

## Whence the Termites of Hawaii?

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(Presented by O. H. Swezey at the meeting of March 1, 1923.)

On a recent visit to the Museum of Comparative Zoology, Cambridge, Mass., through the kindness of Mr. Nathan Banks, I was able to examine a small collection of termites from Hawaii. Among this material were large-sized soldiers of a species of *Neotermes* which may be *Neotermes connexus* var. *major* Sny. I recently described this variety from dealated adults collected at Kaiwiki. The label in the vial of the material from the Museum of Comparative Zoology was merely "Hawaiian Islands."

Very few termites are known from Hawaii; but five species have been described, four being in the more primitive family Kalotermitidae and one being in the intermediate family Rhinotermitidae; no species in the more highly specialized family Termitidae are known from Hawaii. A list of the species of termites of Hawaii showing family relationship and occurrence follows:

### Family Kalotermitidae.

<i>Neotermes connexus</i> Snyder.....	All Islands
<i>Neotermes connexus</i> var. <i>major</i> Snyder.....	Hawaii, Kaiwiki
<i>Kalotermes immigrans</i> Snyder.....	Oahu, Honolulu
<i>Cryptotermes piceatus</i> Snyder.....	Oahu, Honolulu

### Family Rhinotermitidae.

<i>Coptotermes intrudens</i> Oshima.....	Oahu, Honolulu
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It would be interesting to know whether these termites are native to Hawaii or not. Students of the fauna of Hawaii claim that there is only one native species of termite, namely the mountain form, *Neotermes connexus* Snyder, formerly supposed to be "*Calotermes*" *castaneus* Burmeister of the United States and the West Indies. *Neotermes connexus* Sny. is a true forest insect, confining itself to the mountain forests, but occurs on all the islands. It is sometimes injurious to living forest

trees but does not cause any extensive dying of trees. *Kalotermes immigrans* Snyder, believed to have been *Kalotermes marginipennis* Latr. of North and Central America and the West Indies, is believed to have been introduced. This species occurs in dead trees and other timbers on the lowlands. Nevertheless it is known to have been present in Hawaii since 1883, which is also the first record of *Neotermes connexus*. *Cryptotermes piceatus* Snyder, believed to have been *Cryptotermes brevis* Walker, has been known to occur in Hawaii only since 1904, and with *Coptotermes intrudens* Oshima, known to occur in Hawaii only since 1913, is responsible for the greater part of the destruction of the woodwork of buildings, furniture and other timber in Honolulu. Both of these termites are supposed to have been introduced into Hawaii and are confined principally to Honolulu, although spreading rapidly.

The species in the family Kalotermitidae occurring in Hawaii are related to species occurring in the United States and the West Indies, whereas *Coptotermes intrudens* is related to a species of *Coptotermes*, namely *formosanus* Shiraki, of Japan and Formosa. It may be that some of these species have been introduced into Hawaii and have since developed into distinct species. However, *Neotermes connexus* and *Neotermes connexus*, var. *major* seem to be native species and I should not be surprised if *Kalotermes immigrans* were also native. A single specimen, possibly a variety of this species, collected at Waikiki is lighter colored, longer, with longer, wider head, and has the pronotum relatively shorter in proportion to its width; the wings are also longer; membrane of wing rugose between median and subcosta. Of course it may be that it has been introduced and it is splitting up into varieties. Another species collected on Hawaii, at Hilo in July, 1900, by H. W. Henshaw, is apparently new. More material is needed to definitely determine whether these are varieties or distinct species.

Recently Claude Fuller has described a species of *Cryptotermes* from Durban, South Africa, which is very close if not identical with *Cryptotermes brevis* Walker of Southern Florida and the West Indies. Fuller named this species *pseudobrevis*. It was confined to one carpenter shop in one locality. Such species of termites living in dry, sound wood may easily become

cosmopolitan through commerce. Strict enforcement of quarantine laws will prevent much of such distribution.

Recent systematic work on termites is giving us concise records on distribution. *Reticulitermes flavipes* Kol. is found to occur only in the eastern portion of the United States. *Leucotermes tenuis* Hagen of America includes three other distinct species. *Neotermes castaneus* Burmeister is a definite species of restricted distribution.

May I not make a plea for a more thorough survey of the distribution of termites in Hawaii and the collection of specimens of soldiers with winged forms, if possible! Such specimens can be placed in alcohol and sent to the United States National Museum. Such a survey may enable us to better determine the status and relationship of Hawaiian termites.

A description of the soldier of *Neotermes major* Snyder is appended.

#### **Neotermes major** Snyder.

*Soldier*.—Head light castaneous-brown, darker anteriorly, broad, but longer than broad, fairly flat, but slightly arched, area of epierianial suture slopes to anterior and is slightly depressed, head with scattered long and short hairs. Width of gula at front nearly three times width at center.

Eye spot purplish, elongate (2 mm. long) slanting.

Labrum yellow-brown, broader than long, rounded and with long hairs at apex.

Mandibles black (reddish brown at base), fairly stout, slenderer and incurved at tips; left mandible with two sharp, pointed teeth at middle and a basal molar; right mandible with one sharp, pointed tooth at middle and basal molar.

Antennae light castaneous-brown, 16 segments, pubescent; third segment elongate, clavate, nearly as long as fourth and fifth segments together.

Pronotum yellow-brown, darker rim at anterior margin, broader than head, deeply roundedly concave at anterior margin, corners high anteriorly, sides roundedly narrowed to posterior margin, latter is slightly emarginate; with scattered long hairs.

Legs with tibiae swollen.

Abdomen yellow-brown, with long hairs.

Measurements: Length of entire soldier, 10.5+ (?) mm.; length of head with mandibles, 4.9-5.20 mm.; length of head without mandibles (to anterior), 3.30 mm.; length of left mandible, 1.70 mm.; length of

pronotum, 1.70 mm.; length of hind tibia, 1.80-1.90 mm. (aver. 1.85); width of head, 2.5-2.7 mm.; width of pronotum, 2.8 mm.

Described from three soldiers in the Museum of Comparative Zoology, Cambridge, Mass., in a vial with label "Hawaiian Islands." This soldier is believed from its size, etc., to be the same species as *Neoterme connexus*, var. *major* Snyder, described from dealated adults from Kaiwiki, Hawaii. If so, it is a valid species, not a variety; if not, it is a new species. Two of these specimens from which the description was made are in the Museum of Comparative Zoology, Cambridge, Mass., the other is in the U. S. National Museum, Washington, D. C.