

# **Infestation of *Sybra alternans*, (Cerambycidae: Coleoptera), a Long-Horned Beetle in a Hawaii Banana Plantation**

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## **Summary**

A long-horned beetle, *Sybra alternans* Wiedemann (Cerambycidae: Coleoptera), was found in a Hawaii banana farm feeding on Williams hybrid banana fruits on the dried blossom end. The infestation was surveyed and evaluated. This beetle was first reported in the Hawaiian Islands in 1917. Its host range was described by many authors; however, banana has not been reported as a host. This is the first report of this beetle species infesting banana. The significance of this finding is discussed. A broader and periodical inspection of this beetle on banana farms is suggested.

## **Introduction**

One of the early shipments of Hawaii bananas to Japan was rejected at the port of entry on July 16, 1999, due to the presence of an actionable immature insect found feeding inside one of the fingers. Being an actionable pest and an unknown species, fumigation which is required of almost all shipments of fresh fruits into Japan was refused. The information provided by the importer included pictures of the immature insect inside the banana which looked like a caterpillar. The economic impact of such a rejection is significant to any sized farm. Consequently, a field survey was requested with the objective of identifying the pest and determining the extent of its infestation for this banana exporting farm.

## **Materials and Methods**

Four out of thirty blocks, blocks 5, 17, 27, and 28, were randomly selected and sampled. The size of the blocks were 8.6, 10.2, 8.7, and 15.0 acres, respectively. Thirteen additional samples were observed at the packing station.

Only banana bunches ready for harvest were surveyed in the field. The maximum harvesting age was 13 weeks. A total of 20 bunches were sampled with five bunches per block. Infested

fingers were carefully cut open at the blossom end to determine the level of damage and whether the caterpillar-like, immature insects were still alive and feeding in the pulp. Further, 69 banana fingers with infested blossom ends out of the 20 sampled bunches were collected and taken to the laboratory for further evaluation.

## Results

**Field observation.** In fields 5 and 17, over 20 percent of the bananas were damaged on the dried blossom ends. When damaged bananas were carefully cut open at the blossom end. Immature insects were found boring in and feeding in the banana pulp of many of the individual fingers. One adult long-horn beetle was found at the dried blossom end and collected. One caterpillar was found on the skin of a banana fruit causing scarification. However, the immature insects that were feeding on the dried blossom ends of the banana fruits were recognized as beetle larvae, not caterpillars. The larvae were collected. When cut at about one inch from the tip of the infested finger, a black tunnel caused by the feeding larvae could be seen in the center of the fruit. In fields 27 and 28, beetle damage count was as low as one out of 30 bananas (3.3%). Thirteen cluster samples were examined for beetle damage at the plantation's banana packing plant. An average of 8.5 percent beetle larvae infestation rate was recorded.

**Laboratory rearing.** The 69 infested fingers collected from the fields were held in insect rearing cages in the laboratory for 13 days. Twenty-seven were cut at the tips and each tip was transferred to a 30 ml plastic rearing cup for insect emergence. The remaining bananas were held in the rearing cages. Two adult long-horn beetles emerged from the holding cages. Unfortunately, the banana tips in plastic cups started to mold after four days. A caterpillar was observed in one of the 27 cups, but identification of the caterpillar was not made due to the molding of the banana tips.

**Insect identification.** The adult long-horn beetle caught on a banana blossom tip in the field and the one that emerged from the rearing cages were identical and identified by an insect taxonomist from the Hawaii Department of Agriculture as *Sybra alternans*. The caterpillar collected on the banana skin in the field was identified as the banana moth, *Opogona sacchari*.

## Biology, Distribution and Host Range

The limited literature on *Sybra alternans* only focused on its distribution and host range, whereas its biology was barely described. However, according to Duffy (1953), the mature larva is 12

mm in length, 2.9 mm breadth, meso- and metanotum slightly shining, smooth abdomen with ampullae not bilobed. Swezey (1950) revealed that *Sybra* beetle's life cycle was equal or less than four months, with a rather long larval stage as cerambycid beetles in general. It has nocturnal activities and seems to prefer host plants that are thoroughly dried (Notes & Exhibitions 1951). The beetle feeds on the inner fermenting and decaying bark and the outer wood. As a result, it must obtain growth before food materials become dried. The larvae eventually bore into the wood to PUPATE for final transformation (Swezey 1950).

**Distribution.** *Sybra alternans* was distributed to Indonesia, Philippines, Micronesia, and Hawaiian Islands (Gressitt 1956, Duffy 1963). *Sybra alternans* was one of the species that was recorded in the collections from Midway Atoll where many insects were introduced from Hawaii through shiploads of soil intended for a cable station (Suehir 1960). It was also featured in Kwajalein Atoll's collection, 1960 to 1970s (Sugerman 1972, 1979). In Hawaii, it was first recorded in Honolulu, Oahu where it was recognized in material coming from Philippines on July 6, 1917 (Fullaway 1922). Subsequently, it was again reported on the Island of Hawaii in 1928 (Notes and Exhibitions 1928), on the Island of Molokai in 1930 (Notes and Exhibitions 1934), on the Island of Lanai in 1939 (Sakimura & Linford 1940), on the Island of Maui in 1943 (Krauss 1944<sup>1</sup>), and on the Island of Kauai in 1944 (Krauss 1944<sup>2</sup>).

**Hosts.** *Sybra alternans* has a wide host range including dry limbs of live fig tree (Notes & Exhibitions 1927); stems of jack beans (Notes and Exhibitions 1928); dead aerial root of Pandanus (Swezey, 1931); dead stems of most kinds of trees and shrubs of the lowlands (Notes and Exhibitions, 1934); dead stems of basil and cocklebur (Swezey 1935<sup>1</sup>); dead twigs of cotton (Swezey 1935<sup>2</sup>); dead branch of breadfruit tree (Notes and Exhibitions 1935, 1949); pineapple (Sakimura & Linford 1940); garden bean (Holdaway & Look 1942); *Cordia* fruits (Notes & Exhibitions 1947); dead *Euphorbia* plants (Notes & Exhibitions 1951, Duffy 1953); dying stems of *Euphorbia multiformis* and algaroba (*Prosopis*) trees, and have been reared from Hau (*Hibiscus*) (Swezey 1954); dead branches of *Artocarpus*, *Barringtonia*, *Cycas*, *Triphasia* (Duffy 1963, Gressitt 1956); peduncles of passion fruit (in this case, the damage caused some fruits to drop prematurely) (Notes and Exhibitions 1957); *Hibiscus*, *Ficus*, *Cordia*, pseudo-bulbs of orchids spp. (Notes and Exhibitions 1949, Duffy 1953, 1963); klu pods and its seed coats (Klu pods, at various stages in their development or disintegration, were found to be occupied by many different insects, mites and other organisms) (Hinckley 1960). It was believed that Hawaiian Carambycid species are associated with introduced plants and therefore occur

primarily at low altitudes (below 900 meters) (Gressitt & Davis, 1972). *Sybra alternans* was also reported feeding on sugarcane smut chlamydospores in Hawaii (Bowler et al. 1977), and it was observed as a secondary pest on the dying branches of *pittosporum tobira* hedge (Notes and Exhibitions 1981).

## Discussion

***Sybra alternans* infestation in banana.** The significant finding of this survey was that the immature insects feeding on the dried blossom ends of the banana fruits were the beetle larvae, not the caterpillars. Larvae from the family of Cerambycidae were described as wood-boring and destructive to shade, forest, fruit trees and freshly cut logs (Borror et al., 1989). *Sybra alternans* are known to feed on dead and decaying plant parts and has been reported on several plants (Swezey 1954). However, there have been no reports of infestation of banana. Therefore, this report could be the first instance of *Sybra alternans* in banana. Different fields had different infestation rates which might be affected by the vegetation, moisture in the surrounding areas, and field sanitation. Beetle infestation can spread and increase in a short time. Therefore, control strategies are imperative.

**Economic impact.** The economic impact of *Sybra alternans* is the function of several factors, such as farm size, yields, price per box or pound, transportation cost, crop insurance, etc. The overall loss to the banana industry if not treated, could be worth millions of dollars (Fonsah & Chidefelu, 1995). Detailed economic impact will be discussed in a separate paper.

## Summary and Recommendations

An unknown pest was found in one of the early shipments of Hawaiian banana to Japan and prompted a rejection. Consequently, a field survey was conducted in the plantation where the banana originated, aimed at identifying the pest and recommending various eradication strategies.

Four out of 30 blocks were randomly selected and sampled. Thirteen additional cluster samples were carried out at the packing station. Only bunches ready for harvest were surveyed in the field, with a maximum harvesting age of 13 weeks. Furthermore, 69 infested fingers were taken to the laboratory for further evaluation.

Over 20 percent of the samples from fields 5 and 17, and 3.3 percent of fields 27 and 28 were infested. The rationale behind this percentage disparity is that fields 5 and 17 are closer to the

dumpster while fields 27 and 28 are some distance away. The two adult long-horned beetles that emerged from the holding cage were identified as *Sybra alternans*, whereas the caterpillar feeding on the banana skin was identified as the banana moth, *Opogona sacchari*.

Other findings reveal that the larvae from the family of Cerambycidae were described as wood-boring and destructive to shade, forest, fruit trees and freshly cut logs. However, the significance of our finding is that this pest also attacks banana even though it has never been reported.

Possible infestations of *Sybra alternans* should be inspected in banana plantations in Hawaii and other banana growing regions around the world. A thorough study is recommended on the biology, host range, damage and economic impact in banana the industry if more infestations are discovered.

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