Living Plants in Hawaii Attacked by *Coptotermes formosanus*[1]

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ABSTRACT

Forty-seven species of living plants in 27 families were found infested by *Coptotermes formosanus* Shiraki in Hawaii. The symptoms caused by the infestations were dependent on the mode of attack. Although an actual value was not placed on the economic losses caused by the attacks, evidence indicates that the losses are substantial.

The Formosan subterranean termite, *Coptotermes formosanus* Shiraki, is a xylophagous species which can feed and survive on almost any material containing cellulose. It is the most serious structural pest in the Hawaiian Islands. In fact it is the single most destructive insect in Hawaii (Lai 1977). *C. formosanus* attacks finished products such as books, cardboards, lumber, fabric, paper, etc.

In addition to finished products, *C. formosanus* will attack many living plants. There are several ways in which the termite may attack the plant. With many of the large trees, the main attack will be in the heartwood. Occasionally the termites may tunnel to the surface of the tree and build tunnels at the surface indicating that the tree had been attacked. The tree appears normal and healthy since most of the living parts of the tree are undamaged. However, since the support structure of the tree has been destroyed, it can easily be blown over by high winds. Trees falling because of attacks by *C. formosanus* have injured people, crushed homes, cars, and caused other property damage.

Secondly, the termites may feed directly on the roots and kill the plant. The plant takes on a wilted appearance before dying. This occurs because the termites have destroyed so much of the roots and root hairs that the plant cannot take up water and nutrients. This frequently happens with citrus and eucalyptus.

Thirdly, termites may girdle trees and large shrubs. As girdling progresses, some of the branches above the damaged area may show signs of wilting. The tree dies when the trunk is completely girdled.

In a fourth type of attack the termites infest all parts of the plant at about the same time. This usually occurs with shrubs and smaller plants. Termites can be found in the stems, in the roots, in edible parts such as fruits, corms, etc. This attack also kills the plant.

Although *C. formosanus* is now known to attack many living plants in Hawaii, the economic losses caused by these attacks are not known. It is apparent that these losses are significant since termites have attacked and reduced the yields of sugar cane, and other economic crops. In addition it has attacked ornamental and fruit trees, such as avocado, mango, octopus tree, and eucalyptus which are commonly grown in urban

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TABLE 1. Living plants in Hawaii attacked by *Coptotermes formosanus* Shiraki.

Plants			Location		
Family	Species	Common Name	Island	Area	Year
Anacardiaceae	*Mangifera indica* L.	Mango	Oahu	Bingham Tract	1974
	Schinus terebinthifolius Raddi	Christmas Berry	Oahu	Matsonia Drive	1974
Apocynaceae	*Vinca minor* L.	Small Periwinkle	Oahu	Punchbowl	1976
	Plumeria obtusa L.	Singapore Plumeria	Oahu	Kailua	1982
Araliaceae	*Brassaia actinophylla* Endl.	Octopus Tree	Oahu	U.H. Campus	1974
	Polyscias quilfoylei (Bull) L.H. Bailey	Panax	Oahu	Nuuanu	1973
Araucariaceae	*Araucaria heterophylla* (Salisb.) Franco	Norfolk Island Pine	Oahu	Nuuanu	1974
	Agathis robusta (Moore) F. Muell.	Queensland Kauri Pine	Oahu	Makiki	1978
Brassicaceae	*Brassica oleracea* L.	Head Cabbage	Oahu	Pearl City	1981
	Raphanus sativus L.	Radish	Oahu	Pearl City	1982
Caricaceae	*Carica papaya* L.	Papaya	Oahu	Kailua	1979
Casuarinaceae	*Casuarina equisetifolia* L.	Ironwood	Oahu	Poamoho	1975
Celastraceae	*Elaeodendron orientale* Jacq.	False Olive	Oahu	U.H. Campus	1976
Chenopodiaceae	*Beta vulgaris* L.	Red Beet	Oahu	Pearl City	1983
Dicksoniaceae	*Cibotium* spp.	Hawaiian Fern	Hawaii	Paradise Park	1975
Euphorbiaceae	*Aleurites moluccana* (L.) Willd.	Kukui Nut	Oahu	U.H. Campus	1973
	Ricinus communis L.	Castor Bean	Oahu	U.H. Campus	1974
Gramineae	*Cynodon dactylon* (L.)	Bermudagrass	Oahu	Manoa	1979
	Saccharum officinarum L.	Sugar Cane	Hawaii, Oahu & Kauai	Mauna Kea Sugar Co., Ewa & Lihue	1971
	Zoysia spp.	Zoysia	Oahu	Kailua	1982
	Zea mays L.	Corn	Oahu	Waimanalo	1974

Lauraceae	*Persea americana* Mill	Avocado	Kauai, Oahu	Hanapepe, Manoa	1974
Leguminosae	*Acacia koa* Gray	Koa	Oahu	Maunalani Heights	
	Cassia fistula L.	Golden Shower	Kauai	Waimea	1974
	Cassia javanica L.	Rainbow Shower	Oahu	Kalihi	1975
	Delonix regia (Bojer) Raf.	Poinciana	Oahu	U.H. Campus, Moiliili	1974
	Leucaena glauca (L.) Benth.	Haole Koa	Oahu, Kauai	U.H. Campus Waimea	1974
	Prosopis pallida (Humb. & Bonpl. ex. Willd.) HBK	Kiawe	Oahu	Sand Island	1973
	Samanea saman (Jacq.) Merr.	Monkeypod	Oahu, Maui	Manoa, Wailuku	1964
Malvaceae	*Hibiscus* spp.	Hibiscus	Oahu	U.H. Campus	1972
Meliaceae	*Swietenia mahagoni* (L.) Jacq.	Mahogany	Oahu	Pawaa	1982
Moraceae	*Ficus* sp.	Banyan	Oahu	Kailua	1974
	Cannabis sativa L.	Marijuana	Oahu	unknown	1982
Musaceae	*Musa* sp.	Banana	Oahu	Kailua	1974
Myrtaceae	*Eucalyptus* sp.	Eucalyptus	Oahu	U.H. Campus	1971
	E. pilularis sm.	Blackbutt Eucalyptus	Kauai	Kalepa Mt.	1975
	Eugenia cuminii (L.) Druce	Java Plum	Oahu	Waiahole Valley	1975
	Melaleuca leucadendra L.	Paper Bark	Oahu	Pearl City	1980
	Tristania conferta R. Br.	Brush Box	Oahu	Waiahole Valley	1975
Palmae	*Cocos nucifera* L.	Coconut	Oahu	Waikiki	1974
Pandanaceae	*Pandanus odoratissimus* L.f.	Pandanus	Oahu	U.H. Campus	1974
Pittosporaceae	*Pittosporum* sp.	Pittosporum	Oahu	Kahala	1977
Rosaceae	*Rosa* sp.	Rose	Oahu	Niu Valley	1974
Rutaceae	*Citrus limon* (L.) Burm.f.	Lemon	Oahu	Waialae	1974
	C. aurantiifolia (Christmann) Swingle	Lime	Oahu	Kaimuki	1976
Sapotaceae	*Achras zapota* L.	Chico	Oahu	Makiki	1982
Solanaceae	*Capsicum annum* L.	Bell Pepper	Oahu	Lualualei	1977
Verbenaceae	*Lantana camara* L.	Lantana	Oahu	Kalihi	1983

Honolulu. Many panax and hibiscus hedges have been destroyed by the termites. Moreover, the feeding of the termites on live tissues may enable plant pathogens to enter through the wounds. This would significantly increase the damage caused by the termite.

Although Harris (1969) listed 32 species of plants attacked by various species of termites, no list has been compiled for *C. formosanus.* We present here a list of 48 plants in 27 families attacked by *C. formosanus* in Hawaii (Table 1). This list is comprised mainly of records from the island of Oahu since the termite is most widespread on this island and most of the work on *C. formosanus* is being done on this island. There is no doubt that this list will be greatly expanded in the future as people become more aware of the symptoms caused by termite attacks.

The nomenclature of the plants in this list follows that of Neal (1965) and Terrell (1977).

The table lists the earliest date that each plant species was found infested on each island. Subsequent observations were not recorded in the table.

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