

the field in closed box cars had clouds of beetles emerge when the doors were opened at the cannery platform. In contrast with this situation, few beetles were noticeable about the boxes of fruit on open cars. During transit most of the pests fly and are blown away from the open crates. Hence, I concluded, the situation would be considerably relieved by openings in the box cars—the beetles flying to the light are blown away.

The wind relation is another consideration in combating these insects in the cannery. Factories with receiving platforms to the windward are considerably troubled with the pest, while just the reverse is true where the fruit is received on the leeward side. In this latter case, the beetles when disturbed take wing and are wafted away from the cannery by the prevailing wind. This is particularly noticeable in one of the canneries favorably situated in Honolulu.

That the souring beetles travel far on the wing is another factor that must be taken into consideration in dumping cannery waste. They are strong fliers with the wind, as I found in one instance. In this case it was difficult to account for the great numbers of beetles entering a cannery with no breeding material in the immediate vicinity. I finally traced the source to a dump of pineapple refuse from another cannery more than a mile to the windward. Hence, we may conclude that dumping the refuse is a poor policy under any consideration, for the hordes of insects produced soon spread to fields of growing plants, curtailing production, and eventually, as we have seen, many travel back to the cannery with the ripe fruit. Therefore it would appear that best results for the industry can only be secured by the strictest sanitary field practice. It is there that the beetles breed, and clean culture will go far toward removing the trouble from these insects in the cannery.

Notes on Some Bugs Associated with Pineapples in Hawaii

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(Presented at the meeting of Jan. 2, 1930)

During our study of yellow spot disease of pineapples, various Hemiptera came in for investigation. I wish here to record briefly notes on three species of Heteroptera.

Leucopocilla albofasciata Reuter, is a small mirid, about 2 mm. in length. It is common in weedy pineapple fields, breeding on purslane, nightshade, etc. The eggs, typical for the family, are long-oval shaped with a circular cap, and are imbedded at an angle into the tissues of both leaves and stem of these plants. When caged with seedling pineapple plants, the bugs oviposited in the tender white tissue of the leaves, in the axillary region. The injury was not serious, however; the water-soaked appearance of the plant tissue surrounding the eggs usually disappeared soon after hatching of the insects.

This species has evidently been in the Islands for some time. The first specimen captured is in the collection of the Experiment Station of the Hawaiian Sugar Planters' Association, taken by Terry on Kauai, October 8, 1909.

This species was described in 1907 from specimens taken by Mr. E. P. Van Duzee in Jamaica. It has subsequently been reported from Pennsylvania, Florida, and California. Mr. Van Duzee, who determined my material, says: "It is a common alfalfa bug in Southern California, and must have been introduced to the Islands."

Pycnoderes 4-maculatus Guerin, was also determined by Mr. Van Duzee, who states that it is a species from the southern United States, especially the southeast. He says it was described from Cuba and has been recorded from Mexico. We captured the first specimens in the Islands on purslane among old pineapple plants, Dec. 11, 1929. It is a mirid about 3 mm. in length, mottled gray and white, legs yellowish white, with distal two-fifths of hind femora black. The specific name refers to four conspicuous white spots located on the back, two on each side near the edge. Essig¹ calls this the squash capsid, *Pycnoderes quadrimaculatus* Guerin. He says it is a pest of cucurbs and is particularly injurious to cucumbers, cassaba, canteloupes, muskmelon, squash, and watermelon, but also feeds on beans, lettuce, other garden vegetables, and weeds. To date it has not been reported as a pest in Hawaii.

Triphleps persequens White, is a fairly old resident in Hawaii. It belongs to the family Anthocoridae, and is a valuable predator upon aphids, thrips, and other minute insect pests. Search for the

¹ Insects of W. N. Amer. p. 363 (1926).

eggs of this species resulted in the discovery that they were also imbedded in the tissue of the leaves of purslane. The eggs look quite like those of the mirid bugs. This species also inserted its eggs into pineapple leaves when caged upon these plants, but no serious harm resulted. While investigating oviposition, I found a paper by H. Garman and H. H. Jewett,² dealing with the biology of *Triphleps insidiosus*, of considerable assistance. This paper has a splendid illustration, showing the eggs inserted into corn silk. During our study of thrips, which transmit the disease yellow spot of pineapples, we found that *Triphleps persequens* quickly congregated whenever thrips became abundant, resulting in the rapid reduction of the pest.

² Ky. Agr. Exp. Sta. Bul. 187, pp. 587-88, (Dec. 1914).