



Terrestrial Arthropod Survey of Halona  
Valley, Joint Base Pearl Harbor-Hickam,  
Naval Magazine, Lualualei Annex,  
August 2017– October 2017

Hawaii  
Biological  
Survey

Final Report

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**Terrestrial Arthropod Survey of  
Halona Valley, Joint Base Pearl Harbor-Hickam,  
Naval Magazine Lualualei Annex, August 2017–October 2017**

Neal L. Evenhuis, Keith T. Arakaki, Clyde T. Imada

Final Report prepared for the U.S. Navy

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## EXECUTIVE SUMMARY

The Bishop Museum was contracted by the U.S. Navy to conduct surveys of terrestrial arthropods in Halona Valley, Naval Magazine Lualualei Annex, in order to assess the status of populations of three groups of insects including species at risk in those groups: picture-winged *Drosophila* (Diptera; flies), *Hylaeus* spp. (Hymenoptera; bees), and *Rhyncogonus welchii* (Coleoptera; weevils). The first complete survey of Lualualei for terrestrial arthropods was made by Bishop Museum in 1997. Since then, the Bishop Museum has conducted surveys in Halona Valley in 2015, 2016–2017, and the current survey. Surveys were conducted from late August 2017 through mid-December 2017, comprising a total of 12 trips. Surveys were conducted using yellow water pan traps, pitfall traps, hand collecting, aerial net collecting, and observations. The area chosen for study was a *Sapindus oahuensis* grove in Halona Valley. The area had potential for all three groups of arthropods to be present, especially the *Rhyncogonus* weevil, which has previously been found in association with *Sapindus* trees. Trapped and collected insects were taken back to the Bishop Museum for sorting, identification, data entry, and storage and preservation. The results of the surveys proved negative for any of the target groups. However, by-catch of 89 species of insects and other terrestrial arthropods resulted in 26 new records for Halona Valley and 12 for the entire Naval Magazine Lualualei. A listing of all species identified from this survey is given and added to the previous survey lists of terrestrial arthropods known from Lualualei. Further surveying in additional areas of Halona Valley should be conducted in order to better assess the presence/absence of the target taxa but also to assess potential threats to populations of such vulnerable taxa.

## INTRODUCTION

In 1997, the Bishop Museum conducted a terrestrial arthropod survey of the Joint Base Pearl Harbor-Hickam, Naval Magazine Lualualei Annex (hereinafter shortened to Lualualei) (Evenhuis, 1997a) in order to provide a faunal list of all terrestrial arthropods in assisting the U.S. Navy with their conservation efforts on the base. In that survey, a total of 637 taxa were collected and identified. The majority of the taxa were found in Halona Valley, which proved to harbor a rich and diverse assemblage of both plants and animals. The current survey was conducted to update that 1997 survey by focusing on Halona Valley and to assess the populations of three target arthropod groups that include species at risk, as well as federally listed species. The Bishop Museum was contracted in 2015 to re-survey areas of high potential for three sets of target insects that were rare or endangered. That report failed to find any of the target organisms, but the by-catch resulted in 18 new records for Lualualei Naval Magazine and for Halona Valley (Evenhuis *et al.*, 2016). The Museum was again contracted in 2016 to survey another portion of Halona Valley, southwest of the previous year's surveying and located in a *Sapindus* grove where the last *Rhyncogonus welchii* weevil had been collected in 1997. Surveys were conducted from November 2016 through mid-February 2017, comprising a total of 12 trips with negative results for the target organisms, but by-catch resulted in 23 new records for Halona Valley and 19 new records for Lualualei Naval Magazine (Evenhuis *et al.*, 2017). The current survey was conducted at another *Sapindus* grove a few hundred meters southeast of the previous year's survey and comprised 12 trips from mid-August through mid-November 2017. Again there were negative results for the target organisms, but the by-catch resulted not only in new records, but also a new species of flightless dolichopodid, known previously from the summit bog of Mt. Ka'ala. The new species was recently described and is discussed in this report. With the new records obtained during the current survey, the total number of species of terrestrial arthropods for Lualualei Naval Magazine is now 689 (a 7% increase) and for Halona is 423 (a 21% increase). Arthropods were observed and collected specimens brought back to the Bishop Museum for identification, data entry, and preservation. Results of collection and identification work are provided in the Appendices

## MATERIAL AND METHODS

**Survey Site and Collection Points.** Halona Valley was chosen for survey work because it is the locality where many of the target taxa were last seen. Halona Valley is a large basin shaped region forming the headwaters of a major drainage feeding Niuli'i Reservoir, originating below Pohakea Pass. This area is today accessed via bunkers located on Dent Street and Forrestal Street.

A small grove of *Sapindus oahuensis* trees at approximately 1380 ft elev. was selected as the primary survey area since it was the near the last recorded collecting site for the *Rhyncogonus* weevil (*R. welchii*) (Coleoptera: Curculionidae) [that site was the survey site for 2016-2017]. Picture-winged *Drosophila* (Diptera: Drosophilidae) had been seen

at higher altitudes in the valley, but it was hoped that they would be attracted to the baits we placed at the site so we could observe and record them. A trail to the site provided reasonably easy access through *koa haole* (*Leucaena leucocephala*) shrubland and Christmas berry (*Schinus terebinthifolius*) forest.

Surveying was done at sites within and adjacent to the *Sapindus* trees. Collecting sites were marked with a GPS to obtain latitude and longitude (Table 1).

**Table 1. Collecting Sites in Naval Magazine Lualualei, Halona Valley for the 2017 field season.**

**pitfall and bait sites**

Site	Waypoint	GPS	elev.	collecting method
1	241	N21.42505° W158.10329°	1352 ft.	pitfall, bait
2	240	N21.42498° W158.10329°	1368 ft.	pitfall, bait
3	242	N21.42475° W158.10361°	1380 ft.	pitfall, bait
4	243	N21.42471° W158.10355°	1383 ft.	pitfall
5	244	N21.42467° W158.10356°	1390 ft.	pitfall, bait
6	245	N21.42469° W158.10361°	1386 ft.	pitfall
7	246	N21.42469° W158.10371°	1386 ft.	pitfall, bait
8	248	N21.42480° W158.10370°	1370 ft.	pitfall
9	249	N21.42473° W158.10378°	1376 ft.	pitfall
10	247	N21.42472° W158.10368°	1404 ft.	pitfall, bait

**pan trap sites**

Site	Waypoint	GPS	elev.	collecting method
1	251	N21.42480° W158.10341°	1379 ft.	yellow pans
2	252	N21.42473° W158.10344°	1384 ft.	yellow pans

**ant bait traps**

Site	Waypoint	GPS	elev.	collecting method
1	254	N21.42869° W158.10524°	1081 ft.	peanut butter
2	255	N21.42806° W158.10512°	1112 ft.	peanut butter
3	256	N21.42771° W158.10422°	1173 ft.	peanut butter
4	257	N21.42729° W158.10318°	1241 ft.	peanut butter
5	258	N21.42655° W158.10294°	1282 ft.	peanut butter
6	259	N21.42607° W158.10301°	1326 ft.	peanut butter
7	260	N21.42548° W158.10330°	1338 ft.	peanut butter
8	261	N21.42505° W158.10350°	1344 ft.	peanut butter
9	262	N21.42483° W158.10347°	1354 ft.	peanut butter
10	263	N21.42480° W158.10376°	1366 ft.	peanut butter

**Collecting Methods.** A number of collecting methods were employed during the survey to enable collection of as wide a variety of arthropods as possible. Some included observation only to avoid collecting of federally listed picture-winged *Drosophila*. A list of the trapping methods used included:

**Yellow water pans** (Fig. 1). These are used to collect a variety of flying insects that are attracted to the yellow color. The traps consist of small yellow bowls filled with water with a small amount of surfactant (usually soap), which causes trapped specimens to sink and drown. A small amount of ethylene glycol was added to repel fungal growth and reduce evaporation of the liquid. Pans were placed in a fairly open area (i.e., not under a canopy) and in presumed flight paths to allow flying insects to better see the pans and be attracted to them.



**Fig. 1.** Yellow Pan trap setup (propylene glycol giving liquid a pinkish appearance).

**Pitfall Traps** (Fig. 2). These traps are designed to collect ground-dwelling arthropods and other invertebrates that fall into the traps. The traps consist of a plastic cup buried in the substrate so as to be relatively level with the ground and filled with a 50/50 mix of water and propylene glycol (marine anti-freeze that is “eco-friendly”). Cups that were above ground level were provided with natural “ramps” of twigs. Traps were protected from rain and falling debris by placing a cap rock on top but still leaving space for crawling invertebrates to get to the cup. This survey modified the procedure of previous surveys by adding a second plastic cup that was used as a protective sleeve. When the inner cup containing the liquid was removed in order to collect specimens, the outer “protective” cup was kept in place, which kept loose soil and rocks from falling into the excavation, thus saving time in otherwise having to re-excavate.



**Fig. 2.** Pitfall trap in place with rock protective cover. Flag used to mark location.

**Bait traps** (Figs. 3–4). These consisted of two types of baits (fermented banana and fermented mushroom). Sponges were affixed to the mauka-facing surface of *Sapindus* trunks at eye level for easy observation. Baits were applied to sponges and let sit for a few hours before observations commenced. After two days, baits were observed again. Insects associated with the baits that were not picture-winged *Drosophila* were hand collected using snap cap vials. The unexpected presence of Australian cockroaches (see further under Discussion below) caused the baits to not function, as the flying adults would fly in bypassing the Tanglefoot® barrier (which was placed in order to keep ants from the baits) and eat all the banana bait and much of the mushrooms so that observations of picture-winged *Drosophila* or other small flies that would otherwise be attracted to the baits could not be observed or collected.



**Figs. 3–4.** Bait traps. **3 (left)**. Banana and mushroom bait before Tanglefoot® barrier (ants eating the baits). **4 (right)**. Same bait after Tanglefoot® barrier (note the presence of numerous *Drosophila*).



**Aerial sweep nets.** Flying insects were collected with aerial sweep nets (Fig. 5) when they appeared. Often, insects were collected out of the net with an aspirator. Collected insects were placed in snap cap vials and brought back to the lab for identification.



**Fig. 5.** Using an aerial sweep net.

**Ant bait traps.** A simple smear of peanut butter on a stick was used to attract ants at various sites along the trail to the main site. Collected ants were placed in a vial of ethanol and taken back to the lab for identification. Ant baits were placed at various points along the trail to the main collecting site, which included large *koa haole* (*Leucaena leucocephala*) and Christmas berry (*Schinus terebinthifolius*) populations.

**Hand collecting.** This often involved using snap cap vials for collecting hard-to-reach specimens (such as flies under leaves of bushes) or insects walking on substrata (or ground dwelling spiders and amphipods and isopods).

### Collecting Times

Six trapping episodes were conducted (12 trips overall) from August through October 2017 at the main study site, with the first day filled with placing traps and collecting in the area; the second day (usually two days later to avoid evaporation of liquid in traps) involved collecting trapped specimens and conducting further on-site collecting. Forays outside of the study site were also made to ascertain potential for collecting then and in the future. As weather permitted, both collecting days during each collecting episode involved searching leaf litter and vegetation for *Rhyncogonus welchii* (see Discussion below for further details).

## RESULTS

A total of 89 taxa of terrestrial arthropods were identified during this survey (see Appendix), but no target organisms were seen or collected. The recorded taxa included 26 new records for Halona Valley and 12 new records for Lualualei (since Halona is by far the most diverse of the areas in Lualualei for terrestrial invertebrates, it is no surprise that if a taxon is new to Halona, then it would probably not have been found anywhere else in Lualualei previous to this study, thus is new to all of Lualualei too). A full list is given in the Appendix. A few of the collected and identified taxa resulting from this survey are highlighted here.

***Bark/boring beetles (Coleoptera):*** The following beetles were recorded as new to Halona and Lualualei: *Chryphalus sylvicola* (Perkins), *Hypothenemus seriatus* (Eichhoff), and *Xylosandrus crassiusculus* (Motschulsky) (Scolytidae). These are probably not recent introductions to the area but were not recorded in the Evenhuis (1997a) survey because of the lack of proper identification keys which were not available at that time.

***Flies (Diptera):*** Of the new records of flies reported here from Halona and Lualualei for the first time, one in particular is noteworthy. Two specimens (a male and a female) of a flightless dolichopodid were collected in a pitfall trap (cf. Fig. 6). Examination showed them to belong to a new species of *Campsicnemus*, which was recently described as *C. hao* Evenhuis (Evenhuis 2018). In 1993, specimens of this species were collected at the summit of Mt. Ka‘ala and in a subsequent publication (Evenhuis, 1997b) were thought to be the same as *Campsicnemus bryophilus* (Adachi), which, up to then, only was known to occur on Moloka‘i. Because subsequent collecting Mt. Ka‘ala turned up no additional specimens of this species and it was thought the 1993 specimens might possibly have been Moloka‘i specimens mislabeled as from Mt. Ka‘ala. After the two pitfall specimens were found during this survey, a re-examination of both Moloka‘i and Mt. Ka‘ala populations were conducted and consistent differences in the two were found, which makes these Wai‘anae specimens a new species. The finding of two specimens at such a low elevation [1400 ft.] (all other flightless flies are found at summits of mountains or at high elevations usually over 5000 ft.) is extremely unusual—as is the finding of a flightless fly surviving in the midst of large populations of predatory *Anoplolepis gracilis* ants as well as numerous nests of *Solenopsis papuana* ants.



**Fig. 6.** *Campsicnemus hao* Evenhuis (flightless male)

**Wasps (Hymenoptera).** A fig wasp (*Pleistodontes* sp.) was recorded from Halona for the first time. This was no doubt associated with the large and singular banyan tree near the collecting site. The wasp was not identified to species but they are supposed to be species-specific to the fig trees (banyans). Also, the hyperparasitic scelionid wasp *Dyscritobaeus comitans* Perkins was collected and marks a new record for Lualualei Naval Magazine.

Additionally, the jewel wasp, *Ampulex compressa* (Ampulicidae) is a new record for the Naval Magazine. It is a parasite of large cockroaches like the Australian cockroach that was so common in the leaf litter, so this is no doubt why it was in the area. Live specimens were not seen, but sifting leaf litter near a nest of *Solenopsis papuana* resulted in the finding of exoskeleton parts of the distinctive metallic thorax and abdomen. It is presumed the ants discarded the exoskeleton parts after finishing off the adult.

## DISCUSSION

### Efforts to find *Rhyncogonus*

Since the locality chosen for this year's project near the site of the last collection of the rare *Rhyncogonus welchii* in 1997, we made a special effort to locate any live specimens or elytra that may be in the leaf litter. Leaf litter under *Sapindus* trees were diligently searched for the beetle but with no luck. The method employed in leaf litter searching was to slowly remove leaves from the surface until the lowermost layer was exposed. Then the area was cleared and the topsoil was hand-sifted in hopes of finding larvae or adults under ground. Rocks and small boulders were also turned over. Although we obtained negative results for the beetle, this method revealed leaf-litter fauna that would have otherwise been missed and we encourage further use of this method at other high-potential *Rhyncogonus* areas (e.g., *Sapindus* groves) in order to try and find evidence of the weevil itself, or elytra. Elytra can persist for years and can give evidence of previous populations in the area.

### Cockroaches

The presence of a fairly large and stable population of the Australian cockroach, *Periplaneta australasiae* (Fig. 7), thwarted our efforts at using banana / mushroom baits, as flying adults would bypass the Tanglefoot® barrier and consume the banana bait and mushrooms shortly after they were put in place. We abandoned the baits, and visual observation for the picture-winged *Drosophila* was continued without baits, which was not optimal and had negative results. Note: This is the only locality in Halona for which this species of cockroach was seen to thrive. Previous collections of this species in Lualualei Naval Magazine were in association with outdoor sites in more urban environments, which is the more normal habitat for this species. It is surmised that a rogue gravid female laid ootheca at this site and the food supply was enough to start and maintain a healthy population, which apparently has not expanded beyond this locality.



**Fig. 7.** The Australian cockroach, *Periplaneta australasiae*.

### **Possible threats to native invertebrate fauna**

The presence of large numbers of *Anoplolepis gracilipes* (crazy ants) and *Solenopsis papuana* at the study site could be a potential threat to any soil-dwelling or arboreal native invertebrate fauna. The *Anoplolepis* ants at the study site were part of a supercolony and could contain as many as millions of individuals. We were unable to locate the nest but it may not even be in the area of our study (or it may have also been part of last year's *Anoplolepis* ant colony). A heavy rain after the first collecting week seemed to have helped reduce the observed individuals in later weeks. It could have also been that the ants found a drier area in which to forage. We will keep monitoring this population to see if it is stable, increasing, reducing, or oscillating in numbers over time.

### **CONCLUSION**

Although we had negative results for the target taxa, there no reason to believe that they do not exist in Halona Valley and further surveying in other areas should hopefully bear this out. At a minimum, this survey continues to increase the baseline inventory of terrestrial arthropods in Halona Valley and Lualualei and can assist resource managers in decision-making with regard to conservation management, protection of existing native biota, and understand and possibly mitigate possible threats to vulnerable taxa of plants and invertebrates in the area.

### ACKNOWLEDGMENT

Karl Magnacca is thanked for identifying the *Lasioglossum* bee. The U.S. Navy is thanked for allowing access to the Naval Magazine Lualualei Annex to conduct these surveys.

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**APPENDIX. Table of terrestrial arthropods collected from Lualualei Naval Magazine, with special reference to Halona Valley**

(new records are indicated in red)

	Lualualei 1997	Halona 1997	Halona 2015	Halona 2016–17	Halona 2017
<b>ACARI</b>					
<b>Acaridae</b>					
Tyrophagus putrescentiae (Schrank)	1	1			
<b>Ascidae</b>					
Asca aphidioides (Linnaeus)	1	1			
Asca duosetosa Fox	1	1			
Asca quinquesetosa Wharton	1				
<b>Bdellidae</b>					
Bdella captiosa Atyeo	1	1			
Bdella distincta Baker & Balock	1	1			
Bdella mexicana Baker & Balock	1	1			
Spinibdella depressa (Ewing)	1	1			
Spinibdella sp. [immature]	1	1			
<b>Brachycthoniidae</b>					
Sellnickthonus sp.	1				
<b>Caligonellidae</b>					
Coptocheles solanii Swift	1				
Neognathus spectabilis (Summers & Schlinger)	1				
<b>Cepheidae/Andremaeidae</b>					
gen. sp.	1	1			
<b>Cheyletidae</b>					
Hemicheyletia wellsi (Baker)	1	1			
<b>Cryptognathidae</b>					
Favognathus goffi Swift	1	1			
Favognathus pictus (Summers & Chaudhri)	1	1			
<b>Ctenacaridae</b>					
Ctenacarus araneolus (Grandjean)	1				
<b>Cunaxidae</b>					
Pulaeus n.sp.	1	1			
<b>Digamasellidae</b>					
Dendroseius sp.	1				
<b>Ereynetidae</b>					
Ereynetes sp.	1	1			
<b>Euphthiracaridae</b>					
Euphthiracarus sp.	1	1			
<b>Eupodidae</b>					
Eupodes sigmoidensis Strandtmann & Goff	1	1			
<b>Galumnidae</b>					
Pergalumna hawaiiensis (Jacot)	1	1			

	Lualualei 1997	Halona 1997	Halona 2015	Halona 2016–17	Halona 2017
<b>Laelapidae</b>					
Pseudoparasitus trincisus Hunter	1	1			
<b>Macrochelidae</b>					
Macrocheles muscaedomesticae (Scopoli)	1	1			
Macrocheles sp. nr. rodriguezii (Oliver & Krantz)	1	1			
<b>Nanorchestidae</b>					
Nanorchestes sp. 1	1	1			
Nanorchestes sp. 2	1	1			
<b>Nothridae</b>					
Nothrus sp.	1	1			
<b>Ologamasidae</b>					
Gamasiphis sp.	1	1			
<b>Oppiidae</b>					
gen. spp. (3)	1	1			
<b>Oribatidae</b>					
gen. sp.	1		1	1	
<b>Paratydeidae</b>					
Paratydeus sp.	1				
<b>Podocinidae</b>					
Podocinum sagax (Berlese)	1	1			
<b>Polyaspididae</b>					
gen. sp.	1	1			
<b>Pygmephoridae</b>					
Pygmephorus sp.	1				
<b>Raphignathidae</b>					
Raphignathus n.sp.	1				
<b>Rhagidiidae</b>					
Shibaia longisensilla (Shiba)	1				
<b>Schelorbitidae</b>					
Schelorbitates sp. nr. oahuensis Jacot	1	1			
Schelorbitates sp.	1	1			
<b>Stigmaeidae</b>					
Eustigmaeus microsegnis (Chaudhri)	1	1			
Eustigmaeus ornatus Ueckermann & Meyer	1	1			
Eustigmaeus segnis grp.	1	1			
Stigmaeus n.sp.	1	1			
<b>Tarsonemidae</b>					
Hemitarsonemus sp.	1				
<b>Tydeidae</b>					
Tydeus sp.	1				
<b>Uropodidae</b>					
gen. sp.	1	1			



	Lualualei 1997	Halona 1997	Halona 2015	Halona 2016–17	Halona 2017
<b>Veigaiidae</b>					
<i>Veigaia nemorensis</i> (C.L. Koch)	1				
<b>AMPHIPODA</b>					
<b>Talitridae</b>			1	1	1
<i>Talitroides topitotum</i> Burt	1	1			
<b>ARANEAE</b>					
<b>Araneidae</b>			1		
<i>Argiope appensa</i> (Walckenaer)	1	1			
<i>Gasteracantha mammosa</i> C.L. Koch	1	1	1	1	
<i>Neoscona</i> sp.	1				
<b>Clubionidae</b>					
<i>Cheiracanthium mordax</i> L. Koch	1	1			
<b>Dysderidae</b>					
<i>Dysdera crocota</i> C.L. Koch	1	1			
<b>Gnaphosidae</b>					
<i>Camillina elegans</i> (Bryant)	1	1			
<b>Linyphiidae</b>					
<i>Labulla</i> sp.	1	1			
<b>Nesticidae</b>					
<i>Eidmanella pallida</i> (Emerton)	1	1			
<b>Oonopidae</b>					
<i>Oonopinus hunus</i> Suman	1				
<i>Oonopinus</i> n.sp.	1				
<i>Opopaea lena</i> Suman	1				
<i>Orchestina</i> sp.	1				
<b>Pholcidae</b>					
<i>Pholcus phalangioides</i> (Fuesslins)	1				
<b>Salticidae</b>			1	1	1
<i>Hasarius adansoni</i> (Audouin)	1				
<i>Phintella versicolor</i> (C.L. Koch)	1				
<b>Tetragnathidae</b>					
<i>Tetragnatha</i> n. sp.	1	1			
<b>Theridiidae</b>			1	1	
<i>Argyrodes argyrodes</i> (Walckenaer)	1				
<i>Latrodectus geometricus</i> C.L. Koch	1				
<i>Steatoda grossa</i> (C.L. Koch)	1				
<i>Theridion melanostictum</i> (Pickard-Cambridge)	1				
<b>Thomisidae</b>					
<i>Misumenops</i> sp. A	1				
<i>Misumenops</i> sp. B	1	1			
<i>Misumenops</i> sp. C	1	1			

	Lualualei 1997	Halona 1997	Halona 2015	Halona 2016–17	Halona 2017
<b>CHILOPODA</b>					
<b>Geophilidae</b>					
gen. sp.	1		1	1	
<b>Lithobiidae</b>					
Lithobius sp.	1	1			
<b>Scolopendridae</b>					
gen. sp. [immatures]	1				
Scolopendra subspinipes Leach	1	1			
<b>COLEOPTERA</b>					
<b>Aglycyderidae</b>					
Proterhinus blackburni blackburni Sharp	1	1			
Proterhinus deceptor Perkins	1				
Proterhinus sp. (not blackburni group)	1	1			
<b>Alleculidae</b>					
Pseudocistela sp.	1				
<b>Anthribidae</b>					
Araecerus fasciculatus (De Geer)	1				
Araecerus levipennis Jordan	1	1			1
Araecerus vieillardii (Montrouzier)	1				
Exillis lepidus Jordan	1				
gen. in subfamily Choraginae nr. Cisanthribus					1
gen. sp.	1	1			
<b>Bostrichidae</b>					
Amphicerus cornutus (Pallas)	1				
Xylopsocus castenoptera (Fairmaire)				1	
Xylopsocus religiosus (Boisduval)	1	1	1		
<b>Bruchidae</b>					
Acanthoscelides macrophthalmus (Schaeffer)	1	1			
Lithraeus atronotatus (Pic)	1	1			
Stator pruininus (Horn)	1	1			
gen. sp.	1				
<b>Buprestidae</b>					
Chrysobothris octocola Le Conte	1				
<b>Cantharidae</b>					
Caccodes oceaniae (Bourgeois)	1				
<b>Carabidae</b>					
Colpodes buchannani Hope	1				
Gnathaphanus picipes (Macleay)	1	1			
Gnathaphanus upolensis (Csiki)	1	1			
Stenolophus sp.	1	1			
<b>Cerambycidae</b>					
Ceresium unicolor (Fabricius)	1	1			
Curtomerus flavus (Fabricius)	1	1			
Gelonaetha hirta (Fairmaire)	1	1			

	Lualualei 1997	Halona 1997	Halona 2015	Halona 2016–17	Halona 2017
<i>OPSIS</i>					
<i>OPSIS</i> <i>nutator</i> (Fabricius)	1	1			
<i>PHORACANTHA</i>					
<i>PHORACANTHA</i> <i>semipunctata</i> (Fabricius)	1	1			
<i>PLACOSTERNUS</i>					
<i>PLACOSTERNUS</i> <i>crnicornis</i> {Chevrolat}	1	1		1	
<i>PTEROLOPHIA</i>					
<i>PTEROLOPHIA</i> <i>camura</i> Newman	1	1			
<i>SYBRA</i>					
<i>SYBRA</i> <i>alternans</i> (Wiedemann)	1	1			1
<b>CHRYSOMELIDAE</b>					
<i>DIACHUS</i>					
<i>DIACHUS</i> <i>auratus</i> (Fabricius)	1	1			
<i>OCTOTOMA</i>					
<i>OCTOTOMA</i> <i>scabripennis</i> Guerin-Meneville	1	1			
<i>UROPLATA</i>					
<i>UROPLATA</i> <i>girardi</i> Pic	1	1			
<b>CIIDAE</b>					
gen. sp. B	1				
gen. sp. A	1	1			
<b>COCCINELLIDAE</b>					
<i>CRYPTOLAEMUS</i>					
<i>CRYPTOLAEMUS</i> <i>montrouzieri</i> Mulsant	1	1			
<i>CURINUS</i>					
<i>CURINUS</i> <i>coeruleus</i> (Mulsant)	1	1		1	
<i>HALMUS</i>					
<i>HALMUS</i> <i>chalybeus</i> (Boisduval)	1				
<i>NEPHUS</i>					
<i>NEPHUS</i> <i>bilucernarius</i> (Mulsant)	1	1			
<i>OLLA</i>					
<i>OLLA</i> <i>v-nigrum</i> (Mulsant)	1	1	1		
<i>ORCUS</i>					
<i>ORCUS</i> <i>australasiae</i> (Boisduval)	1	1			
<i>RHYZOBIOUS</i>					
<i>RHYZOBIOUS</i> <i>forestieri</i> (Mulsant)	1	1			
<i>SCYMNUS</i>					
<i>SCYMNUS</i> sp.	1	1			
<i>STICHOLOTIS</i>					
<i>STICHOLOTIS</i> <i>ruficeps</i> Weise	1	1			
<i>TELSIMIA</i>					
<i>TELSIMIA</i> <i>nitida</i> Chapin	1	1			
<b>COLYDIIDAE</b>					
<i>PENTHELISPA</i>					
<i>PENTHELISPA</i> <i>rufipennis</i> (Montrouzier)	1				
<b>CORYLOPHIDAE</b>					
<i>GRONEVUS</i> <i>rotundus</i> (Sharp)	1				1
<i>GRONEVUS</i> sp.	1				
<i>ORTHOOPERINI</i> sp. (not <i>Orthoperus aequalis</i> Sharp)	1				
<i>SERICODERUS</i>					
<i>SERICODERUS</i> <i>pubipennis</i> Sharp	1	1		1	1
<b>CURCULIONIDAE</b>					
<i>ACALLES</i> sp.					1
<i>ANOTHEORUS</i>					
<i>ANOTHEORUS</i> sp.	1				
<i>ASYNONYCHUS</i>					
<i>ASYNONYCHUS</i> <i>godmanni</i> Crotch	1	1			1
<i>DRYOPHTHORUS</i>					
<i>DRYOPHTHORUS</i> <i>distinguendus</i> Perkins	1	1			
<i>OODEMAS</i>					
<i>OODEMAS</i> <i>punctulatissimum</i> Perkins	1	1			
<i>OXYDEMA</i>					
<i>OXYDEMA</i> <i>fusiforme</i> Wollaston	1	1			
<i>PENTARTHURUS</i>					
<i>PENTARTHURUS</i> sp.				1	
<i>PHOLIDOPHORUS</i>					
<i>PHOLIDOPHORUS</i> <i>advena</i> Zimmerman	1	1			
<i>RHYNCOGONUS</i>					
<i>RHYNCOGONUS</i> <i>welchii</i> Perkins	1	1			
<i>SIBINIA</i>					
<i>SIBINIA</i> sp.	1	1			
<b>DERMESTIDAE</b>					
<i>ORPHINUS</i>					
<i>ORPHINUS</i> <i>terminalis</i> (Sharp)	1				
<b>DYTISCIDAE</b>					

	Lualualei 1997	Halona 1997	Halona 2015	Halona 2016–17	Halona 2017
Rhantus pacificus (Boisduval)	1				
Rhantus pseudopacificus Balke	1	1			
<b>Elateridae</b>					
Chalcolepidius erythroloma Candeze	1				
Conoderus exsul (Sharp)	1	1			1
<b>Endomychidae</b>					
Eidoreus minutus Sharp	1				
<b>Hydrophilidae</b>					
Cryptopleurum minutum (Fabricius)	1				
Enochrus sayi Gundersen	1				
Helochares sp.	1				
Tropisternus lateralis humeralis Motschulsky	1				
<b>Jacobsoniidae</b>					
Derolathrus atomus Sharp	1	1			
<b>Languriidae</b>					
<i>Cryptophilus integer</i> (Heer)	1				1
<b>Lathridiidae</b>					
Corticaria longicollis (Zetterstedt)	1				
<b>Mycetophagidae</b>					
Litargus vestitus Sharp	1				
<b>Nitidulidae</b>					
<i>Carpophilus dimidiatus</i> (Fabricius)					1
Carpophilus hemipterus (Linnaeus)	1				
Carpophilus humeralis (Fabricius)	1	1			
Carpophilus mutilatus Erichson	1				
Carpophilus oculatus Murray				1	1
Epuraea (Haptoncus) mundus Sharp	1	1			
Epuraea (Haptoncus) ocularis (Fairmaire)	1	1		1	
Nesopeplus roridus Sharp	1				
Phenolia limbata tibialis (Boheman)				1	1
Soronia variegata Macleay	1	1			
Stelidota geminata (Say)				1	1
<b>Ptiliidae</b>					
Ptiliodes sp.	1				
gen. sp.	1				
<b>Rhizophagidae</b>					
Hesperobaenus capito (Fairmaire)	1		1		
<b>Scarabaeidae</b>					
Adoretus sinicus Burmeister	1	1			
Copris incertus prociuus Say	1	1			
Onthophagus incensus Say	1	1			
<b>Scirtidae</b>					
gen. sp.	1				

	Lualualei 1997	Halona 1997	Halona 2015	Halona 2016–17	Halona 2017
<b>Scolytidae</b>			1		1
<i>Chryphalus sylvicola</i> (Perkins)	1		1		
<i>Hypothenemus crudiae</i> (Panzer)	1				
<i>Hypothenemus eruditus</i> (Westwood)	1				
<i>Hypothenemus seriatus</i> (Eichhoff)					1
<i>Wallacellus denticulatus</i> (Motschulsky)				1	
<i>Xyleborinus andrewsi</i> (Blandford)			1	1	1
<i>Xyleborinus saxeseni</i> (Ratzeburg)	1		1		
<i>Xyleborus affinis</i> Eichhoff	1				1
<i>Xyleborus ferrugineus</i> (Fabricius)	1	1			1
<i>Xyleborus interjectus</i> Blandford	1				1
<i>Xyleborus lanaiensis</i> Perkins	1	1	1		
<i>Xyleborus perforans</i> (Wollaston)	1	1	1		1
<i>Xyleborus spinulosus</i> Blandford			1		1
<i>Xylosandrus compactus</i> (Eichhoff)			1		1
<i>Xylosandrus crassiusculus</i> (Motschulsky)					1
<b>Silvanidae</b>					
<i>Cryptamorpha desjardinsi</i> (Guérin-Méneville)	1	1	1		
<i>Psammoechus</i> sp.	1				
<b>Staphylinidae</b>					
<i>Aleocara</i> sp.				1	
<i>Anotylus</i> sp. prob. <i>nitidifrons</i> (Wollaston)			1		1
<i>Atheta coriaria</i> (Kraatz)	1				
<i>Atheta</i> sp. (not <i>coriaria</i> )	1				1
<i>Coproporus</i> sp.	1				
<i>Ctenandropus</i> sp.	1				
<i>Philonthus discoideus</i> (Gravenhorst)	1				
<i>Philonthus longicornis</i> Stephens	1	1			
<i>Philonthus</i> sp.	1				
<i>Philonthus</i> sp. (Newton sp. 1)	1				
<i>Philonthus turbidus</i> Erichson	1	1			
<i>Sunius</i> sp.	1	1			1
<i>Thyrecephalus albertisi</i> (Fauvel)	1	1			
gen. sp.	1				
gen. sp. (Piestinae)	1	1			
<b>Tenebrionidae</b>					
<i>Blapstinus dilatatus</i> Le Conte	1				
<i>Gnathocerus cornutus</i> (Fabricius)	1				
<i>Platydema subfascia</i> (Walker)	1				
<b>COLLEMBOLA</b>					
<b>Entomobryidae</b>					
<i>Entomobrya nyhusae</i> Christiansen & Bellinger	1				
<i>Salina celebensis</i> (Schäffer)			1	1	

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<b>Hypogastruridae</b>					
Neanura sp.	1				
<b>Neelidae</b>					
Neelus minutus Folsom	1				
<b>Sminthuridae</b>					
gen. spp. (2)	1		1		1
<b>DERMAPTERA</b>					
<b>Carcinophoridae</b>					
Euborellia annulipes (Lucas)	1	1			
Euborellia eteronoma (Borelli)	1	1			1
<b>Chelisochidae</b>					
Chelisoches morio (Fabricius)	1				
<b>Labiidae</b>					
Sphingolabis hawaiiensis (Bormans)	1				
Spirolabia dubronyi (Hebard)	1	1			1
<b>DICTYOPTERA</b>					
<b>Blaberidae</b>					
Diploptera punctata (Eschscholtz)	1	1			
<i>Pycnoscelus indicus</i> (Fabricius)	1				1
<b>Blattellidae</b>					
Balta notulata (Stål) [= Onchostylus notulatus]			1	1	1
Balta similis (Saussure)	1	1			
Balta sp. (not similis)	1	1			
Blattella germanica (Linnaeus)	1	1			
Blattella lituricollis (Walker)	1				
Lobopterella dimidiatipes (Bolivar)				1	1
<b>Blattidae</b>					
Periplaneta americana (Linnaeus)	1				
<i>Periplaneta australasiae</i> (Fabricius)	1				1
Platyzosteria soror (Brunner)	1	1			
<b>Polyphagidae</b>					
Euthyrrhapha pacifica (Coquebert)	1				
<b>DIPLOPODA</b>					
<b>Cambalidae</b>					
Nannolene sp.	1	1			
<b>Paradoxosomatidae</b>					
Asiomorpha coarctata (Saussure)	1				
Oxidus gracilis (C.L. Koch)	1				
<b>Polyxenidae</b>					
<i>Polyxenus</i> sp.	1				1
<b>Pyrgodesmidae</b>					
<i>Aporodesminus wallacei</i> Silvestri	1				1
<b>Spirobolidae</b>					
Spirobolellus immigrans (Chamberlain)	1				

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<b>DIPTERA</b>					
<b>Agromyzidae</b>					
Amauromyza maculosa (Malloch)	1				
Liriomyza sp. nr. sativae Blanchard	1	1			
Melanagromyza metallica Thomson	1				
Phytoliriomyza montana Frick	1	1			
Pseudonapomyza spicata (Malloch)	1				
<b>Anthomyiidae</b>					
Anthomyia vicarians Schiner	1				
<b>Asteiidae</b>					
Asteia sabroskyi Hardy & Delfinado	1	1			
<b>Calliphoridae</b>					
Calliphora vomitoria (Linnaeus)	1				
Chrysomya megacephala (Fabricius)	1	1	1		
Dyscritomyia cuprea James	1	1			
Dyscritomyia fasciata (Grimshaw)	1	1			
Dyscritomyia limbipennis (Thomson)	1	1			
Lucilia sp. nr. cuprina (Wiedemann)	1				
Lucilia sericata (Meigen)	1				
Melinda pusilla (Villeneuve)	1				
<b>Cecidomyiidae</b>					
Dasineura mangiferae Felt	1		1		
<b>Ceratopogonidae</b>					
Forcipomyia hardyi Wirth & Howarth	1	1	1		
<b>Chironomidae</b>					
Chironomus hawaiiensis Grimshaw	1				
Corynoneura sp.	1				
Cricotopus bicinctus (Meigen)	1				
Orthocladius sp. nr. wirthi Hardy	1				
Orthocladius williamsi Hardy	1	1			
<b>Chloropidae</b>					
Cadrema pallida (Loew)				1	1
Conioscinella formosa (Becker)	1	1			
Gaurax bicoloripes (Malloch)	1	1			
Rhodesiella scutellata (Meijere)	1	1	1		1
<b>Cryptochetidae</b>					
Cryptochetum iceryae (Williston)	1	1			
<b>Culicidae</b>					
Aedes albopictus (Skuse)	1		1	1	1
<b>Dixidae</b>					
Dixa longistyla Takahashi	1				
<b>Dolichopodidae</b>					
Campsicnemus gloriosus Van Duzee	1				
Campsicnemus halonae Evenhuis	1	1			

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<b>Campsicnemus hao (flightless)</b>					1
Campsicnemus miser Parent	1	1			
Campsicnemus patellifer Grimshaw	1	1			
Campsicnemus planitibia Parent	1				
Chrysosoma globiferum (Wiedemann)	1	1	1		1
Chrysotus longipalpis Aldrich	1		1		
Dolichopus exsul Aldrich	1				
Eurynogaster sp.	1				
Medetera griseascens Meijere	1				
Pelastoneurus lugubris Loew	1	1			
Syntormon flexibile Becker	1				
Tachytrechus sp.	1				
<b>Drosophilidae</b>					
Chymomyza procnemis (Williston)	1				
Dettopsomyia formosa Lamb	1				
Drosophila cf. ?hydei				1	
Drosophila immigrans Sturtevant	1		1	1	1
Drosophila nasuta Lamb				1	
Drosophila cf. ?repleta				1	
Drosophila simulans				1	
Drosophila sulfigaster bilimbata Bezzi	1			1	
Drosophila suzukii (Matsumura)	1	1		1	1
Drosophila tamashiroi Hardy	1	1			
Scaptomyza buccata Hackman	1				
Stegana sp.	1				
Zaprionus indianus (Gupta)				1	1
<b>Empididae</b>					
Hemerodromia stellaris Melander	1				
<b>Ephydriidae</b>					
Brachydeutera hebes Cresson	1				
Donaceus nigronotatus Cresson	1				
Hydrellia williamsi Cresson	1				
Nostima niveivenosa Cresson	1				
Scatella hawaiiensis Grimshaw	1				
<b>Keroplattidae</b>					
Tylparua hawaiiensis (Grimshaw)	1				
<b>Lauxaniidae</b>					
<b>Homoneura hawaiiensis (Grimshaw)</b>					1
Homoneura unguiculata (Kertész)	1	1	1		1
Poecilominettia sexseriata Hendel	1	1			1
<b>Limoniidae</b>					
Dicranomyia hawaiiensis Grimshaw	1	1	1		
Dicranomyia jacobae Alexander	1				
Dicranomyia perkinsi (Grimshaw)	1	1			



	Lualualei 1997	Halona 1997	Halona 2015	Halona 2016–17	Halona 2017
<i>Dicranomyia stygipennis</i> Alexander			1		
<i>Dicranomyia swezeyi</i> Alexander	1		1		
<b>Lonchaeidae</b>					
<i>Lonchaea polita</i> Say	1				
<b>Micropezidae</b>					
<i>Taenaptera angulata</i> (Loew)	1				
<b>Milichiidae</b>					
<i>Desmometopa inaurata</i> Lamb	1	1			
<b>Muscidae</b>					
<i>Atherigona orientalis</i> Schiner	1	1			
<i>Atherigona reversura</i> Villeneuve	1	1			
<i>Brontaea quadristigma</i> (Thomson)	1	1			
<i>Haematobia irritans</i> (Linnaeus)	1				
<i>Lispocephala</i> sp.	1				
<i>Stomoxys calcitrans</i> (Linnaeus)	1				
<b>Neriidae</b>					
<i>Telostylinus lineolatus</i> (Wiedemann)	1		1	1	1
<b>Phoridae</b>					
<i>Chonocephalus</i> sp.	1				
<i>Diplonevra peregrina</i> (Wiedemann)				1	1
<i>Dohrniphora cornuta</i> (Bigot)	1				
<i>Megaselia furcatilis</i> Beyer				1	
<i>Megaselia</i> sp.	1				
<i>Puliciphora</i> sp.	1	1	1	1	1
<b>Psychodidae</b>					
<i>Psychoda</i> sp. nr. <i>wirthi</i> Quate	1		1		
<b>Rhiniidae</b>					
<i>Rhinia apicalis</i> (Wiedemann)	1				
<b>Sarcophagidae</b>					
<i>Helicobia morionella</i> (Aldrich)	1	1			
<i>Johnsonia elegans</i> Coquillett	1	1			
<i>Parasarcophaga ruficornis</i> (Fabricius)	1				
<i>Sarcophagula occidua</i> (Fabricius)	1	1			
<i>Seniorwhitea reciproca</i> (Walker)	1				
<b>Scatopsidae</b>					
<i>Holoplagia guamensis</i> (Johanssen)			1		
<b>Scenopinidae</b>					
<i>Scenopinus adventicius</i> Hardy	1	1			
<i>Scenopinus lucidus</i> Becker	1			1	1
<b>Sciaridae</b>					
<i>Bradysia molokaiensis</i> (Grimshaw)	1				
<i>Ctenosciara hawaiiensis</i> (Hardy)	1				
<b>Sepsidae</b>					
<i>Sepsis</i> sp.	1	1			

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<i>Sepsis thoracica</i> (Robineau-Desvoidy)	1				
<b>Sphaeroceridae</b>					
<i>Leptocera abdominiseta</i> (Duda)	1				
<i>Leptocera</i> ( <i>Coproica</i> ) sp.	1	1			
<i>Poecilosomella punctipennis</i> (Wiedemann)	1	1	1	1	1
<i>Spinilimosina rufifrons</i> (Duda)				1	
<b>Stratiomyidae</b>					
<i>Gobertina picticornis</i> Bigot	1				
<i>Hermetia illucens</i> (Linnaeus)	1	1			1
<i>Merosargus</i> sp.	1				1
<b>Syrphidae</b>					
<i>Allograpta exotica</i> (Wiedemann)	1				
<i>Allograpta obliqua</i> (Say)	1	1			1
<i>Copestylum apicale</i> (Loew)	1	1			
<i>Copestylum tamaulipanum</i> (Townsend)	1				
<i>Eristalinus arvorum</i> (Fabricius)	1				
<i>Eumerus aurifrons</i> (Wiedemann)	1				
<i>Ocyptamus dimidiatus</i> (Fabricius)			1		
<i>Ornidia obesa</i> (Fabricius)	1	1	1	1	
<i>Syritta</i> sp.			1		
<i>Toxomerus marginatus</i> (Say)	1	1			
<b>Tachinidae</b>					
<i>Archytas cirphis</i> Curran	1	1			
<i>Chaetogaedia monticola</i> (Bigot)	1				
<i>Eucelatoria armigera</i> (Coquillett)	1	1			
<i>Lespesia archippivora</i> (Riley)	1	1			
<i>Trichopoda pilipes</i> (Fabricius)	1	1			
<b>Tephritidae</b>					
<i>Acinia picturata</i> (Snow)	1	1			
<i>Bactrocera cucurbitae</i> (Coquillett)	1	1			1
<i>Bactrocera dorsalis</i> (Hendel)			1		
<i>Ensina sonchi</i> (Linnaeus)	1				
<i>Eutreta xanthochaeta</i> Aldrich	1				
<i>Procecidochares alani</i> Steyskal	1				
<i>Tetraeuaesta obscuriventris</i> (Loew)	1				
<b>Ulidiidae</b>			1		
<i>Acrosticta apicalis</i> (Williston)	1	1			
<i>Euxesta stigmatais</i> Loew	1	1			
<i>Notogramma cimiciforme</i> Loew	1				
<b>Xylomyidae</b>					
<i>Solva</i> sp.				1	1
<b>EMBIIDINA</b>					
<b>Oligotomidae</b>					
<i>Oligotoma saundersii</i> (Westwood)	1	1		1	1

	Lualualei 1997	Halona 1997	Halona 2015	Halona 2016–17	Halona 2017
<b>HETEROPTERA</b>					
<b>Anthocoridae</b>					
Paratriphleps laeviusculus Champion	1				
<b>Cydnidae</b>					
Geotomus pygmaeus (Dallas)	1	1			
Rhytidoporus indentatus Uhler	1	1			
<b>Lygaeidae</b>					
Metrarga nuda White	1	1			
Nysius communis Usinger	1				
Pachybrachius sp.	1	1			
<b>Miridae</b>					
Halticus bractatus (Say)	1	1			
Hyalopeplus pellucidus (Stal)	1	1			
Kamehameha n.sp.	1				
Koanoa n.sp.	1				
Lygus (prob.) sp. (not elisae)	1	1			
Nesidiorchestes hawaiiensis Kirkaldy	1	1			
Orthotylus n.sp. A [sensu Asquith]	1				
Orthotylus n.sp. B [sensu Asquith]	1				
Orthotylus n.sp. C [sensu Asquith]	1				
Orthotylus n.sp. D [sensu Asquith]	1				
Orthotylus sp.	1				
Rhinacloa forticornis Reuter	1				
Stenotus sp. (not binotatus)	1	1			
Taylorilygus (prob.) pallidulus (Blanchard)	1	1			
<b>Nabidae</b>					
Nabis blackburni White	1	1			
Nabis sp.	1	1			
<b>Pentatomidae</b>					
Nezara viridula (Linnaeus)	1	1			
Plautia stali Scott	1	1			
<b>Plataspidae</b>					
Coptosoma xanthogramma (White)	1	1			
<b>Reduviidae</b>					
Empicoris rubromaculatus (Blackburn)	1	1			
Gallobelgicus saevus Bergroth				1	
Haematoloecha rubescens Distant	1	1			
Zelus renardii Kolenati	1				
<b>Rhopalidae</b>					
gen. sp.	1	1			
<b>Tingidae</b>					
Corythucha morrilli Osborn & Drake	1	1			
Leptobyrsa decora Drake	1	1			

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<i>Teleonemia scrupulosa</i> Stal	1	1			
<b>Veliidae</b>					
<i>Microvelia vagans</i> White	1				
<b>HOMOPTERA</b>					
<b>Aphididae</b>					
<i>Aphis gossypii</i> Glover	1				
<i>Aphis</i> sp.	1		1		1
<b>Aphrophoridae</b>					
<i>Clastoptera xanthocephala</i> Germar	1	1	1		
<b>Cicadellidae</b>					
<i>Cameocephala sagittifera</i> (Uhler)	1	1			
<i>Linnavouriella</i> sp.	1				
<i>Nesosophryne</i> sp. nr. <i>myrsines</i> Kirkaldy	1	1			1
<i>Sophonia rufofascia</i> (Kuoh & Kuoh)	1	1			1
<b>Cixiidae</b>					
<i>Oliarus discrepans</i> Giffard	1				
<i>Oliarus kaiulani</i> Giffard	1	1			
<i>Oliarus</i> sp. prob. <i>olympus</i> Giffard	1	1			
<i>Oliarus</i> sp.	1	1			1
<b>Coccidae</b>					1
<i>Ceroplastes rubens</i> Maskell	1				
<b>Delphacidae</b>					
<i>Aloha artemisiae</i> (Kirkaldy)	1				
<i>Aloha campylothecae</i> Muir	1				
<i>Aloha swezeyi</i> Muir	1				
<i>Dictyophorodelphax mirabilis</i> Swezey	1				
<i>Nesosydne</i> sp.	1				
<i>Nesothoe terryi</i> Kirkaldy	1	1			
<i>Perkinsiella saccharicida</i> Kirkaldy	1				
<b>Flatidae</b>				1	
<i>Melormenis basalis</i> (Walker)	1	1	1		
<i>Siphanta acuta</i> (Walker)	1	1			
<b>Membracidae</b>					
<i>Vanduzeeea segmentata</i> (Fowler)	1				
<b>Psyllidae</b>					
<i>Heteropsylla mimosae</i> Crawford	1				
<i>Heteropsylla</i> sp.	1	1			
<i>Kuwayama pisonia</i> Caldwell	1				
<i>Trioza</i> sp.	1				
<b>Tropiduchidae</b>				1	
<i>Kallitaxila granulata</i> (Stal)				1	
<b>HYMENOPTERA</b>					
<b>Agaonidae</b>					
<i>Pleistodontes</i> sp.	1				1

	Lualualei 1997	Halona 1997	Halona 2015	Halona 2016–17	Halona 2017
gen. sp. (Epicichrysomallinae)	1	1			
<b>Ampulicidae</b>					
<i>Ampulex compressa</i> (Fabricius)					1
<b>Anthophoridae</b>					
<i>Xylocopa sonorina</i> F. Smith	1				
<b>Aphelinidae</b>					
<i>Aphelinus</i> sp.	1	1			
<b>Aphidiidae</b>					
<i>Aphidius smithi</i> Sharma & Rao	1	1			
<i>Lysiphlebus testaceipes</i> (Cresson)	1	1			
<b>Apidae</b>					
<i>Apis mellifera</i> Linnaeus	1	1	1		1
<b>Bethylidae</b>					
<i>Epyris extraneus</i> Bridwell	1	1			
<i>Epyris</i> sp. (not extraneus)	1				
<i>Sierola</i> sp.	1	1			1
gen. sp.	1				
<b>Braconidae</b>					
<i>Apanteles</i> sp.	1				
<i>Apanteles trifasciatus</i> Muesebeck	1	1			
<i>Aphaereta pallipes</i> (Say)	1				
<i>Glyptocolastes</i> sp.	1				
<i>Macrocentrus calacte</i> Nixon	1	1			
<i>Meteorus laphygmae</i> Viereck	1	1			
<i>Ontsira palliatus</i> (Cameron)	1	1			
<i>Opius dissitus</i> Muesebeck	1	1			
<i>Opius incisi</i> Silvestri	1	1			
<i>Opius lantanae</i> Bridwell	1				
<i>Phanerotoma hawaiiensis</i> Ashmead	1	1			
<i>Phanerotoma myeloisae</i> Fullaway	1	1			
<i>Rhaconotus vagrans</i> (Bridwell)	1	1			
<i>Spathius prusias</i> Nixon	1	1			
<i>Stenocorse bruchivora</i> (Crawford)	1	1			
<b>Ceraphronidae</b>					
<i>Ceraphron plebeius</i> Perkins	1				
<b>Chalcididae</b>					
<i>Antrocephalus apicalis</i> (Walker)	1				
<i>Conura</i> sp.	1	1			
<i>Dirhinus anthracia</i> Walker	1	1			
<i>Dirhinus</i> sp.	1	1			
<b>Chrysididae</b>					
<i>Trichrysis triacantha</i> (Mocsary)	1		1		
<b>Colletidae</b>					
<i>Hylaeus</i> spp.	1	1			

	Lualualei 1997	Halona 1997	Halona 2015	Halona 2016–17	Halona 2017
<b>Diapriidae</b>					
Stylaclista sp.	1				
Trichopria sp.	1	1			1
<b>Encyrtidae</b>					
Aenasius advena Compere	1	1			
Anagyrus sp.	1				
Blepyrus sp.	1				
Cheiloneuromyia javensis Girault	1				
Copidosoma sp.	1	1			
Encyrtus sp.	1	1			
Homalotylus sp.	1				
Microterys flavus (Howard)	1				
Prochiloneura rex (Girault)	1				
<b>Eucoilidae</b>					
gen. sp.	1				
<b>Eulophidae</b>					
<i>Aprostocetus cf hagenowii</i> (Ratzeburg)					1
Euderus sp. nr. metallicus (Ashmead)	1	1			
Euplectrus platyhyphenae Howard	1	1			1
Setelacher fasciatus Soucek	1				
Symplesis sp.	1				
gen. sp. (Entedoninae)	1				
gen. sp. (Tetrastichinae)	1	1			
<b>Eupelmidae</b>					
gen. #1 sp.	1				
gen. #2 sp.	1				
gen. #3 sp.	1				
Anastatus sp.	1	1			
Eupelmus sp.	1	1			
Reikosiella melina Yoshimoto	1	1			
<b>Eurytomidae</b>					
Eurytoma tephritidis Fullaway	1	1			
Sycophila sp.	1				
<b>Evaniidae</b>					
Evania sp. prob. appendigaster (Linnaeus)	1		1		
<b>Formicidae</b>					
Anoplolepis gracilipes [was longipes]	1	1	1	1	1
Cardiocondyla emeryi Forell			1		
Leptogenys falcigera Roger			1		1
Pheidole megacephala (Fabricius)	1	1	1		1
Pseudomyrmex gracilis mexicanus (Roger)	1				
Solenopsis papuana Emery			1	1	1
Technomyrmex albipes (F. Smith)	1	1	1		

	Lualualei 1997	Halona 1997	Halona 2015	Halona 2016–17	Halona 2017
Technomyrmex difficilis Forel				1	1
gen. sp. A	1	1			
gen. sp. B	1				
<b>Halictidae</b>			1		
Halictus sp.	1				
<i>Lasioglossum impavidum</i> (Sandhouse)					1
<b>Heloridae</b>					
Helorus ruficomis Foerster	1	1			
<b>Ichneumonidae</b>					
Barichneumon californicus Heinrich	1	1			
Casinarina infesta (Cresson)	1	1			
Diadegma blackbumi (Cameron)	1	1			
Echthromorpha agrestoria fuscator (Fabricius)	1	1			
Echthromorpha sp. (not fuscator)	1	1			
Enicospilus sp.	1	1			
Gotra sp.	1	1			
Hyposoter exiguae (Viereck)	1	1			
Pachysomoides stupidus (Cresson)	1				
Pimpla punicipes Cresson	1	1			1
Pristomerus sp.	1				
Rubicundiella perturbatrix Heinrich	1				
Trathala flavoorbitalis (Cameron)	1	1			
Tromatobia ovivora (Boheman)	1	1			
gen. sp. (Gelinae)	1				
<b>Mymaridae</b>			1		
<i>Gonatocerus dolichocerus</i> Ashmead	1				1
Polynema sp.	1	1			1
<b>Platygastridae</b>					
gen. #1 sp.	1				
gen. #2 sp.	1				
gen. #3 sp.	1				
gen. #4 sp.	1	1			
<b>Pompilidae</b>					
Anoplius Juctuosus (Cresson)	1				
Tachypompilus analis (Fabricius)	1	1			
<b>Proctotrupidae</b>					
Brachyserphus hawaiiensis (Ashmead)	1			1	
<b>Pteromalidae</b>					
Callocleonimus swezeyi (Yoshimoto & Ishii)	1				
Pteromalus sp.	1				
Trichomalus sp.	1	1			
<b>Scelionidae</b>					
Anteromorpha dubiosa (Perkins)	1				

	Lualualei 1997	Halona 1997	Halona 2015	Halona 2016–17	Halona 2017
Aporophlebus sp.	1				
Baryconus sp.	1				
Caenoteleia elegans (Perkins)	1				
<i>Dyscritobaeus comitans</i> Perkins					1
Telenomus sp. A	1	1			
Telenomus sp. B	1				
Trissolcus basalis (Wollaston)	1	1			
<b>Sphecidae</b>					
Ampulex compressa (Fabricius)	1	1	1		
Chalybion bengalense (Dahlbom)	1				
Dolichurus stantoni (Ashmead)	1		1		
Ectemnius sp. A	1	1			
Ectemnius sp. B	1	1			
Ectemnius sp. C	1	1			
Isodontia mexicana (Saussure)	1				
Pison insulare F. Smith	1	1	1		
Pison iridipenne F. Smith	1	1			
Tachysphex apicalis Fox	1				
Tachysphex morosus (F. Smith)	1	1			
Trypoxylon bicolor F. Smith	1				
Trypoxylon philippinense Ashmead	1				
gen. sp. (Pemphredoninae)	1				
<b>Torymidae</b>					
Megastigmus transvaalensis (Hussey)	1	1			
Megastigmus sp.	1	1			
Torymus advenus (Osten Sacken)	1	1			
<b>Trichogrammatidae</b>					
gen. sp.					
<b>Vespidae</b>					
Delta campaniforme campaniforme (Fabricius)	1				
Delta curvata (Saussure)	1				
<i>Delta pyriformis philippinense</i> (Bequaert)	1				1
Odynerus pseudochromoides Perkins	1	1			
Odynerus sp.	1	1			
Odynerus sp. nr. waianaeanus	1				
Pachyodynerus nasidens (Latreille)	1				
Polistes aurifer Saussure	1	1			
Polistes exclamans Viereck			1		1
<b>ISOPODA</b>					
<b>Armadillidae</b>					
Reductoniscus costulatus Kesselyak	1				
<b>Philosciidae</b>					
Australophiloscia societatis (Maccagno)	1	1		1	
Burmoniscus meeusi (Holthuis)	1				



	Lualualei 1997	Halona 1997	Halona 2015	Halona 2016–17	Halona 2017
Burmoniscus okinawaensis (Nunomura)	1	1			
<b>Platyarthridae</b>					
Trichorhina tomentosa (Budde-Lund)	1	1			
<b>Porcellionidae</b>					
Porcellio laevis Latreille	1	1	1	1	1
Porcellio scaber Latreille	1			1	
Porcellionides pruinosus (Brandt)	1	1			
<b>Styloniscidae</b>					
Clavigeroniscus riquieri (Arcanelli)	1	1			
Styloniscus spinosus (Patience)	1	1			
<b>Trachelipidae</b>					
Nagurus cristatus (Dollfus)	1				
<b>ISOPTERA</b>					
<b>Kalotermitidae</b>					
Neotermes connexus Snyder	1	1			1
<b>Rhinotermitidae</b>					
Coptotermes formosanus Shiraki	1				
<b>LEPIDOPTERA</b>					
<b>Alucitidae</b>					
Alucita objurgatella (Walsingham)	1	1			
<b>Cosmopterigidae</b>					
Hyposmocoma sp. A	1				
Hyposmocoma sp. B	1				
Hyposmocoma sp. C	1				
<b>Crambidae</b>					
Euchromius ocelleus (Haworth)	1	1			
Eudonia geraea (Meyrick)	1				
Eudonia n. sp. 1 [of Munroe]	1	1			
Eudonia n. sp. 2 [of Munroe]	1	1			
Eudonia n. sp. 3 [of Munroe]	1				
Eudonia ombrodes (Meyrick)	1				
Glyphodes sp. nr. cyanomichla Meyrick	1	1			
Herpetogramma licarsisalis (Walker)	1	1			
Mestolobes sp. prob. minuscula (Butler)	1	1			
Nomophila noctuella (Denis & Schiffermueller)	1	1			
Otthomecyna sp. nr. exigua (Butler)	1				
Otthomecyna sp.	1	1			
Salbia haemorrhoidalis Guenee	1	1			
Spoladea recurvalis (Fabricius)	1	1			
Tamsica sp. nr. oxyptera (Meyrick)	1				
Tamsica sp.	1	1			
<b>Gelechiidae</b>					
Crasimorpha infuscata Hodges	1				

	Lualualei 1997	Halona 1997	Halona 2015	Halona 2016–17	Halona 2017
<b>Geometridae</b>					
Anacamptodes fragilaria (Grossbeck)	1	1			
Cyclophora nanaria (Walker)	1				
Euacidalia brownsvillea Cassino	1	1			
Eupithecia sp.	1				
Macaria abydata Guenee	1	1			
<b>Hesperiidae</b>					
Hylephila phyleus (Drury)	1			1	
<b>Lycaenidae</b>					
<i>Strymon bazochii</i> (Godart)	1				1
Udara blackburni (Tuely)	1	1			
<b>Noctuidae</b>					
Achaea janata (Linnaeus)	1	1			
Agrotis ipsilon (Hufnagel)	1	1			
Anomis flava (Fabricius)	1	1			
Ascalapha odorata (Linnaeus)	1				
Athetis thoracica Moore	1	1			
Callopietria maillardi Guenee	1				
Chrysodeixis eriosoma (Doubleday)	1	1			
Elaphria nucicolora (Guenee)	1	1			
Hypena laceratalis Walker	1	1			
Hypocala deflorata (Fabricius)	1	1			
Leucania striata Leech	1	1			
Lycophotia porphyrea (Denis & Schiffermüller)	1	1			
Megalographa biloba (Stephens)	1				
Melipotis indomita (Walker)	1	1			
Neogalea sunia (Guenee)	1	1			
Ophiusa disjungens (Walker)	1	1			
Pandesma anysa Guenee	1	1			
Penicillaria jocosatrix Guenee	1	1			
Spodoptera mauritia (Boisduval)	1	1			
<b>Nymphalidae</b>					
<i>Agraulis vanillae</i> (Linnaeus)	1				1
Danaus plexippus (Linnaeus)	1	1			
Vanessa sp. ( cardui or virginiensis)	1	1			
Vanessa cardui (Linnaeus)	1	1			
Vanessa tameamea Eschscholtz	1				
<b>Oecophoridae</b>					
Stoeberhinus testaceus Butler	1	1			
Thyrocopa sapindiella Swezey	1				
Thyrocopa sp.	1				
<b>Papilionidae</b>					
Papilio xuthus Linnaeus	1	1			

	Lualualei 1997	Halona 1997	Halona 2015	Halona 2016–17	Halona 2017
<b>Pieridae</b>					
<i>Pieris rapae</i> (Linnaeus)	1	1			
<b>Psychidae</b>					
<i>Brachycyttarus griseus</i> De Joannis	1				
<b>Pterophoridae</b>					
<i>Anstenoptilia marmorodactyla</i> (Dyar)	1	1			
<i>Stenoptilodes littoralis littoralis</i> (Butler)	1	1			
<b>Pyralidae</b>					
<i>Homoeosoma albosparsum</i> (Butler)	1	1			
<b>Sphingidae</b>					
<i>Agrius cingulata</i> (Fabricius)	1	1			
<i>Daphnis nerii</i> (Linnaeus)				1	
<i>Hyles calida</i> (Butler)	1	1			
<i>Hyles lineata</i> (Fabricius)	1				
<i>Hyles wilsoni perkinsi</i> (Swezey)	1	1			
<i>Macroglossum pyrrhostictum</i> (Butler)	1	1			
<i>Psilogramma menephron</i> (Cramer)	1	1			
<b>Tineidae</b>					
<i>Decadarchis simulans</i> (Butler)	1	1			
<i>Opogona omoscropa</i> (Meyrick)	1				
<i>Opogona</i> sp.	1				
<b>Tortricidae</b>					
<i>Amorbia emigratella</i> Busck	1	1			
<i>Cryptophlebia illepida</i> (Butler)	1	1			
<i>Cydia</i> sp.	1				
<i>Eccoptocera</i> sp.	1	1			
<i>Episimus utilis</i> Zimmerman	1	1	1		
<i>Platynota stultana</i> Walsingham	1	1			
<i>Spheterista</i> sp.	1				
<b>MANTODEA</b>					
<b>Mantidae</b>					
<i>Brunneria borealis</i> Scudder	1		1		
<b>NEUROPTERA</b>					
<b>Chrysopidae</b>					
<i>Anomalochrysa</i> sp.	1	1			
<i>Anomalochrysa sylvicola</i> Perkins	1	1			
<i>Mallada basalis</i> (Walker)	1	1			
<b>Hemerobiidae</b>					
<i>Micromus timidus</i> Hagen	1	1			
<i>Micromus vagus</i> (Perkins)	1				
<b>ODONATA</b>					
<b>Aeshnidae</b>					
<i>Anax junius</i> (Drury)	1				
<i>Anax strenuus</i> Hagen	1				

	Lualualei 1997	Halona 1997	Halona 2015	Halona 2016–17	Halona 2017
<b>Coenagrionidae</b>					
Ischnura posita (Hagen)	1				
Ischnura ramburii (Selys-Longchamps)	1				
<b>Libellulidae</b>					
Orthemis ferruginea (Fabricius)	1				
Pantala flavescens (Fabricius)	1		1		1
Tramea abdominalis (Rambur)	1				
<b>ORTHOPTERA</b>					
<b>Acrididae</b>					
Oedaleus abruptus {Thunberg}	1				
Schistocerca nitens (Thunberg)	1				
<b>Gryllidae</b>					
Gryllus bimaculatus DeGeer	1				
Laupala sp. nr. hapapa Otte	1				
<b>Tetrigidae</b>					
Paratettix mexicanus (Saussure)	1				
<b>Tettigoniidae</b>					
Conocephalus saltator (Saussure)	1	1			
Elimaea punctifera (Walker)	1				
Euconocephalus nasutus {Thunberg}	1	1			
Phaneroptera furcifera Stal	1				
Xiphidiopsis lita Hebard	1	1			
<b>PSEUDOSCORPIONIDA</b>					
<b>Undetermined family</b>					
gen. sp.	1	1			
<b>PSOCOPTERA</b>					
<b>Ectopsocidae</b>					
Ectopsocus sp.	1				
<b>SCHIZOMIDA</b>					
<b>Schizomidae</b>					
Schizomus siamensis (Hansen)	1				
<b>STREPSIPTERA</b>					
<b>Elenchidae</b>					
Elenchus sp.	1	1			
<b>TRICHOPTERA</b>					
<b>Hydropsychidae</b>					
Cheumatopsyche pettiti (Banks)	1				
<b>Hydroptilidae</b>					
Oxyethira maya Denning	1				
<b>total Halona</b>	<b>637</b>	<b>334</b>	<b>75</b>	<b>52</b>	<b>89</b>
new records for Lualualei			21	19	12
new records for Halona			40	23	26