

# Insects Infesting *Acacia koa* (Leguminosae) and *Metrosideros polymorpha* (Myrtaceae) in Hawaii: Annotated List

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## ABSTRACT

Phytophagous insects associated with *Acacia koa* and *Metrosideros polymorpha* in Hawaii are listed. Information on their distribution within the State and mode of damage to host is included.

*Koa* (*Acacia koa* Gray) and 'ohi'a-lehua (*Metrosideros polymorpha* Gaudichaud) are two of the most prominent native forest tree species in Hawaii. They cover 250.5 thousand hectares (619,000 acres) or 69% of all the native and naturalized forest land in the State. Forest insects are an important element in such a large native ecosystem. However, since Swezey's (1954) list of insects associated with 85 genera of Hawaiian forest plants was published, only a few papers have dealt with forest insects of Hawaii. Many new species have been recorded and specimens deposited in several local insect collections. Using Swezey's (1954) publication as a base, I added information from published papers, from insect reference collections of the Hawaii Department of Agriculture, University of Hawaii, the Bishop Museum, and from my personal collection and observations.

This paper presents an alphabetical list of phytophagous insects associated with *koa* and 'ohi'a-lehua in Hawaii and includes information on their distribution within the State and the mode of damage to the host. Most insects are endemic and one would expect the list to be incomplete, especially for higher elevations, where collections have been limited. Accidental insects and those that infest only dead tissue have been excluded.

Of the 192 species listed, the largest group belongs to the order Homoptera, in marked contrast to the preponderance of Lepidopteran and Coleopteran species associated with other tropical forest ecosystems (Gray 1972). Insects associated with *koa* and 'ohi'a-lehua are similar to other phytophagous insects in Hawaii in that they are usually restricted to a particular island and are usually host specific. *Plagithmysus* borers infesting 'ohi'a-lehua and *koa* are prime examples. The same is true of these troglobites adapted to environmental conditions of the lava cave dark zone that feed on 'ohi'a roots: crickets *Caconemobius varius* Gurney and Rentz and *Thaumatoeryllus* sp., planthoppers *Oliarus polyphemus* Fennah and *O. priola* Fennah, and the noctuid moth *Schrankia* sp.

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The following is a explanation of abbreviations and symbols used: Host — A = *Acacia koa*, M = *Metrosideros polymorpha*; Distribution — H = Hawaii, K = Kauai, L = Lanai, O = Oahu, Mu = Maui, Mk = Molokai, N = Niihau; Source — # = my personal observations or collection, + = Bishop Museum reference collection, / = University of Hawaii reference collection, @ = Hawaii State Department of Agriculture reference collection.

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TABLE 1. Phytophagous insects associated with *Acacia koa* and *Metrosideros polymorpha* in Hawaii.

| Order, family, and species                  | Host | Mode of damage  | Distribution | Source             |
|---------------------------------------------|------|-----------------|--------------|--------------------|
| <b>ORTHOPTERA</b>                           |      |                 |              |                    |
| <b>Gryllidae</b>                            |      |                 |              |                    |
| <i>Caconemobius varius</i> Gurney and Rentz | M    | Root feeding    | H            | Howarth (1981)     |
| <i>Elimaea punctifera</i> (Walker)          | M    | Defoliation     | H,O,Mk       | Zimmerman (1948)   |
| <i>Thaumatoeryllus</i> sp.                  | M    | Root feeding    | H            | Howarth (1981)     |
| <b>THYSANOPTERA</b>                         |      |                 |              |                    |
| <b>Phlaeothripidae</b>                      |      |                 |              |                    |
| <i>Haplothrips davisi</i> Bianchi           | A,M  | Sucking         | H            | +, Bianchi (1945)  |
| <i>Haplothrips rosai</i> Bianchi            | M    | Sucking         | H            | +, Bianchi (1945)  |
| <b>Thripidae</b>                            |      |                 |              |                    |
| <i>Aptinothrips rufa</i> (Gmelin)           | A,M  | Sucking seeds   | H,Mu         | Zimmerman (1948)   |
| <i>Baliothrips minutus</i> (Van Deventer)   | M    | Sucking seeds   | H,K,O,Mk     | +                  |
| <i>Chirothrips patruelis</i> Hood           | A,M  | Sucking seeds   | H            | +, Gagné (1976)    |
| <i>Dorcadothrips cyperaceae</i> Bianchi     | M    | Sucking seeds   | H (O,Mu?)    | +, Gagné (1976)    |
| <i>Heliothrips haemorrhoidalis</i> (Bouché) | A,M  | Sucking         | H,K,O,Mu,Mk  | Zimmerman (1948)   |
| <i>Isoneurothrips australis</i> Bagnall     | M    | Sucking flowers | All islands  | Sakimura (1967)    |
| <i>Karyothrips dollicornis</i> Bianchi      | M    | Sucking         | H            | +, Bianchi (1945)  |
| <i>Neurisothis antennatus</i> (Moulton)     | A,M  | Sucking flowers | H,O,Mu,Mk    | +, Sakimura (1966) |
| <i>Neurisothis carteri</i> (Moulton)        | A,M  | Sucking         | H,O          | +, Sakimura (1966) |
| <i>Neurisothis multispinus</i> (Bagnall)    | A,M  | Sucking flowers | H,K,Mk       | +, Sakimura (1966) |
| <i>Neurisothis williamsi</i> (Moulton)      | A,M  | Sucking flowers | H,K,O        | +, Sakimura (1966) |
| <i>Taeniothrips frici</i> (Uzel)            | A    | Sucking flowers | H,Mu         | @, Swezey (1954)   |
| <i>Taeniothrips hawaiiensis</i> (Morgan)    | A,M  | Sucking flowers | All islands  | @, Swezey (1954)   |
| <i>Thrips tabaci</i> Lindeman               | A,M  | Sucking flowers | All islands  | Zimmerman (1948)   |

(Table 1 continued)

| Order, family, and species             | Host | Mode of damage | Distribution | Source           |
|----------------------------------------|------|----------------|--------------|------------------|
| <b>HEMIPTERA</b>                       |      |                |              |                  |
| <b>Lygaeidae</b>                       |      |                |              |                  |
| <i>Metrarga obscura</i> Blackburn      | M    | Sucking        | H            | @, Swezey (1954) |
| <i>Nysius blackburni</i> White         | M    | Sucking        | H,Mu         | Swezey (1954)    |
| <i>Nysius coenosulus</i> Stål          | M    | Sucking        | All islands  | @, Swezey (1954) |
| <i>Nysius communis</i> Usinger         | M    | Sucking        | All islands  | @, Swezey (1954) |
| <i>Nysius delectus</i> White           | M    | Sucking        | H,L,O,Mu,Mk  | Swezey (1954)    |
| <i>Nysius nigriscutellatus</i> Usinger | M    | Sucking        | All islands  | /, Swezey (1954) |
| <i>Oceanides montivagus</i> (Kirkaldy) | M    | Sucking        | All islands  | +, Swezey (1954) |
| <i>Oceanides pteridicola</i> (White)   | M    | Sucking        | H,Mu         | Swezey (1954)    |
| <i>Oceanides vulcan</i> (White)        | M    | Sucking        | H            | Swezey (1954)    |
| <b>Miridae</b>                         |      |                |              |                  |
| <i>Hyalopeplus pellucidus</i> (Stål)   | M    | Sucking        | All islands  | Swezey (1954)    |
| <i>Koanoa hawaiiensis</i> Kirkaldy     | M    | Sucking        | All islands  | Swezey (1954)    |
| <i>Psallus sharpianus</i> Kirkaldy     | A    | Sucking        | K,O          | Swezey (1954)    |
| <i>Sarona adonias</i> Kirkaldy         | A,M  | Sucking        | H,L,Mu,Mk    | #, Swezey (1954) |
| <b>Scutellaridae</b>                   |      |                |              |                  |
| <i>Coleotichus blackburniae</i> White  | A    | Sucking        | All islands  | Swezey (1954)    |
| <b>HOMOPTERA</b>                       |      |                |              |                  |
| <b>Cicadellidae</b>                    |      |                |              |                  |
| <i>Nesophrosyne cuprescens</i> Osborn  | M    | Sucking        | O            | Swezey (1954)    |
| <i>Nesophrosyne notatula</i> Osborn    | M    | Sucking        | O            | Swezey (1954)    |
| <i>Nesophrosyne pluvialis</i> Kirkaldy | A    | Sucking        | H            | #, Gagné (1976)  |
| <i>Nesophrosyne silvicola</i> Kirkaldy | M    | Sucking        | H,L          | #, Swezey (1954) |
| <i>Nesophrosyne sinuata</i> Osborn     | M    | Sucking        | H,O          | #, Swezey (1954) |

(Table 1 continued)

| Order, family, and species                 | Host | Mode of damage | Distribution  | Source            |
|--------------------------------------------|------|----------------|---------------|-------------------|
| <b>Delphacidae</b>                         |      |                |               |                   |
| <i>Leialoha hawaiiensis</i> (Muir)         | M    | Sucking        | H             | +, Swezey (1954)  |
| <i>Leialoha kauaiensis</i> (Muir)          | M    | Sucking        | K             | +, Swezey (1954)  |
| <i>Leialoha lanaiensis</i> (Muir)          | M    | Sucking        | L             | Swezey (1954)     |
| <i>Leialoha lehuae</i> (Kirkaldy)          | M    | Sucking        | L,O           | Swezey (1954)     |
| <i>Leialoha mauiensis</i> (Muir)           | M    | Sucking        | Mu            | Swezey (1954)     |
| <i>Leialoha naniicola</i> (Kirkaldy)       | A,M  | Sucking        | H,K,O         | #, Swezey (1954)  |
| <i>Leialoha oahuensis</i> (Muir)           | M    | Sucking        | L,O           | Swezey (1954)     |
| <i>Leialoha ohiae</i> (Kirkaldy)           | M    | Sucking        | H,K,O,Mu      | Swezey (1954)     |
| <i>Nesosydne koae</i> Kirkaldy             | A    | Sucking        | H,K,O         | Swezey (1954)     |
| <i>Nesosydne koae-phyllodii</i> Muir       | A,M  | Sucking        | H,K,O         | Swezey (1954)     |
| <i>Nesosydne pseudorubescens</i> Muir      | A    | Sucking        | H,Mu          | #, Swezey (1954)  |
| <i>Nesosydne rubescens</i> (Kirkaldy)      | A    | Sucking        | All islands   | @, Swezey (1954)  |
| <i>Nesosydne rubescens pele</i> (Kirkaldy) | A    | Sucking        | H,O           | Swezey (1954)     |
| <i>Nesothoe gulicki</i> (Muir)             | M    | Sucking        | H,L,O         | Swezey (1954)     |
| <i>Nesothoe perkinsi</i> Kirkaldy          | M    | Sucking        | O             | Swezey (1954)     |
| <b>Cixiidae</b>                            |      |                |               |                   |
| <i>Iolania perkinsi</i> Kirkaldy           | A,M  | Sucking        | H             | #, Gagné (1976)   |
| <i>Oliarus acaciae</i> Kirkaldy            | A    | Sucking        | O             | Swezey (1954)     |
| <i>Oliarus inconstans</i> Giffard          | A,M  | Sucking        | H             | #, +              |
| <i>Oliarus koae</i> Giffard                | A    | Sucking        | K             | +, Swezey (1954)  |
| <i>Oliarus kahavalu</i> Kirkaldy           | M    | Sucking        | Mk            | Swezey (1954)     |
| <i>Oliarus kakananus</i> Kirkaldy          | M    | Sucking        | H             | Swezey (1954)     |
| <i>Oliarus polyphemus</i> Fennah           | M    | Sucking        | H             | +, Howarth (1981) |
| <i>Oliarus priola</i> Fennah               | M    | Sucking        | Mu            | +, Howarth (1981) |
| <b>Flatidae</b>                            |      |                |               |                   |
| <i>Siphanta acuta</i> (Walker)             | A,M  | Sucking        | H,K,L,O,Mu,Mk | +, Swezey (1954)  |

(Table 1 continued)

| Order, family, and species                     | Host | Mode of damage | Distribution  | Source              |
|------------------------------------------------|------|----------------|---------------|---------------------|
| <b>Psyllidae</b>                               |      |                |               |                     |
| <i>Kuwayama gracilis</i> Crawford              | M    | Sucking        | O,Mu,Mk       | Zimmerman (1948)    |
| <i>Kuwayama minuta</i> Crawford                | M    | Pit gall       | H,K           | Zimmerman (1948)    |
| <i>Kuwayama nigricapita</i> Crawford           | M    | Sucking        | H,L,Mu,Mk     | Swezey (1954)       |
| <i>Kuwayama</i> n. sp.                         | M    | Sucking        | H             | /, Nishida (1977)   |
| <i>Psylla uncatoides</i> (Ferris and Klyver)   | A    | Sucking        | H,O           | /, #, Leeper (1973) |
| <i>Trioza hawaiiensis</i> Crawford             | M    | Stem gall      | H             | /, Nishida (1977)   |
| <i>Trioza iolani</i> Kirkaldy                  | M    | Gall           | K,O,Mu        | Swezey (1954)       |
| <i>Trioza kauaiensis</i> Crawford              | M    | Gall           | K             | Swezey (1954)       |
| <i>Trioza lanaiensis</i> Crawford              | M    | Gall           | L,Mk          | Swezey (1954)       |
| <i>Trioza lehua</i> Crawford                   | M    | Gall           | K             | Swezey (1954)       |
| <i>Trioza molokaiensis</i> Crawford            | M    | Gall           | Mk            | Swezey (1954)       |
| <i>Trioza ohiacola</i> Crawford                | M    | Gall           | H,O,Mu        | #, Swezey (1954)    |
| <i>Trioza pullata</i> Crawford                 | M    | Gall           | L             | Swezey (1954)       |
| <i>Trioza</i> n. sp.                           | M    | Flat gall      | H             | /, Nishida (1977)   |
| <i>Trioza</i> n. sp.                           | M    | Cone gall      | H             | /, Nishida (1977)   |
| <b>Aphidae</b>                                 |      |                |               |                     |
| <i>Rhopalosiphoninus latusiphon</i> (Davidson) | M    | Sucking        | H,Mu          | Beardsley (1976)    |
| <b>Margarodidae</b>                            |      |                |               |                     |
| <i>Icerya purchasi</i> Maskell                 | A,M  | Sucking        | H,K,L,O,Mu,Mk | Swezey (1954)       |
| <b>Coccidae</b>                                |      |                |               |                     |
| <i>Ceroplastes rubens</i> Maskell              | M    | Sucking        | H,L,O,Mu,Mk   | Nakahara (1978)     |
| <i>Coccus hesperidum</i> Linnaeus              | M    | Sucking        | O,Mu          | Nakahara (1978)     |
| <i>Coccus longulus</i> (Douglas)               | A,M  | Sucking        | H,O,Mu        | Zimmerman (1948b)   |
| <i>Eucalymnatus tessellatus</i> (Signoret)     | M    | Sucking        | H,K,O,Mu      | Nakahara (1978)     |
| <i>Kilifia acuminata</i> (Signoret)            | M    | Sucking        | H,O,Mu        | Nakahara (1978)     |

(Table 1 continued)

| Order, family, and species                          | Host | Mode of damage | Distribution  | Source             |
|-----------------------------------------------------|------|----------------|---------------|--------------------|
| <i>Parasaissetia nigra</i> (Nietner)                | M    | Sucking        | H,O,Mu,Mk,N   | Nakahara (1978)    |
| <i>Pulvinaria psidii</i> Maskell                    | M    | Sucking        | H,K,L,O,Mk    | /, Nakahara (1978) |
| <i>Saissetia oleae</i> (Olivier)                    | A    | Sucking        | H,Mu          | Nakahara (1978)    |
| <b>Asterolecaniidae</b>                             |      |                |               |                    |
| <i>Asterolecanium pustulans</i> (Cockerell)         | A    | Sucking        | K,O,Mu        | Nakahara (1978)    |
| <b>Pseudococcidae</b>                               |      |                |               |                    |
| <i>Dysmicoccus neobrevipes</i> Beardsley            | A    | Sucking        | H,K,O,Mu,Mk   | /, Nakahara (1978) |
| <i>Gallulacoccus tenorioi</i> Beardsley             | M    | Leaf gall      | K             | Beardsley (1971)   |
| <i>Geococcus coffeae</i> Green                      | A,M  | Sucking        | H,K,O,Mu      | @, Nakahara (1978) |
| <i>Ohiacoccus cryptus</i> Beardsley                 | M    | Sucking        | H,O           | Beardsley (1971)   |
| <i>Pseudococcus longispinus</i> (Targioni-Tozzetti) | M    | Sucking        | H,K,L,O,Mu,Mk | @, Nakahara (1978) |
| <i>Pseudococcus obscurus</i> Essig                  | A    | Sucking        | H,K,O,Mu      | #                  |
| <i>Pseudococcus swezeyi</i> Ehrhorn                 | A    | Sucking        | K,O,Mu        | Nakahara (1978)    |
| <i>Tympanococcus tympanistus</i> (Ferris)           | M    | Sucking        | H,Mu          | /, Nakahara (1978) |
| <b>Dactylopiidae</b>                                |      |                |               |                    |
| <i>Duplaspidotus claviger</i> (Cockerell)           | M    | Sucking        | H,K,O,Mu,N    | Nakahara (1978)    |
| <i>Hemiberlesia lataniae</i> (Signoret)             | A,M  | Sucking        | All islands   | Zimmerman (1948b)  |
| <i>Hemiberlesia rapax</i> (Comstock)                | A,M  | Sucking        | H,K,L,O,Mu    | Zimmerman (1948b)  |
| <i>Howardia biclavis</i> (Comstock)                 | M    | Sucking        | H,O,Mu,N      | Zimmerman (1948b)  |
| <i>Pinnaspis strachani</i> (Cooley)                 | A    | Sucking        | H,K,L,O,Mu,N  | Nakahara (1978)    |
| <b>COLEOPTERA</b>                                   |      |                |               |                    |
| <b>Anthribidae</b>                                  |      |                |               |                    |
| <i>Araecerus levipennis</i> Jordan                  | A    | Seed boring    | All islands   | #, Swezey (1954)   |
| <b>Bruchidae</b>                                    |      |                |               |                    |
| <i>Stator limbatus</i> (Horn)                       | A    | Seed boring    | All islands   | #, Swezey (1954)   |
| <i>Stator pruininus</i> (Horn)                      | A    | Seed boring    | All islands   | #, Swezey (1954)   |

(Table 1 continued)

| Order, family, and species                         | Host | Mode of damage | Distribution | Source                |
|----------------------------------------------------|------|----------------|--------------|-----------------------|
| <b>Cerambycidae</b>                                |      |                |              |                       |
| <i>Ceresium unicolor</i> (Fabricius)               | A,M  | Boring         | All islands  | #, @                  |
| <i>Curtomerus flavus</i> (Fabricius)               | A,M  | Boring         | H,L,O,Mu     | #, +                  |
| <i>Megopis reflexa</i> (Karsch)                    | M    | Boring         | All islands  | Gressitt (1969)       |
| <i>Parandra puncticeps</i> Sharp                   | A    | Boring         | H,K,O,Mu     | +, Gressitt (1972)    |
| <i>Plagithmysus abnormis</i> (Sharp)               | M    | Boring         | H            | +, @, Gressitt (1969) |
| <i>Plagithmysus aequalis</i> Sharp                 | A    | Boring         | K            | +, @, Gressitt (1969) |
| <i>Plagithmysus aestivus</i> Sharp                 | M    | Boring         | Mk           | +, @, Gressitt (1969) |
| <i>Plagithmysus annectens</i> (Sharp)              | A    | Boring         | K            | +, @, Gressitt (1969) |
| <i>Plagithmysus arachnipes</i> Sharp               | A    | Boring         | K            | +, Gressitt (1972)    |
| <i>Plagithmysus attenuatus</i> (Boisduval)         | A    | Boring         | O            | +, Gressitt (1972)    |
| <i>Plagithmysus bilineatus</i> Sharp               | M    | Boring         | H            | #, Gressitt (1969)    |
| <i>Plagithmysus claviger</i> (Sharp)               | A    | Boring         | H            | +, @, Gressitt (1969) |
| <i>Plagithmysus concolor arachnipes</i> Sharp      | A    | Boring         | K            | +, @, Gressitt (1969) |
| <i>Plagithmysus c. concolor</i> Sharp              | M    | Boring         | K            | +, @, Gressitt (1969) |
| <i>Plagithmysus c. munroi</i> Sharp                | M    | Boring         | K            | +, @, Gressitt (1969) |
| <i>Plagithmysus cristatus</i> (Sharp)              | A    | Boring         | O            | +, @, Gressitt (1969) |
| <i>Plagithmysus debilis</i> (Sharp)                | A    | Boring         | H            | +, @, Gressitt (1969) |
| <i>Plagithmysus finschi</i> (Harold)               | A    | Boring         | Mu           | +, @, Gressitt (1969) |
| <i>Plagithmysus fragilis</i> (Sharp)               | A    | Boring         | O            | +, @, Gressitt (1969) |
| <i>Plagithmysus koeae</i> Gressitt and Davis       | A    | Boring         | Mu           | +, @, Gressitt (1969) |
| <i>Plagithmysus laticollis</i> (Sharp)             | A    | Boring         | Mu           | +, @, Gressitt (1969) |
| <i>Plagithmysus lanaiensis</i> Sharp               | M    | Boring         | L            | +, @, Gressitt (1969) |
| <i>Plagithmysus longipes</i> (Sharp)               | A    | Boring         | K            | +, @, Gressitt (1969) |
| <i>Plagithmysus metrosideri</i> Gressitt and Davis | M    | Boring         | K            | +, @, Gressitt (1969) |
| <i>Plagithmysus modestus</i> (Sharp)               | A    | Boring         | Mu           | +, @, Gressitt (1969) |

(Table 1 continued)

| Order, family, and species                      | Host | Mode of damage | Distribution | Source                |
|-------------------------------------------------|------|----------------|--------------|-----------------------|
| <i>Plagithmysus nodifer</i> (Sharp)             | A    | Boring         | H            | +, @, Gressitt (1969) |
| <i>Plagithmysus obscurus</i> (Sharp)            | A    | Boring         | K            | +, @, Gressitt (1969) |
| <i>Plagithmysus pennatus</i> (Sharp)            | A    | Boring         | Mu           | +, @, Gressitt (1969) |
| <i>Plagithmysus pulverulentus</i> (Motschulsky) | A    | Boring         | O            | +, Gressitt (1972)    |
| <i>Plagithmysus pulvillatus</i> Karsch          | M    | Boring         | Mu           | +, @, Gressitt (1969) |
| <i>Plagithmysus solitarius</i> Sharp            | M    | Boring         | O            | +, @, Gressitt (1969) |
| <i>Plagithmysus timberlakei</i> (Perkins)       | M    | Boring         | O            | +, @, Gressitt (1969) |
| <i>Plagithmysus ultimus</i> (Sharp)             | A    | Boring         | O            | +, Gressitt (1972)    |
| <i>Plagithmysus varians</i> Sharp               | A    | Boring         | H            | #, Gressitt (1969)    |
| <i>Xystrocera globosa</i> (Olivier)             | A    | Boring         | H,K,O        | #, Gressitt (1972)    |
| Chrysomelidae                                   |      |                |              |                       |
| <i>Diachus auratus</i> (Fabricius)              | A    | Defoliation    | All islands  | @, Swezey (1954)      |
| Curculionidae                                   |      |                |              |                       |
| <i>Odemas konanum</i> Perkins                   | M    | Boring         | H            | +, Gagné (1976)       |
| <i>Odemas</i> sp.                               | M    | Boring         | H            | +, Gagné (1976)       |
| <i>Orthorhinus klugi</i> Boheman                | A    | Boring         | H            | #, @                  |
| <i>Pantomorus cervinus</i> Boheman              | A,M  | Defoliation    | H            | #, Gagné (1976)       |
| <i>Rhyncogonus blackburni</i> Sharp             | A    | Defoliation    | O            | @, Swezey (1954)      |
| Proterhinidae                                   |      |                |              |                       |
| <i>Proterhinus affinis</i> Perkins              | M    | Boring         | H            | #, +                  |
| <i>Proterhinus blackburni</i> Perkins           | A,M  | Boring         | H            | +, Gagné (1976)       |
| <i>Proterhinus desquamatus</i> Perkins          | A    | Boring         | H            | +, Gagné (1976)       |
| <i>Proterhinus ferrugineus</i> Perkins          | A    | Boring         | H            | +, Gagné (1976)       |
| <i>Proterhinus similis</i> Blackburn            | M    | Boring         | H            | +, Gagné (1976)       |
| <i>Proterhinus tarsalis</i> Blackburn           | M    | Boring         | H            | +, Gagné (1976)       |



(Table 1 continued)

| Order, family, and species                     | Host | Mode of damage                | Distribution | Source                 |
|------------------------------------------------|------|-------------------------------|--------------|------------------------|
| <b>Scolytidae</b>                              |      |                               |              |                        |
| <i>Hypothenemus insularis</i> Perkins          | A    | Boring                        | O            | +, Swezey (1954)       |
| <i>Hypothenemus ruficeps</i> Perkins           | A    | Boring                        | Mu           | +, Swezey (1954)       |
| <i>Xyleborinus saxeseni</i> (Ratzeburg)        | A,M  | Boring                        | H,K,O,Mu     | +, Samuelson (1981)    |
| <i>Xyleborus affinis</i> Eichhoff              | A    | Boring                        | H,K,O,Mu     | +, Samuelson (1981)    |
| <i>Xyleborus fornicatus</i> Eichhoff           | A    | Boring                        | H,K,O,Mu,Mk  | +, Samuelson (1981)    |
| <i>Xyleborus perforans</i> (Wollaston)         | A    | Boring                        | H,K,O,Mu     | +, Samuelson (1981)    |
| <i>Xyleborus simillimus</i> Perkins            | M    | Boring                        | H            | +, #, Samuelson (1981) |
| <i>Xyleborus spinulosus</i> Blandford          | A    | Boring                        | O            | +, Samuelson (1981)    |
| <i>Xyleborus vulcanus</i> Perkins              | A    | Boring                        | H,L,O,Mu     | +, Samuelson (1981)    |
| <i>Xylosandrus compactus</i> (Eichhoff)        | A    | Boring                        | H,K,L,Mu,Mk  | +, #, Samuelson (1981) |
| <i>Xylosandrus crassiusculus</i> (Motschulsky) | A,M  | Boring                        | H,K,O,Mu     | +, Samuelson (1981)    |
| <b>LEPIDOPTERA</b>                             |      |                               |              |                        |
| <b>Carposinidae</b>                            |      |                               |              |                        |
| <i>Carposina</i> n. sp.                        | M    | Chewing terminal buds         | O            | Zimmerman (1978)       |
| <b>Cynodiidae</b>                              |      |                               |              |                        |
| <i>Thyrocopa abusa</i> Walsingham              | A    | Boring                        | O            | Zimmerman (1978)       |
| <b>Gelechiidae</b>                             |      |                               |              |                        |
| <i>Hypsmocoma cryptogamiella</i> (Walsingham)  | A    | Stem boring                   | H,K,L,O,Mk   | Zimmerman (1978)       |
| <i>Hypsmocoma latiflua</i> Meyrich             | A    | Phyllode boring               | O,Mu         | Zimmerman (1978)       |
| <i>Hypsmocoma palmifera</i> (Meyrich)          | A    | Boring (associated with rust) | H,O          | Zimmerman (1978)       |
| <i>Hypsmocoma</i> n. sp.                       | A    | Defoliation                   | O            | Zimmerman (1978)       |

(Table 1 continued)

| Order, family, and species                                | Host | Mode of damage | Distribution  | Source              |
|-----------------------------------------------------------|------|----------------|---------------|---------------------|
| <b>Geometridae</b>                                        |      |                |               |                     |
| <i>Eucymatoge monticolans</i> Butler                      | M    | Defoliation    | H,K,L,O,Mu,Mk | Zimmerman (1978)    |
| <i>Scotorythra caryopis</i> Meyrick                       | A    | Defoliation    | K,O           | Zimmerman (1978)    |
| <i>Scotorythra corticea</i> (Butler)                      | A    | Defoliation    | H,Mu          | Zimmerman (1978)    |
| <i>Scotorythra euryphaea</i> Meyrick                      | M    | Defoliation    | K,O,Mu,Mk     | Zimmerman (1978)    |
| <i>Scotorythra hyparcha</i> Meyrick                       | M    | Defoliation    | H             | Zimmerman (1978)    |
| <i>Scotorythra metacrossa</i> Meyrick                     | A    | Defoliation    | O             | Zimmerman (1978)    |
| <i>Scotorythra pachyspila</i> Meyrick                     | M    | Defoliation    | H,K,L,O,Mu    | Zimmerman (1978)    |
| <i>Scotorythra paludicola</i> (Butler)                    | A    | Defoliation    | H,K,O,Mu      | #, Zimmerman (1978) |
| <i>Scotorythra rara</i> (Butler)                          | A,M  | Defoliation    | H,K,O,Mu,Mk   | +, Zimmerman (1978) |
| <b>Gracilariidae</b>                                      |      |                |               |                     |
| <i>Philodoria basalis</i> Walsingham                      | M    | Leaf mining    | H,O,Mu        | +, Zimmerman (1978) |
| <i>Philodoria splendida</i> Walsingham                    | M    | Leaf mining    | H,K,L,O,Mk    | +, Zimmerman (1978) |
| <b>Lycaenidae</b>                                         |      |                |               |                     |
| <i>Vaga blackburni</i> (Tuely)                            | A    | Defoliation    | All islands   | +, Zimmerman (1978) |
| <b>Noctuidae</b>                                          |      |                |               |                     |
| <i>Peridroma c. cinctipennis</i> (Butler)                 | M    | Defoliation    | K,O,Mu,Mk     | +, Zimmerman (1978) |
| <i>Schrankia</i> sp.                                      | M    | Root feeding   | H             | Howarth (1981)      |
| <b>Pyralidae</b>                                          |      |                |               |                     |
| <i>Uresiphita polygonalis</i> (Denis and Schiffermueller) | A    | Defoliation    | H,K,O,Mu      | +, Zimmerman (1978) |
| <b>Sphingidae</b>                                         |      |                |               |                     |
| <i>Hyles c. calida</i> (Butler)                           | A,M  | Defoliation    | K,O,Mu        | +, Zimmerman (1978) |
| <i>Hyles w. wilsoni</i> (Rothschild)                      | A,M  | Defoliation    | H             | +, Zimmerman (1978) |
| <b>Tortricidae</b>                                        |      |                |               |                     |
| <i>Cryptophlebia illepida</i> (Butler)                    | A    | Seed boring    | H,K,L,O,Mu    | #, Swezey (1954)    |
| <i>Cydia conspicua</i> (Walsingham)                       | A    | Seed boring    | O,Mu          | +, Swezey (1954)    |

(Table 1 continued)

| Order, family, and species                | Host | Mode of damage        | Distribution | Source              |
|-------------------------------------------|------|-----------------------|--------------|---------------------|
| <i>Cydia rufipennis</i> (Butler)          | A    | Pod and flower boring | K,O          | +, Zimmerman (1978) |
| <i>Cydia walsinghamii</i> (Butler)        | A    | Twig boring           | H,K,O,Mu     | #, Zimmerman (1978) |
| <i>Eccoptocera foetorivorans</i> (Butler) | M    | Defoliation           | O            | +, Zimmerman (1978) |
| <i>Eccoptocera</i> spp.                   | M    | Defoliation           | All islands  | +, Zimmerman (1978) |
| <i>Epiphyas postvittana</i> (Walker)      | A    | Leaf rolling          | H,K,O,Mu,Mk  | +, Zimmerman (1978) |

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