *Hawaii Agr. Expt. Sta. Rpt.* (1940): 45.
8. Holmes, Francis O. 1939.
Handbook of Phytopathogenic Viruses. Minneapolis. 221 pp.

9. Look, W. C., and McAfee (Lucas, E.). 1944.
Some First Records of Aphids in Hawaii. *Haw. Ent. Soc., Proc.* 12(1) : 95-98.
10. Noble, R. J., and Noble, N. S. 1939.
Aphid Vectors of the Virus of Woodiness or Bullet Disease in Passion Fruit (*Passiflora edulis* Sims). *Roy. Soc. N. S. Wales, Jour. and Proc.* 72 : 293-317.
11. Patch, E. M. 1938.
Food-Plant Catalogue of the Aphids of the World. (Including the Phylloxeridae). *Maine Agr. Expt. Sta. Bul.* 393 : 35-431.
12. Smith, Kenneth M. 1937.
A Textbook of Plant Virus Diseases. London. 615 pp.
13. Timberlake, P. H. 1924.
Notes on Hawaiian Aphididae, with a List of Food Plants. *Haw. Ent. Soc. Proc.* 5(3) : 450-460.