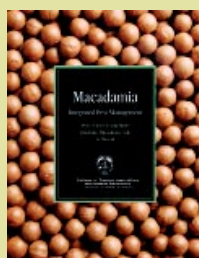


Insect and Mite Pests of Macadamia Nuts in Hawai'i—A Quick Reference Guide

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This poster provides a quick reference guide to CTAHR's book *Macadamia Integrated Pest Management* by Vincent P. Jones, 2002.

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The most important arthropod pests of macadamia are illustrated here, with brief comments on their biology and the damage caused. A page reference to the Jones book is provided for each.

Tropical nut borer (TNB) (Jones, p. 24)

Where do they occur?—TNB are found in sticktight nuts, in nuts on the orchard floor, and in alternative hosts, e.g., carob, asoka fruit, and castor bean.



Egg, larva, and pupa



Adult TNB



Damage to a kernel by TNB

What kills them?—The beetles shown here eat the eggs and larvae of TNB. Chemical control can be achieved with endosulfan.



Predatory beetle larva



Beetle adults

Southern green stinkbug (SGS) (Jones, p. 35)

Where do they occur?—SGS attacks macadamia nuts and various weed species. They attack nuts both on the tree and the ground.



Eggs and different stages of SGS development

SGS causes pitting on kernels, resulting in rejection of nuts by processors.



SGS damage to kernel

What kills them?—SGS eggs are parasitized by a wasp; the adults are parasitized by a fly. The flies lay eggs on the adult SGS (arrow), and their larvae burrow into and kill the bug.



Wasp (1/16" long)



Fly (3/8" long)



Koa seedworm and litchi fruit moth (Jones, p. 42)

Where do they occur?—Koa seedworm moths lay their eggs on the husks of macadamia nuts. The larvae then bore into the husk or kernel, if the shell has not yet hardened.



Eggs (3/100" diameter)



Larvae may bore into the kernel



Adult Koa seedworm moth



Koa seedworm damage to macadamia kernels

What kills them?—No parasites of their eggs are found here. Some parasitic wasps attack and kill the larvae. Chemical control of Koa seedworm is not recommended.



Wasps (four species) (bodies ~1/16" long)

Some minor pests

Broad mites feed on macadamia flowers, leaves, and fruit; damage to flowers may be significant (Jones, p. 52).



Broad mite damage on husks

Flat mites rarely cause economic damage (Jones, p. 54).

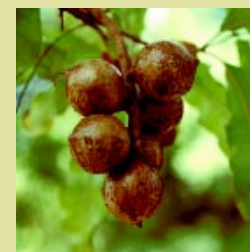


Flat mite damage on husks

Redbanded thrips feed on husks and leaves. They may cause malformation of leaves (Jones, p. 56).



Thrips damage to leaves



Redbanded thrips damage to husks



Redbanded thrips juveniles have red bands; adults are black