ANNUAL ADDRESS

Some Observations on the Insect Faunas of Native Forest Trees in the Olinda Forest on Maui

BY O. H. SWEZEY

(Presented at the meeting of Dec. 12, 1929)

The particular region involved in these observations lies at an elevation of 3500-4500 feet on the slope of Haleakala, Maui, eastward from Olinda. It is about one mile across pasture land from the "Olinda" bungalow of Mr. H. A. Baldwin to the western edge of this forest. The forest is penetrated by a trail following the Kula pipe line—a wooden stave pipe which conducts water from the streams in the rain forest for domestic purposes of residents of the Kula district. It is about five or six miles to the extreme intake of this pipe at Honamanu stream. It is mostly a very rainy region.

There is a considerable area composed chiefly of *Acacia koa* extending for three or four miles along the trail and for about a mile below and another mile above. The other most important tree is the lehua, *Metrosideros collina polymorpha*, which is scattered among the koa trees, and makes up the most of the forest beyond the limits of the distinctly koa forest. Other trees scattered more or less but making up a conspicuous part of the forest are: *Cheirodendron gaudichaudii, Coprosma vontempskyi, Pipturus albidus, Straussia, Suttonia lessertiana, Sophora chrysophyllum, Clermontia arborescens.* Trees of smaller size and shrubs are: *Pelea* spp., *Broussaisia arguta, Cyrtandra cordifolia, Vaccinium penduliflorum, Rubus hawaiiensis* and tree ferns: *Cibotium chamissoi* and *Cibotium menziesii.* Climbing shrubs are *Freycinetia arnotti, Smilax sandwicensis* and *Alyxia olivaeformis.*

In January, 1926, attention was called to this region on account of a nearly complete defoliation of the koa trees, so that viewed from the lower regions the forest appeared to be mostly dead trees. It was first visited by Dr. H. L. Lyon and myself on January 13, 1926, at the instance of Mr. H. A. Baldwin, who accompanied us to the region on that day. The following day we were

accompanied by Messrs. F. Muir and R. H. Van Zwaluwenburg. Other visits were made to the region on February 26, 1926; October 10, 1926; February 10, 1927; June 11-18, 1927; February 13, 1928; August 16 and 25, 1929. These visits were primarily for the purpose of ascertaining the causes for the defoliation of the koa trees, and the after-effects upon the individual trees and the forest as a whole.

Right at the first it was demonstrated that the defoliation was caused by caterpillars of a native moth, *Scotorythra paludicola* (Butl.), which had increased in such enormous numbers as to practically entirely defoliate all the koa trees of the region. In the study of this situation observations were made on whatever other insects were attacking the koa trees, both in the living condition and after death. Similarly, the insect faunas of the other trees of the region were given attention. The results of these observations are herein arranged under the various respective host trees.

ACACIA KOA

Scotorythra paludicola (Butler)

When the region was first visited, the adult moths of this species were numerous along the trail, being scared up from the grass and banks by the side of the trail as one walked along. The koa trees at the time were so completely denuded that the cause of it was not always present, but on occasional small branches or sprouts and on some isolated trees in some of the gulches that were not so badly denuded, caterpillars were to be found feeding on the remaining vestiges of foliage. By digging in the ground and beneath trash and under moss on logs, pupae were also found. Some of the larvae and pupae were brought to the laboratory, and the moths that issued were the same as the adults which had been observed in flight along the trail.

In correspondence with Dr. Perkins, it was ascertained that there had been a similar defoliation of the koa trees in the Olinda region about 30 years previously, by caterpillars of the same moth.

There has been no recurrence of the 1926 outbreak since that time. The trees were slow in making a new growth, but during the summer they gradually became covered with new foliage. How-

ever, in many of the trees the branches died back at the tips from one to three feet, and many whole branches died. Thus some trees looked half dead, and there were others that died entirely. These latter may have been partially dead already at the time of the caterpillar attack, for there were standing dead trees at the time, both koas and other trees, as conditions have not been entirely favorable in the region and the whole forest has been on the decline.

At the time of the last visit to the place (August, 1929), the foliage was not suffering from attack of caterpillars. A few were present, and the adult moths were quite numerous, continually flying up along the trail. Whether the moths were numerous enough to bring about another epidemic of caterpillars with resultant defoliation of the koas has not been ascertained.

Other Insects on the Foliage

Lepidoptera

Lycaena blackburni (Tuely). A native butterfly whose larvae feed on the new foliage.
Archips postvittanus (Walker). A leafroller. Not common.

Homoptera

Ilburnia koae (Kirk.) A native leafhopper.
Ilburnia rubescens (Kirk.) A native leafhopper.
Nesophrosyne sp. A native leafhopper.
Siphanta acuta (Walker). The torpedo bug. Quite common.
Oliarus kahavalu Kirk.

Heteroptera

Oechalia grisea (Burm.). A predator on caterpillars. Quite common.
Nysius sp. A plant bug. Common.
Mirid bug. An occasional specimen.

Hymenoptera

Enicospilus manicola Ashm. Parasite on caterpillars.

Diptera

Chaetogaedia monticola (Bigot). Parasite on caterpillars.
Frontina archippivora (Will.) Parasite on caterpillars.

Coleoptera

Pantomorus godmani (Crotch). The Olinda bettle. Abundant.

Acari

Leaf mites or red spiders. Sometimes abundant.

In Dead Twigs and Branches

Coleoptera

Proterhinus punctipennis Sharp. Rare in small twigs.
Plagithmysus finschi (Harold). Rare in trunks and branches.
Neoclytarlus pennatus (Sharp). Numerous in trunks and branches.
Parandrita aenea (Sharp). Rare.
Cis bimaculatus Sharp. Abundant.
Anobiid. Rare.

Hymenoptera

Ischiogonus palliatus (Cam.). Parasite of *Neoclytarlus pennatus.*

In Dead Wood and Logs

Coleoptera

Dryophthorus squalidus Sharp. In rotten wood.
Dryophthorus crassus Sharp. In rotten wood.
Oodemas corticis Sharp. In rotten wood.
Parandra puncticeps Sharp. In rotten wood.
Carabids. Several species. Predators, under bark and in rotten wood.
Eopenthes sp. Occasional larva in rotten wood.

Lepidoptera

Enarmonia walsinghami (Butl.) Common.
Aphthonetus bitincta Walsm. Rare.
Hyposmocoma lupella candidella Walsm. Larva in case.
Hyposmocoma chilonella Walsm. Larva without case.
Thyrocopa indecora (Butl.) Larva in rotten bark.
Opogona omoscopa (Meyrick). Larvae numerous in rotten wood.

Thysanoptera

Hoplothrips mauiensis Moulton. Under bark of dead tree.
Macrophthalmothrips hawaiiensis Moult. Under bark of dead tree.
Phloeothrips mauiensis Moult. Under bark of dead tree.

Miscellaneous

Hymenoptera

Alaptus sp. A parasite of psocid eggs. Rare.
Polynema sp. A parasite of psocid eggs. Rare.
Anagyrus sp. A parasite of mealybugs.
Sierola sp. A parasite of Microlepidoptera. Common.
Ecphylopsis nigra Ashm. Wingless parasite. Rare, on dead twigs.
Chalcids. Several species of these parasites.
Odynerus laevisulcatus Perkins. Nesting in borer holes in standing dead trees.

Heteroptera

Emesid bug. A predator. Rare.

Corrodentia

Psocids. Several species on bark of dead twigs.

METROSIDEROS COLLINA POLYMORPHA

Lepidoptera

Agrotis cinctipennis (Butl.). Cluster of eggs on leaf.
Scotorythra rara (Butl.). Looping caterpillar on leaves.
Eucymatoge monticolans (Butl.). Larvae on leaves.
Eccoptocera foetorivorans (Butl.) Tortricid larva on leaves.
Hyposmocoma chilonella Walsm. Larva in rotten wood.
Philodoria basalis Walsm. Leafminer.

Heteroptera

Oechalia grisea (Burm.). Predacious bug.
Nysius sp. 2 species. Plant bugs on foliage.

Homoptera

Oliarus pele Kirk. 2 reared from nymphs in rotten log.
Siphanta acuta (Walk.). Torpedo bug. Common on new growth.
Leialoha lehuae (Kirk.). Leafhopper. Not common.
Trioza spp. 2 or 3 species. Jumping plant-lice. Very abundant. Producing galls on leaves.
Nesophrosyne sp. Leafhopper. Not common.
Saissetia nigra (Nietn.). Scale insect on leaves.

Hymenoptera

Pristomerus hawaiiensis Perkins. Parasite, reared from *E. foetorivorans.*
Sierola sp. Parasite of Microlepidoptera.
Aphanomerus pusillus Perkins. Egg-parasite of *Siphanta acuta.* Common.
Toxeuma ferrugineipes Ashm. Parasite on *Dryophthorus modestus.*
Sympiesis sp. Parasite of Trioza.
Polynema sp. Parasite of leafhopper eggs.
Chalcids. Several species. Parasites, their hosts not known.

Coleoptera

Thriscothorax subconstrictus Sharp. In rotten log, predacious.
Proterhinus sp. From dead twigs.
Cis sp. From dead twigs.
Dryophthorus modestus Sharp. In rotten log.
Dryophthorus declivis Shp. In rotten log.

Corrodentia

Psocids. 2 or 3 species. On bark and twigs.

CHEIRODENDRON GAUDICHAUDII

Lepidoptera

Scotorythra sp. Caterpillar on leaves.
Spheterista sp. Leafroller caterpillar, sometimes abundant.
Hyposmocoma chilonella Walsm. Larva in rotten wood.

Coleoptera

Carabid. In rotten wood, a predator.
Parandra punctiveps Sharp. Larva in rotten wood.
Proterhinus epichrysus Perkins. In dead twigs.
Anobiid. Larva in dead wood.
Scolytid. In dead trunk.
Araeocerus fasciculatus (De G.)
Nitidulid. On bark.

Homoptera

Siphanta acuta (Walk.). Torpedo bug. Abundant.
Oliarus similis var. c Giffard.
Nesophryne sp.
Nesophrosyne spp. 2 species. Leafhoppers.
Aphid. Plant louse on new foliage.

Heteroptera

Oechalia grisea (Burm.). Predacious bug.
Nysius sp. Plant bug.
Nesiomiris hawaiiensis Kirk. Large green mirid bug.
Mirid bug. Small mirid bug.

Neuroptera

Hemerobiid. Predacious on aphids.
Anomalochrysa sp. Predacious on aphids. Eggs parasitized.

Hymenoptera

Angitia blackburni (Cam.). Parasite of *Spheterista* sp.

Corrodentia

Psocids. 2 or 3 species. On bark.

COPROSMA VONTEMPSKYI

Lepidoptera

Semnoprepia sp. Larva in rotten wood.

Coleoptera

Thriscothorax subconstrictus Sharp. In rotten wood, predator.
Thriscothorax unctus (Blkb.). In rotten wood.
Cerambycid. In rotten wood.
Anobiid. In rotten wood.
Dryophthorus sp. In rotten wood.
Proterhinus sp. From dead twigs.
Cis sp. From dead twigs.
Nitidulid. Beaten from foliage.

Hymenoptera

Odynerus sp. Pupa found in cell in borer hole in rotten wood.
Sclerodermus sp. Probably parasitic on anobiid larvae.
Toxeuma hawaiiensis Ashm.
Eupelmus sp.
Sierola sp.

Neuroptera

Anomalochrysa sp.

Homoptera

Siphanta acuta (Walk.). Torpedo bug. Abundant.
Oliarus similis var. c Giffard.
Ilburnia coprosmae Muir. Leafhopper.
Nesophrosyne sp. 2 or 3 species. Leafhopper. Common.
Aphid.

Heteroptera

Mirid bugs. 2 or 3 species. Leaf bugs.

Corrodentia

Psocids. 2 or 3 species. On bark and twigs.

PIPTURUS ALBIDUS

Lepidoptera

Vanessa tammeamea Esch. Kamehameha butterfly. Larvae on leaves.
Eucymatoge sp. (?) Larvae numerous on leaves, none reared.
Phlyctaenia sp. Larvae on leaves.
Philodoria sp. Leafminer.

Coleoptera

Plagithmysus simillimus Perkins. All stages in wood of dead tree.
Proterhinus sp. On dead twigs.

Homoptera

Nesophrosyne sp. Leafhopper.

Heteroptera

Tichorhinus sp. Leaf bug.

Corrodentia

Psocids. 2 or 3 species. On bark and dead twigs.

SOPHORA CHRYSOPHYLLUM

Lepidoptera

Scotorythra sp. Green looping caterpillar on leaves.
Mecyna virescens Butl. Larvae in webbed leaves.

Coleoptera

Plagithmysus funebris Sharp. Larvae in dead trees.

Heteroptera

Nysius sp. Leaf bug.

Tichorhinus sp. Leaf bug.

PELEA

Lepidoptera

Semnoprepia sp. Larvae in rotten wood.
Opostega spp. 2 or 3 species. Leafminers.

Coleoptera

Nesithmysus forbesii Perkins. Larvae boring in living wood.
Nesithmysus sp. Larvae boring in living wood
Nitidulid.
Proterhinus sp. From dead twigs.

Hymenoptera

Polynema sp. Egg-parasite of leafhopper.

Homoptera

Nesophryne sp. Leafhopper.
Nesophrosyne sp. Leafhopper.
Hevaheva sp. Psyllid on leaves, without galls.

SUTTONIA LESSERTIANA

Lepidoptera

Scotorythra sp. Larva on leaves.
Eulia sp. Larvae on leaves and boring in tips of stems.
Philodoria sp. Leafminer.

Coleoptera

Plagithmysus sp. (?) Larva in dead wood.
Dryophthorus modestus Shp. In dead wood.
Proterhinus sp. From dead twigs.
Holcobius haleakalae Perkins. Larvae in dead wood.

Homoptera

Siphanta acuta (Walk.). Torpedo bug.
Nesophrosyne sp. Leafhopper.
Delphacid. Leafhopper. Nymphs on leaves.

Corrodentia

Psocids. On bark and dead twigs.

Thysanoptera

Hoplothrips swezeyi Moulton. In dead tree.
Dermothrips hawaiiensis Bagn. Under bark of dead tree.

BROUSSAISIA ARGUTA

Coleoptera

Nitidulid.

Homoptera

Nesophrosyne sp. Leafhopper.
Delphacid. Leafhopper. Nymphs on leaves.

Heteroptera

Mirid bug. Leaf bug.

CYRTANDRA CORDIFOLIA

Lepidoptera

Phlyctaenia iocrossa Meyr. Larva under web on leaves.

Diptera

Cecidomyid. Adults, larvae and pupae on underside of leaves, among the numerous hairs.

Homoptera

Delphacid. Leafhopper.
Nesophrosyne sp. Leafhopper.

Heteroptera

Mirid bug. Leaf bug.

CLERMONTIA ARBORESCENS

Diptera

Agromyza sp. Leafminer.

Homoptera

Ilburnia sp. Leafhopper.
Nesophroysne sp. Leafhopper.

Heteroptera

Oechalia grisea (Burm.). Predacious bug.
Nysius sp. Plant bug.
Mirid. Green plant bug.

RUBUS HAWAIIENSIS

Lepidoptera

Scotorythra rara (Butl.). Larvae on leaves, common.
Phlyctaenia endopyra Meyr. Leafroller.
Amorbia emigratella Busck. Leafroller.
Hyposmocoma chilonella Walsm. Larvae in pith.
Thyrocopa albonubila Walsm. Larvae in dead stem.
Opogona omoscopa (Meyr.). Larvae numerous in dead stems.

Coleoptera

Carabid. In dead stem. Predator.
Plagithmysus rubi Perkins. Larvae in dead stems.
Neoclytarlus modestus (Sharp). One adult captured on foliage (accidental).
Nitidulid. In dead stem.
Dromaeolus agritoides Sharp. Larvae numerous in pith.
Proterhinus epichrysus Perkins. Larvae in pith.
Apterocis sp. Larvae in pith.
Oodemas sp. Larvae in pith.

Hymenoptera

Nesoprosopis haleakalae Perkins. Nest in dead stem.
Hyposoter exiguae (Vier.). Parasite of *Scotorythra rara*.
Pycnophion fuscipennis Perkins. Parasite of *Hyposmocoma chilonella*.
Sierola sp. Parasite of Microlepidoptera.
Ophelinus mauiensis Ashm. Parasite of *H. chilonella* larva.
Eupelmus sp. (?) Parasite of *H. chilonella* pupa.

Homoptera

Siphanta acuta (Walk.). Torpedo bug. Common.
Saissetia nigra (Nietn.). Black scale.

Heteroptera

Nysius sp. Plant bug.

Thysanoptera

Hoplothrips swezeyi Moulton. In dead stem.

VACCINIUM PENDULIFLORUM

Lepidoptera

Scotorythra rara (Butl.). (?) Larvae on leaves.
Phlyctaenia pyranthes Meyr. Larvae on leaves.
Platyptilia rhynchophora Meyr. Larvae on leaves.

Coleoptera

Proterhinus sp. In dead twigs.
Oodemas sp. In dead twigs.
Cis sp. In dead twigs.
Anobiid.

Thysanoptera

Thrips. Abundant on leaves.

SMILAX SANDWICENSIS

Lepidoptera

Semnoprepia sp. Larvae in dead stems.

Coleoptera

Neoclytarlus smilacis Perkins. Abundant in stems, both living and dead.
Oodemas obscurum Blkb. In dead stems.
Proterhinus sp. In dead stems.
Cis sp. In dead stems.
Nitidulid. In dead stems.

Hymenoptera

Eupelmus sp. Parasite of *Neoclytarlus smilacis.*

ALYXIA OLIVAEFORMIS

Coleoptera

Mecyclothorax ovipennis Sharp. Beaten from dead stems. Predator.
Proterhinus sp. Beaten from dead stems.
Cis sp. Beaten from dead stems.
Anobiid. Beaten from dead stems.
Nitidulid. Beaten from dead stems.

Homoptera

Nesophrosyne sp. Leafhopper.

Hymenoptera

Hemiteles tenellus (Say). Parasite of lacewing fly.
Polynema sp. Egg-parasite of leafhopper.

Corrodentia

Psocids. Beaten from dead stems.

CIBOTIUM CHAMISSOI

Coleoptera

Mecyclothorax ovipennis Sharp. In dead frond stems, predator.
Atelothrus erro (Blkb.). In dead frond stems, predator.
Staphylinid. In dead frond stems, predator.
Nitidulid. In dead frond stems.
Pentarthrum prolixum Sharp. In dead frond stems.
Dryophthorus sp. In dead frond stems.
Proterhinus epitretus Perkins. In dead frond stems.
Proterhinus sharpi Perkins. In dead frond stems.
Tricopterygid. (?).

Homoptera

Oliarus halehakū Giffard.

Hymenoptera

Toxeuma sp. Parasite of *Proterhinus epitretus*.