

The Distribution and Island Endemism of Hawaiian
Delphacidae (Homoptera) with Additional
Lists of Their Food Plants.

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(Presented at the meeting of December 1, 1921.)

In presenting the following tables as a guide and check list to such as may be interested in this group of our endemic leaf-hoppers, the compiler wishes to digress somewhat from the introductory remarks which such tables might ordinarily occasion. Because our endemic leaf-hoppers, like some others elsewhere, do not particularly affect agricultural interests, and therefore are of no special economic importance, some may wonder why so much interest is taken in their biology and morphology by our local entomologists. There are several reasons for this. First, because of several very injurious species of hoppers, not so very far from our gates, which as yet have not reached Hawaii; and, second, because the sugar cane leaf-hopper (*Perkinsiella saccharicida*), which cost this Territory losses of many millions of dollars in 1903, 1904 and subsequent years, is, as it were, the foundation-stone of economic entomology in Hawaii. Not only was this Delphacid responsible for large money losses, but it was also the cause for organizing in 1903 of a large staff of entomologists for biological research and field work in the Territory, and the building up of such organizations as the Experimental Station of the Hawaiian Sugar Planters' Association and the Territorial Board of Agriculture and Forestry and its Plant Quarantine and Inspection Department. It is therefore not surprising that the many families and groups of leaf-hoppers distributed through both continents are of more than passing interest to some of our systematic as well as economic workers. The systematic study of these families or groups, whether local or foreign, is quite necessary because, with Hawaii as the "Cross Roads of the Pacific" and in almost daily steamship communication with many tropical or sub-tropical regions, there is always the possibility that one or more of several known species of hoppers

or other injurious insects may be accidentally introduced. In this connection, as an instance, it might here be recorded that in 1913 Mr. J. C. Bridwell, while in Nigeria, West Africa, collected there among other material for study in Honolulu, a small Delphacid, allied to our own sugar cane leaf-hopper, which Mr. Muir later described as *Megamelus flavolineatus*. During the past year Mr. Muir has received collections of leaf-hoppers from Porto Rico (where insects of some sort are carrying mosaic disease in sugar cane) and among these he found this West African species of which Mr. Wolcott, the entomologist in Porto Rico, remarks: "The identification of *M. flavolineatus* was especially fortunate, as this is a cane insect which may become a serious pest." The fact, therefore, that these insects convey many plant diseases also makes their study necessary for economic work. Knowledge acquired purely from scientific studies sooner or later is the foundation of applied practices, as is well instanced in the "Fauna Hawaiiensis," without which we never could have handled our local entomological problems with the same degree of certainty.

The present tables summarize our knowledge of the distribution of the endemic Delphacidae in our islands and further adds to the lists of their food plants as previously published.* As is to be expected, the species having *all* or many long-winged forms have a wider distribution than those having only a few or *no* long-winged forms. The comparative paucity of *Alohini* on Kauai and comparative richness of *Leialohini* is of interest and may indicate that that island was separated from the others before the arrival of Delphacidae in the Archipelago. The distribution shows the value of segregation in species formation, which fact is also shown by the lists of food plants. Those species living on two or more plants show much greater variability than those confined to a single plant. When we consider the topography of the islands, the isolated distribution of many plants and the fact that so many species are represented only by short-winged forms or by only an occasional long-winged form, we can see how isolation can take place even on the same island.

* Proc. Haw. Ent. Soc. III, No. 4, May, 1917, p. 339 et seq.

BIBLIOGRAPHY *

- (1) Fauna Hawaiiensis, 1908, Vol. II, Part 6.
 - (2) Proc. Haw. Ent. Soc., 1905-1907, Vol. I, Parts 1-5.
 - (2a) *op. cit.* 1910, Vol. II, Part 3.
 - (3) *op. cit.* 1916, Vol. III, Part 3.
 - (4) *op. cit.* 1917, Vol. III, Part 4.
 - (5) *op. cit.* 1918, Vol. III, Part 5.
 - (6) *op. cit.* 1919, Vol. IV, Part 1.
 - (7) *op. cit.* 1921, Vol. IV, Part 3.
 - (8) *op. cit.* 1922, Vol. V, Part 1.
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* The references include only such papers as give descriptions, notes, and observations.

TABLE I.

Island Distribution of Hawaiian Delphacidae *

ALOHINI	Macrop- terous Form		Brachyp- terous Form		Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	Bibliography†
	Male	Fe- male	Male	Fe- male							
Leialoha											
nanicola.....(Kirk)	X	X				X				X	(1) p. 580; (3) p. 172
lehuae.....(Kirk)	X	X			X	X	X				(1) p. 581; (3) p. 172; (8) p. 91
oahuensis.....Muir	X	X				X	X				(3) 173; (4) 300
hawaiiensis.....Muir	X	X								X	(3) 173; (4) 300; (5) 409
mauiensis.....Muir	X	X							X		(6) 87; (7) 509
lanaiensis.....Muir	X	X					X				(4) 299
kauaiensis.....Muir	X	X			X						(3) 173; (8) 93
suttoniae.....Muir	X	X			X						(8) 92
scævolæ.....Muir	X	X			X						(8) 93
ohia.....(Kirk)	X	X			X	X				X	(1) 581; (3) 174
oceanides.....(Kirk)	X	X			X						(1) 580 (Aloha); (3) 174; (8) 92
pacifica.....(Kirk)		X			?		?				(1) 581
Nesodryas											
freycinetiae.....Kirk	X	X				X					(1) 596; (3) 175
giffardi.....Kirk	X	X				X					(1) 597; (3) 175
elaecarpi.....Kirk	X	X				X					(1) 596; (3) 175
eugeniae.....Kirk	X	X				X	X				(1) 597; (3) 175; (4) 301
antidesmae.....Muir	X	X				X					(4) 300
dodonaee.....Muir	X	X			X						(3) 176; (8) 95
Nesodryas (Nesothoë)											
fletus.....(Kirk)	X	X					X	X			(1) 592; (3) 176; (4) 302; (6) 87
dryope.....Kirk	X	X			X	X			X		(1) 597; (3) 176; (4) 301; (5) 409
haa.....Muir	X	X							X		(7) 509
munroi.....Muir	X	X					X		X		(4) 303; (6) 87
gulieki.....Muir	X	X				X					(3) 177; (4) 301; (6) 87
albuguttata.....Muir	X				X						(8) 94
semialba.....Muir	X	X			X						(8) 95
terryi.....(Kirk)	X	X				X					(1) 594; (4) 301
bobeae.....(Kirk)	X	X				X					(1) 593; (3) 177
piilani.....(Kirk)	X	X				X	X				(1) 594; (3) 178; (4) 301
maculata.....Muir	X	X					X		X		(3) 177; 302; 409
perkinsi.....(Kirk)	X	X				X					(1) 593; (3) 178
seminigrofrons.....Muir	X	X			X						(8) 94
hula.....(Kirk)	X	X			X						(1) 592; (3) 178; (8) 93
laka.....(Kirk)	X	X							X		(1) 594; (3) 178; (6) 87

*Islands showing ? mark opposite three species are included in the summaries and tables of island endemism.

†See page 105 for list of references.

TABLE I—Continued.

ALOHINI	Macrop- terous Form		Brachyp- terous Form		Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	Bibliography
	Male	Fe- male	Male	Fe- male							
<i>Nesodryas</i> (Nesothoë)—cont.d.											
<i>pluvialis</i>(Kirk)		X			X						(1) 595; (3) 178
<i>silvestris</i>(Kirk)		X					X				(1) 595; (3) 178
<i>frigidula</i>(Kirk)		X							X		(1) 593; (3) 178
<i>Aloha</i>											
<i>ipomoeae</i>Kirk		X	X	X	X	X	X	X	X	X	(1) 581; (3) 178; (6) 88
<i>myoporica</i>Kirk			X	X			X		X		(1) 581; (3) 179; (4) 303; (5) 410; (7) 510
<i>plectranthi</i>Muir			X	X		X					(3) 179
<i>kirkaldyi</i>Muir			X	X		X					(3) 180
<i>swezeyi</i>Muir		X	X	X	X	X				X	(3) 180; (4) 303; (5) 410; (8) 96
<i>flavocollaris</i>Muir			X	X		X					(3) 181
<i>dubautiae</i>(Kirk)			X	X		X					(1) 583 (Nesopleias); (3) 182
<i>artemisiae</i>(Kirk)			X	X		X					(2a) 118 (Nesopleias); (3) 182
<i>campylothecae</i>Muir			X	X		X					(3) 183; (4) 303
<i>Nesorestias</i>											
<i>filicicola</i>Kirk			X	X		X					(1) 583
<i>nimbata</i>(Kirk)			X	X		X					(1) 582
<i>Nothorestias</i>											
<i>badia</i>Muir			X			X					(4) 304
<i>swezeyi</i>Muir			X	X		X					(8) 87
<i>Dictyophorodelphax</i>											
<i>mirabilis</i>Swezey			X	X		X					(2) 104; (3) 184; (4) 279
<i>swezeyi</i>Bridwell			X	X		X					(5) 386
<i>praedicta</i>Bridwell			X	X				X			(6) 72
<i>Ilburnia</i>											
<i>koae</i>(Kirk)	X	X	X	X	?	X				X	(1) 583; (2) 161, 208 fig.; (3) 185; (5) 410
<i>rubescens</i>(Kirk)	X	X			X	X			X	X	(1) 584; (2) 202; (5) 411; (6) 90; (8) 96
<i>rubescens</i> var. <i>pulla</i>(Muir)	X	X				X				X	(3) 186; (5) 411
<i>koae-phylopii</i>(Muir)	X	X			X	?					(3) 186; (8) 96
<i>pilo</i>Muir		X	X	X				X			(8) 99
<i>coprosmicola</i>Muir			X	X					X		(6) 103; (7) 516
<i>pseudo-rubescens</i>(Muir)	X	X						X	X		(3) 186; (5) 411; (6) 88
<i>swezeyi</i>(Muir)			X			X					(3) 187
<i>anceps</i>(Muir)			X	X					X		(3) 187; (5) 411
<i>nephelias</i>(Kirk)			X	X			X				(1) 588; (3) 197; (4) 308
<i>nigriceps</i>(Muir)			X	X			X				(4) 308
<i>cyrtandricola</i>(Muir)			X	X					X		(5) 406, 412
<i>dubautiae</i>Muir			X	X					X		(7) 510
<i>pele</i>(Kirk)	X	X								X	(1) 585; (3) 188; (4) 304
<i>raillardicola</i>Muir			X	X					X		(6) 102

TABLE I—Continued.

ALOHINI	Macrop- terous Form		Brachyp- terous Form		Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	Bibliography
	Male	Fe- male	Male	Fe- male							
Ilburnia—continued											
nesopele.....Muir			X	X					X		(7) 511
oahuensis.....(Muir)			X	X		X					(3) 188
stenogynicola.....Muir			X	X					X		(6) 94
campylothecae.....Muir			X	X	X						(8) 97
mamake.....Muir			X	X					X		(6) 101
cyrtandrae.....(Muir)			X						X		(3) 189
timberlakei.....(Muir)			X			X					(4) 304
phyllostegiae.....(Muir)	X		X	X					X		(5) 405, 412
kokolau.....Muir			X	X					X		(6) 95
neocyrtandrae.....(Muir)			X	X					X		(6) 100
gouldiae.....(Kirk)			X	X		X					(1) 586; (3) 189
nephrolepidis.....(Kirk)			X	X		X			X		(1) 586; (2) 203; (3) 189
blackburni.....(Muir)	X	X	X	X		X			X	X	(3) 189; (4) 308; (5) 411; (6) 108; (7) 514
curvata.....Muir			X						X		(6) 96
aku.....Muir			X	X						X	(7) 513
perkinsi.....(Muir)			X						X		(3) 190
nesogunnerae.....(Muir)			X	X				X			(4) 305
gunnerae.....Muir			X	X		X					(4) 305
disjuncta.....Muir			X	X				X			(4) 306
amamau.....Muir			X	X					X		(7) 512
painiu.....Muir			X	X					X		(6) 102
neowailupensis.....Muir			X	X		X					(3) 191 (N. wailupensis); (6) 108
lobeliae.....(Muir)			X	X		X					(3) 212; (4) 306; (6) 108; (7) 520
waikamoienis.....Muir			X	X					X		(6) 97; (7) 514
wailupensis.....(Muir)			X	X		X					(3) 181 (Aloha)
boehmeriae.....Muir			X	X		X					(7) 514
viridis.....Muir			X	X	X						(8) 99
kuschei.....Muir			X	X	X						(8) 96
pipturi.....(Kirk)			X	X		X	X				(1) 584; (1) 202; (3) 191
chambersi.....(Kirk)			X	X					X		(1) 590; (1) 202; (3) 192; (7) 515
osborni.....(Muir)			X	X					X		(3) 192; (6) 99
acuta.....Muir			X	X					X		(6) 96
geranii.....Muir			X	X					X		(7) 515
naenae.....Muir			X	X	X						(8) 98
cyathodis.....(Kirk)			X	X					X		(1) 589; (3) 192; (6) 91
var. fullawayi.....(Muir)			X	X		X					(3) 192; (6) 91
var. lanaiensis.....(Muir)			X	X				X	X		(4) 309; (6) 92
var. nigrinervis.....Muir			X	X					X		(6) 92
var. eeke.....Muir			X	X					X		(6) 92
incommoda.....(Muir)			X	X		X					(3) 193
ahinahina.....Muir			X						X		(6) 98 (pulla); (8)
mauiensis.....Muir			X	X					X		(6) 99
sulcata.....Muir			X	X					X		(7) 516
leahi.....(Kirk)	X	X	X	X	X	X					Ent. 1904 p. 176 (Megamelus) (2) 202; (3) 193

TABLE I—Continued.

ALOHINI	Macrop- terous Form		Brachyp- terous Form		Kauai	Oahu	Molokai	Lana'i	Maui	Hawaii	Bibliography
	Male	Fe- male	Male	Fe- male							
Ibturnia—continued											
monticola..... (Kirk)			X	X					X		(1) 591; (3) 197; (6) 90
rallardiae..... (Kirk)		X	X	X						X	(1) 590; (2) 203; (3) 194; (4) 309; (7) 516
coprosmae..... Muir			X	X					X		(6) 93
neorallardiae..... Muir			X	X						X	(7) 517
ipomoecicola..... (Kirk)	X	X	X	X	X	X				X	(1) 588; (2) 202; (3) 194; (5) 412; (7) 517; (8) 96
longipes..... Muir			X	X					X		(6) 93
halia..... (Kirk)			X	X		X					(1) 584; (2) 202; (3) 194
giffardi..... (Muir)			X	X		X					(3) 194
montis-tantalus..... (Muir)			X	X		X					(3) 195
sharpi..... (Muir)			X	X		X					(3) 195
asteliae..... (Muir)			X	X		X					(4) 307
koebelei..... (Muir)			X	X		X					(4) 308
gigantea..... Muir			X	X		X					(7) 517
rocki..... (Muir)			X	X		X					(3) 196
haleakala..... (Kirk)				X					X		(1) 587; (3) 197
argyroxiphii..... (Kirk)			X	X					X		(1) 590; (2) 203; (3) 197; (6) 89.
procellaris..... (Kirk)			X	X			X				(1) 588; (3) 197
umbratica..... (Kirk)	?	?	?	?						X	(1) 585
hamadryas..... (Kirk)		X				X					(1) 587
palustris..... (Kirk)			X				X				(1) 589; (2) 202
nubigena..... (Kirk)			X				X				(1) 589
imbricola..... (Kirk)			X						X		(1) 590
sola..... (Muir)			X			X					(4) 307
hamata..... (Muir)			X	X				X			(4) 309
tetramolopii..... Muir			X	X					X		(6) 88
bridwelli..... Muir			X	X					X		(6) 90
olympica..... Muir			X	X		X					(7) 520
ulehihi..... Muir			X	X						X	(6) 104
DELPHACINI											
Kelisia											
sporobolocola..... Kirk		X	X	X	X	X			X	X	(1) 578; (4) 310; (6) 86; (7) 509
var. immaculata..... Muir			X	X						X	(7) 509
swezeyi..... Kirk		X	X	X	X	X					(1) 578; (4) 310; (7) 509; (8) 102
eragrosticola..... Muir		X	X	X					X		(6) 85
emoloe..... Muir			X	X		X					(4) 311
†paludum..... Kirk			X	X		X					(1) 579; (4) 310
Perkinsiella											
†saccharicida..... Kirk	X	X	X	X	X	X	X	X	X	X	
Peregrinus											
†maidis..... (Ashm.)	X	X	X	X	X	X	X	X	X	X	

†Introduced species.

TABLE I—Continued.

Summary of Genera and Species Described from all Islands

Genera	Species
Leialoha.....	12
Nesodryas.....	6
Nesodryas (Nesothoë).....	18
Aloha.....	9
Nesorestias.....	2
Nothorestias.....	2
Dictyophorodelphax.....	3
Ilburnia.....	87
†Kelisia.....	6
*Perkinsiella.....	1
*Peregrinus.....	1
Total.....	147

*Recent introduction.

†One species (*K. paludum*) cosmopolitan.

TABLE II.

Total Species on Each Island

Genera	Kauai	Oahu	Molokai	Lanai	Maui	Hawaii
Leialoha.....	7	4	1	3	1	3
Nesodryas.....	1	5	0	1	0	0
Nesodryas (Nesothoë).....	6	5	1	5	2	6
Aloha.....	2	8	1	2	1	3
Nesorestias.....	0	2	0	0	0	0
Nothorestias.....	0	2	0	0	0	0
Dictyophorodelphax.....	0	2	0	0	1	0
Ilburnia.....	9	30	5	6	35	19
Kelisia.....	2	4	0	0	2	2
Perkinsiella.....	1	1	1	1	1	1
Peregrinus.....	1	1	1	1	1	1
	29	64	10	19	44	35

TABLE III.

Single Island Endemism*

Islands	Leialoha	Alohae	Delphacini	Total
Kauai.....	10	4	0	14
Oahu.....	6	33	2	41
Molokai.....	0	3	0	3
Lanai.....	2	5	0	7
Maui.....	2	31	1	34
Hawaii.....	3	13	1	17
	23	89	4	116

*The tables of Island Endemism include *Kelisia paludum*, a cosmopolitan species, but not the recent introductions, *Perkinsiella saccharicida* and *Peregrinus maidis*.

TABLE III—Continued.

Species Included in Single Island Endemism

Genera	Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	Total
Leialoha.....	4	0	0	1	1	1	7
Nesodryas.....	1	4	0	0	0	0	5
Nesodryas (Nesothoë).....	5	3	0	1	1	2	12
Aloha.....	0	6	0	0	0	0	6
Nesorestias.....	0	2	0	0	0	0	2
Nothorestias.....	0	2	0	0	0	0	2
Dictyophorodelphax.....	0	2	0	0	1	0	3
Ilburnia.....	4	20	3	5	30	13	75
Kelisia.....	0	2	0	0	1	1	4
	14	41	3	7	34	17	116

Species Included in Two Island Endemism

	Nesodryas					Totals	
	Leialoha	Nesodryas	(Nesothoë)	Aloha	Ilburnia		Kelisia
Kauai + Oahu.....	0	0	0	0	2	1	3
Kauai + Molokai.....	1	0	0	0	0	0	1
Oahu + Molokai.....	0	0	0	0	1	0	1
Oahu + Lanai.....	1	1	0	0	0	0	2
Oahu + Hawaii.....	1	0	1	0	2	0	4
Molokai + Lanai.....	0	0	1	0	0	0	1
Molokai + Maui.....	0	0	0	0	1	0	1
Lanai + Maui.....	0	0	1	0	1	0	2
Lanai + Hawaii.....	0	0	2	1	0	0	3
Maui + Hawaii.....	0	0	0	1	0	0	1
	3	1	5	2	7	1	19

Species Included in Three Island Endemism

	Leialoha	Aloha	Ilburnia	Total
Kauai + Oahu + Lanai.....	1	0	0	1
Kauai + Oahu + Hawaii.....	2	1	2	5
Oahu + Maui + Hawaii.....	0	0	1	1
	3	1	3	7

Species Included in Four Island Endemism

	Ilburnia	Kelisia	Total
Kauai + Oahu + Maui + Hawaii.....	1	1	2

Species Included in Six Island Endemism

	Aloha
Kauai + Oahu + Molokai + Lanai + Maui + Hawaii.....	1

TABLE IV.

*ADDITIONS TO REFERENCE LIST OF HAWAIIAN DELPHACIDAE WITH THEIR FOOD PLANTS.†

Leialoha.

- L. oahuensis* Muir. *Metrosideros polymorpha* (4) long series, Munro, December, 1916.
- L. mawiensis* Muir. *Coprosma montana* (6) series both sexes and young, Giffard and Fullaway, May, 1918.
- L. lanaiensis* Muir. *Metrosideros polymorpha* (4) Munro, November, 1916.
- L. kauaiensis* Muir. *Metrosideros polymorpha* (3) Swezey, February; (8) Swezey, August, 1921.
- L. hawaiiensis* Muir. *Metrosideros collina polymorpha* (4) long series, with young, January, 1917.
- L. suttoniae* Muir. *Suttonia sandwicensis* (8) series both sexes, Swezey, August, 1921.
- L. scaevolae* Muir. *Scaevola chamissoniana* (8) long series, both sexes, August, 1921.

Nesodryas.

- N. giffardi* Kirk. *Cyrtandra* sp. (4) *Rollandia grandiflora* (4) Giffard, October, 1917.
- N. fletus* (Kirk.). *Antidesma platyphyllum* (6) one female, May, 1918, Giffard and Fullaway.
- N. gulicki* Muir. *Euphorbia* sp. (6) series, Giffard and Muir, December, 1918; *Metrosideros collina polymorpha* var. *glaberrima* (6) large series both sexes, August, 1918, Giffard.
- N. perkinsi* (Kirk.). *Metrosideros polymorpha* var. (4) small series, Giffard and Fullaway, November, 1916.
- N. munroi* Muir. *Dodonaea viscosa* var. *spathulata* (6) long series both sexes and young, Giffard, July, 1918.
- N. piilani* (Kirk.). *Osmanthus sandwicensis* (6) Munro, December, 1916.
- N. haa* Muir. *Antidesma platyphyllum* (7) large series both sexes, August, 1918; January, September, 1919, Giffard.
- N. laka* (Kirk.). *Sida* sp. (8) small series both sexes and young, Bridwell, August, 1918.
- N. hula* (Kirk.). *Sideroxylon* sp. (8) series both sexes, Swezey, August, 1921; *Osmanthus* sp. (8) series both sexes, Swezey, August, 1921.
- N. seminigrofrons* Muir. *Campylothea* sp. (8) one female, one male, Swezey, August, 1921.

* Continued from Proc. Haw. Ent. Soc. III, 4, 1917, p. 339 et seq.

† (3) refers to Proc. Haw. Ent. Soc. 1916, III, 3; (4) op. cit. 1917, III, 4; (5) op. cit. 1918, III, 5; (6) op. cit. 1919, IV, 1; (7) op. cit. 1921, IV, 3; (8) op. cit. 1922, V, 1.

- N. alboguttata* Muir. *Antidesma* sp. (8) one male, Swezey, August, 1921.
- N. semialba* Muir. *Osmanthus* sp. (8) one female, one male, Swezey, August, 1921.
- N. dodonaeae* Muir. *Dodonaea* sp. (8) three males, nine females; *Alphitonia* sp. (8) one male, five females, Swezey, August, 1921.

Aloha.

- A. ipomoeae* Kirk. *Ipomoea pentaphylla* (6) series both sexes, Giffard and Fullaway, May, 1918.
- A. swezeyi* Muir. *Cheirodendron gaudichaudii* (5) long series both sexes and nymphs, Giffard, August, 1917; long series both sexes and nymphs off *Bidens pilosa* (5) Giffard, August, 1917; *Campylotheca* sp. (8) series both sexes, Swezey, August, 1921.

Nothorestias.

- N. swezeyi* Muir. *Aspidium* sp. (8) Swezey, March, 1921.

Dictyophorodelphax.

- D. swezeyi* Brid. *Euphorbia celastroides* (5) small series, May, 1917; large series both sexes and young, February, 1918, Bridwell and Swezey.
- D. praedicta* Brid. *Euphorbia hookeri integrifolia* (6) large series both sexes and young, August-September, 1918, Bridwell.

Iiburnia.

- I. phyllostegiae* (Muir). *Phyllostegia racemosa* (5) long series both sexes and young, Giffard, August, 1917.
- I. cyrtandricola* (Muir). *Cyrtandra* sp. (5) long series both sexes and young, Giffard, August, 1917.
- I. anceps* (Muir). *Freycinetia arnotti* (5) four females and four males, Giffard, August, 1917.
- I. monticola* (Kirk.). *Coprosma montana* (6) long series and young, Bridwell, August, 1918.
- I. tetramolopii* Muir. *Tetramolopium humile* (6) long series and young, Bridwell, August, 1918.
- I. bridwelli* Muir. *Argyroxiphium virescens* (6) small series and young, Bridwell, August, 1918.
- I. longipes* Muir. *Cyrtandra mauiensis* (6) small series both sexes, Giffard and Fullaway, May, 1918.
- I. coprosmae* Muir. *Coprosma montana* (6) long series both sexes, Giffard and Fullaway, May, 1918.
- I. stenogynicola* Muir. *Stenogyne kamehamehae* (6) series both sexes, Giffard and Fullaway, May, 1918.
- I. kokolau* Muir. *Campylotheca* sp. (6) one male, two females, Bridwell, August, 1918.
- I. dubautiae* Muir. *Dubautia plantaginea* (7) Timberlake, July, 1919.

- I. nesopéle* Muir. *Astelia veratroides* (7) series both sexes, Timberlake, July, 1919.
- I. amamau* Muir. *Sadleria* sp. (7) very large series both sexes, and young, Timberlake, July, 1919.
- I. aku* Muir. *Cyanea tritomantha* (7) series both sexes, Giffard, January, 1919.
- I. boehmeriae* Muir. *Boehmeria* sp. (7) small series and young, Swezey, August, 1919.
- I. geranii* Muir. *Geranium arboreum* (7) large series both sexes and young, Timberlake, July, 1919.
- I. sulcata* Muir. *Cyrtandra* sp. (7) small series both sexes and young, Timberlake, July, 1919.
- I. blackburni* (Muir). *Charpentiera obovata* (5) series both sexes and young, Giffard, August, 1917; *Strongylodon lucidum* (5) series both sexes, Giffard, August, 1917; *Touchardia latifolia* (5) small series both sexes and young (dark form), Giffard, August, 1917; *Cyanea hammatiflora* (6) small series both sexes, Rock, August, 1918; *Clermontia coerulea* (7) series both sexes, Timberlake, August, 1919; *Urera sandwicensis* (7) series both sexes and young, Giffard, August, 1918.
- I. neoraillardiae* Muir. *Lipochaeta subcordata* (7) very large series both sexes and young, Giffard.
- I. gigantea* Muir. *Pritchardia* sp. (7) one male only, Swezey, August, 1920.
- I. olympica* Muir. *Lobelia* sp. (7) small series both sexes, Swezey, August, 1920.
- I. chambersi* (Kirk.). *Raillardia ciliolata* (7) small series, Giffard, July, 1919.
- I. cyathodis* var. *lanaiensis* (Muir). *Cyathodes* sp. (6) small series, Bridwell, August, 1918.
- I. cyathodis* var. *nigrinervis* Muir. *Cyathodes* sp. (6) long series, Bridwell, August, 1918.
- I. cyathodis* subsp. *ecke* Muir. *Argyroziphium* sp. (6) long series, Rock, August, 1918.
- I. curvata* Muir. *Cyrtandra* sp. (6) one female only, Giffard and Fullaway, May, 1918.
- I. acuta* Muir. *Cyrtandra mauiensis* (6) small series both sexes, Bridwell, August, 1918.
- I. waikamoensis* Muir. *Cyanea aculeatiflora* (6) small series and young, Rock, August, 1918; *Cyanea* sp. (7) series both sexes and young, Timberlake, July, 1919.
- I. ahinahina* Muir. *Argyroziphium* sp. (6) (8) one male only, Rock, August, 1918.
- I. mauiensis* Muir. *Campylotheca mauiensis* (6) very long series both sexes and young, Giffard and Fullaway, May, 1918.
- I. neocyrtandrae* Muir. *Gunnera petaloidea* (6) long series, Rock, August, 1918.

- I. mamake* Muir. *Pipturus* sp. (6) long series and young, Rock, August, 1918.
- I. raillardicola* Muir. *Raillardia menziesii* and *R. platyphylla* (6) long series and young, Bridwell and Swezey, August, 1918.
- I. raillardiae* (Kirk.). *Raillardia scabra* and *R. ciliolata* (7) long series and young, Giffard, July, 1918.
- I. painiu* Muir. *Astelia veratroides* (6) small series both sexes, Bridwell, August, 1918.
- I. coprosmicola* Muir. *Coprosma ernodioides* (6) long series both sexes and young, Giffard, August, 1918.
- I. ulehihi* Muir. *Smilax sandwicensis* (6) three females and three males, Giffard, August, 1918.
- I. nephrolepidis* (Kirk.). *Nephrolepis exaltata*,* January, August, 1918, January, August, 1919, series both sexes and young, Giffard.
- I. ipomoeicola* (Kirk.). *Gouldia elongata*, *Antidesma* sp., and *Cyrtandra* sp. (5) small series with young in instances, Giffard, August, 1917 (probably accidental captures); *Strongylodon lucidum* (5) long series both sexes and young, Giffard, August, 1917; *Mucuna gigantea* (7) series both sexes and young, Giffard, August, 1918; *Polygonum* sp., *Pipturus* sp., and *Rumex* sp. (8) long series both sexes and young, Swezey, August, 1921.
- I. lobeliae* (Muir). *Kadua glomerata* (6) small series both sexes, Timberlake, September, 1918.
- I. viridis* Muir. *Phyllostegia* sp. (8) small series both sexes, Swezey, August, 1921.
- I. naenae* Muir. *Dubautia* sp. (8) series both sexes, Swezey, August, 1921.
- I. campylothecae* Muir. *Campylotheca* sp. (8) small series both sexes, Swezey, August, 1921.
- I. kuschei* Muir. *Cyrtandra* sp. (8) three females and young, Swezey, August, 1921.
- I. koae-phyllodii* (Muir). *Acacia koa* (8) small series, Swezey, August, 1921.
- I. pilo* Muir. *Coprosma ernodioides* (8) very large series both sexes and young, Timberlake, July, 1919.

Kelisia.

- K. sporobolicola* Kirk. *Eragrostis atropioides* (6) long series, Bridwell, August, 1918; *Eragrostis* sp. (7) one female, one

* The full series were taken two or three at a time on several occasions on several large plants growing in the "Algae steam crack" on the larva flow, within a few hundred yards of the active crater. The heat near steam vents in the crack prevented close collecting. This so-called algae steam crack was since covered by the flow of 1920.

male, Swezey, September, 1920; series, Timberlake, July, 1919.

K. eragrosticola Muir. *Eragrostis variabilis* (6) long series both sexes and young, Giffard and Fullaway, May, 1918.

K. swezeyi Kirk. *Eragrostis* sp. (7) small series, Swezey, September, 1920; *Eragrostis* sp. (8) small series, Swezey, August, 1921.

K. sporobolocola immaculata Muir. *Deschampsia australis* (7) long series both sexes and young, August, September, 1919, Timberlake, Giffard; *Vincentia angustifolia* (7) series both sexes and young (dark var.), Giffard, September, 1919.

Perkinsiella.

* *P. saccharicida* Kirk. (Sugar cane leaf hopper.) Widely distributed on sugar cane since 1902.

Peregrinus.

* *P. maidis* (Ashm.). (Corn leaf hopper.) Widely distributed on Indian corn or maize since about 1880.

TABLE V.

ADDITIONS TO ALPHABETICAL LIST ** OF KNOWN HAWAIIAN FOOD-PLANTS † AND OF THE DELPHACIDAE ATTACHED THERETO.

Alphitonia excelsa Reiss. (Kauila). *Nesodryas dodonaeae* Muir.

Antidesma sp. (Hame). *Nesodryas alboguttata* Muir.

Antidesma platyphyllum Mann (Hame or Haa). *Nesodryas fetus* (Kirk.); *Nesodryas haa* Muir.

Argyroxiphium virescens Hbd. (Ahinahina). *Iburnia bridwelli* Muir.

Argyroxiphium sp. (Ahinahina). *I. cyathodis* subsp. *eeke*. Muir; *I. ahinahina* Muir.

Astelia veratroides Gaud. (Painiu). *I. painiu* Muir.

Bidens pilosa L. *Aloha swezeyi* Muir.

Boehmeria stipularis Wedd. (Akolea). *I. boehmeriae* Muir.

Campylotheca mauiensis Hbd. (Kokolau). *I. mauiensis* Muir.

Campylotheca sp. (Kokolau). *I. kokolau* Muir; *Nesodryas seminigrofrons* Muir; *I. campylothecae* Muir.

Charpentiera obovata Gaud. (Papala). *I. blackburni* (Muir).

Cheiodendron gaudichaudii (D. C.) Seem. (Olapa or Kauilamahu) *Aloha swezeyi* Muir.

Clermontia coerulea Hbd. (Haha). *I. blackburni* (Muir).

Coprosma ernodioides Gray (Kukainene) (gen. Pilo). *I. coprosmicola* Muir; *I. pilo* Muir.

* Accidentally introduced.

** Continued from Proc. Haw. Ent. Soc. III, 4, 1917, p. 345 et seq.

† Specific and native names after Hilbd. Flora Haw. Is. 1888; Rock, Indig. trees of Haw. 1913; Rock, Bot. Bull. No. 2, Bd. Ag. and For. 1913.

- Coprosma montana* Hbd. (Pilo). *Leialoha lehuae mauiensis* Muir; *I. coprosmae* Muir; *I. monticola* Muir.
- Cyanea aculeatiflora* Rock (Haha). *I. waikamoiensis* Muir.
- Cyanea hammatiflora* Rock (Haha). *I. blackburni* (Muir).
- Cyanea tritomantha* Gray (Aku). *I. aku* Muir.
- Cyathodes tameiameiae* Cham. (Pukeawe or Maieli). *I. cyathodis* var. *fullawayi* Muir; var. *lanaiensis* Muir; var. *nigrinervis* Muir.
- Cyrtandra mauiensis* Rock *I. longipes* Muir; *I. acuta* Muir.
- Cyrtandra* sp. *I. cyrtandricola* Muir; *I. sulcata* Muir; *I. curvata* Muir; *I. kuschei* Muir.
- Deschampsia australis* Nees. *Kelisia sporobolicola* var. *immaculata* Muir.
- Dodonaea viscosa* L. var. *spathulata* Sm. (Aalii or Kumakani). *Nesodryas munroi* Muir.
- Dodonaea* sp. (Aalii). *Nesodryas dodonaeae* Muir.
- Dubautia plantaginea* Gaud. (Naenae). *I. dubautiae* Muir.
- Dubautia* sp. (Naenae). *I. naenae* Muir.
- Eragrostis variabilis* Gaud. (Emoloa or Kalamalo). *Kelisia eragrosticola* Muir.
- Eragrostis atropioides* Hbd. (Emoloa). *Kelisia sporobolicola* Kirk.
- Eragrostis* sp. (Emoloa). *K. sporobolicola* Kirk; *K. swezeyi* Kirk.
- Euphorbia hookeri integrifolia* Hbd. (Akoko). *Dictyophorodelphax praedicta* Brid.
- Euphorbia celastroides* Boiss. (Akoko). *D. swezeyi* Brid.
- Euphorbia* sp. (Akoko). *Nesodryas gulicki* Muir.
- Freycinetia arnotti* Gaud. (Ie-ie). *I. anceps* (Muir).
- Geranium arboreum* Gray (Nohuanu). *I. geranii* Muir.
- Gunnera petaloidea* Gaud. (Apeape). *I. neocyrtandrae* Muir.
- Ipomoea pentaphylla* Jacq. (Kuahulu). *Aloha ipomoeae* Kirk.
- Eadua glomerata* Hook & Arn. (Pilo? or Au?) *I. lobeliae* Muir.
- Lipochaeta subcordata* Gray (Nehe). *I. neoraillardiae* Muir.
- Lobelia* sp. *I. olympica* Muir.
- Metrosideros polymorpha* Gaud. vars. (Ohia lehua). *L. lehuae mauiensis* Muir; *L. lehuae lanaiensis* Muir; *L. lehuae kauaiensis* Muir; *L. lehuae oahuensis* Muir; *Nesodryas perkinsi* (Kirk.).
- Mucuna gigantea* D. C. (Kaeëë). *I. ipomoeicola* (Kirk.).
- Nephrolepis exaltata* Schott. (Okupukupu, Nianian or Pamoho). *I. nephrolepides* (Kirk.).
- Osmanthus sandwicensis* (Gray) Knobl. (Pua or Ulupua). *Nesodryas pūlani* (Kirk.); *Nesodryas hula* (Kirk.); *Nesodryas semialba* Muir.
- Pelea* sp. (Alani). *Nesodryas hula* (Kirk.) (one specimen only).
- Phyllostegia* sp. (Ulihi). *I. viridis* Muir; *N. hula* (Kirk.) (one specimen only).
- Phyllostegia racemosa* Benth. (Kiponapona). *I. phyllostegiae* Muir.
- Pipturus albidus* Gray (Mamake). *I. mamake* Muir; *I. ipomoeicola* (Kirk.).
- Polygonum* sp. (Kamole). *I. ipomoeicola* (Kirk.).
- Pritchardia* sp. (Loulou and Hawane). *I. gigantea* Muir.

- Raillardia ciliolata* D. C. (Kupaua?). *I. chambersi* (Kirk.); *I. raillardiae* (Kirk.).
- Raillardia menziesii* Gray (Kupaua?). *I. raillardicola* Muir.
- Raillardia platyphylla* Gray (Kupaua?). *I. raillardicola* Muir.
- Raillardia scabra* D. C. (Kupaua). *I. raillardiae* (Kirk.).
- Rumex* sp. (Pawale or Uhaubako). *I. ipomoeicola* (Kirk.).
- Sadleria* sp. (Amaumau). *I. amamau* Muir.
- Saccharum officinarum* L. (Ko) Sugar Cane. *Perkinsiella saccharicida* Kirk.
- Scaevola chamissoniana* Gaud. (Naupaka). *Leialoha scaevolae* Muir.
- Sesbania tomentosa* Hook & Arn. (Ohai). *Aloha ipomoeae* (Kirk.).
- Sida* sp. (Ilima). *Nesodryas laka* (Kirk.).
- Sideroxylon* sp. (Alaa, Aulu or Kaulu). *Nesodryas hula* (Kirk.).
- Smilax sandwicensis* Kth. (Uhi, Ulehihi & Pioi). *I. ulehihi* Muir.
- Stenogyne kamehamehae* Waw. (Puaainaka, Maohiohi or Mohihi). *I. stenogynicola* Muir.
- Strongylodon lucidum* Seem. (Nukuwi or Kaiwi). *I. blackburni* (Muir); *I. ipomoeicola* (Kirk.).
- Suttonia* sp. (Kolea). *N. hula* (Kirk.) (two specimens only); *N. dodonaeae* Muir (one specimen only).
- Suttonia sandwicensis* (A. D. C.) Mez. (Kolea laulii). *Leialoha suttoniae* Muir.
- Tetramolopium humile* Hbd. *I. tetramolopii* Muir.
- Toucharia latifolia* Gaud. (Oloná). *I. blackburni* (Muir).
- Urera sandwicensis* Wedd. (Opuhe). *I. blackburni* (Muir).
- Vincentia angustifolia* Gaud. *Kelisia sporobolicola immaculata* Muir.
- Zea mays* L. (Maize or Indian Corn). *Peregrinus maidis* (Ashm.).

Notes and Observations on *Parandra puncticeps* Sharp (Coleoptera).

BY W. M. GIFFARD.

(Presented at the meeting of October 6, 1921.)

In July, 1921, the writer found in the dense, inside forest above the "twenty-nine mile" region in Olaa, Hawaii, at approximately 3800 feet elevation, a particularly rotted stump of *Suttonia*, which had been attacked by this Cerambycid. Due to its decayed condition and the absence of all bark, adult beetles were not seen, but a large number of the larvae and pupae were taken. The most part of these were preserved in alcohol for future study, but a number of the pupae were kept alive to be reared, and were later placed in a glass jar filled with the dry but rotted tree loam from the stump. By the end of August, eighteen adults (nine males and nine