Field Study to compare the effectiveness of OneGuard, Imajet10, and Nanotek2000 in preventing damage from Coconut Rhinoceros Beetle in Waipio, Oahu, Hawaii

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BACKGROUND

Coconut Rhinoceros Beetle (*Oryctes rhinoceros* L., CRB) was first detected on O'ahu in 2013 but since then has become a major pest of coconut and other palm species. CRB bores into the palm crown, causing damage to developing fronds and sometimes complete crown death. Ideal management of CRB uses an integrated pest management (IPM) approach including preventative, cultural, physical, biological, or chemical practices. Current management for nursery and landscape applications focuses on the palm tree to target adults with the use of synthetic insecticide injections, contact insecticide spray, or soil drenching. In response to requests from stakeholders, the objective of this trial was to compare the effectiveness of different products according to their recommended method of application.

FIELD STUDY

A three-month field trial was conducted in a landscape nursery in Waipio, Island of Oahu, Hawaii, managed by the Department of Urban Forestry. The coconut palms ranged from 6 to 12 ft trunk height, and had visible damage from CRB.

On February 20, 2024, sixteen palms were selected for the study and treated on the same day. Palms were grouped in 4 blocks with 4 palms each, for a total of 16 palms. Palms in each block were selected with similar location, height, and CRB damage levels and each palm received a different treatment.
The palms were treated with one of the following treatments:

- Control (untreated).
- OneGuard canopy drench: 1.5 ounces of OneGuard concentrate per gallon of water with 0.5 gallons of dilution applied to each palm.
- Imajet 10 trunk injection: 4ml of ImaJet 10 (10% imidacloprid) per 1" of DBH. Imajet volumes were 32ml, 36ml, 36ml, and 34ml for the palms at this site.
- PTWK (Nanotek2000 Palm Tree Weevil Killer) soil drench: 2 tbsp diluted in 5 gallons of water with 10 quarts of the solution applied in holes around each palm, as directed in the product container.

Palms were evaluated on May 20, 2024, 3 months after treatment. Since CRB damage occurs in the heart or spear of the palm, it typically takes months to be visible on newly emerged fronds. New fronds emerge (approx. 1 per month) from the apex of the crown and these carry the most recent damage. The two youngest leaves were scored as follows:
0 = no damage
1 = moderate damage, palm frond not cut through mid-rib (figure 1)
2 = severe damage, palm frond cut through mid-rib (figure 2)

The sum of their scores was used to determine the total damage per palm. Since individual frond damage scores are summed, the total damage score for each palm can range from zero to four.

A palm health observation was performed on June 12, 2024 and palms with visible beetles in boring holes were dissected to observe the level of boring. Palms with no evidence of recent boring were not dissected so we do not provide a quantitative comparison of the number of beetles recovered or number of boreholes.

Figure 1: Examples of moderate damage (score 1, left); and severe damage with leaf length reduced due to boring activity through the mid-rib (score 2, left).

RESULTS

Statistical significance was observed at the 90% confidence level. Statistical analysis using 95% confidence level did not reveal statistical significance. See tables and graphs below for statistical analysis.

Table 1. Coconut Rhinoceros Beetle damage analyzed with 95% level of confidence.

Tukey HSD	
	Subset
Treatment	1
IMD	1.5 a
SPRAY	1.5 a
PTWK	2.8 a
CONTROL	3.2 a
Sig.	0.090
b. Alpha = .05.	

Table 2. Coconut Rhinoceros Beetle damage analyzed with 90% level of confidence.

Tukey HSD[a,b]		
	Subset	
Treatment	1	2
IMD	1.5 a	
SPRAY	1.5 a	
PTWK	2.8 ab	2.8 b
CONTROL		3.2 b
Sig.	0.210	0.934
b. Alpha = .10.		

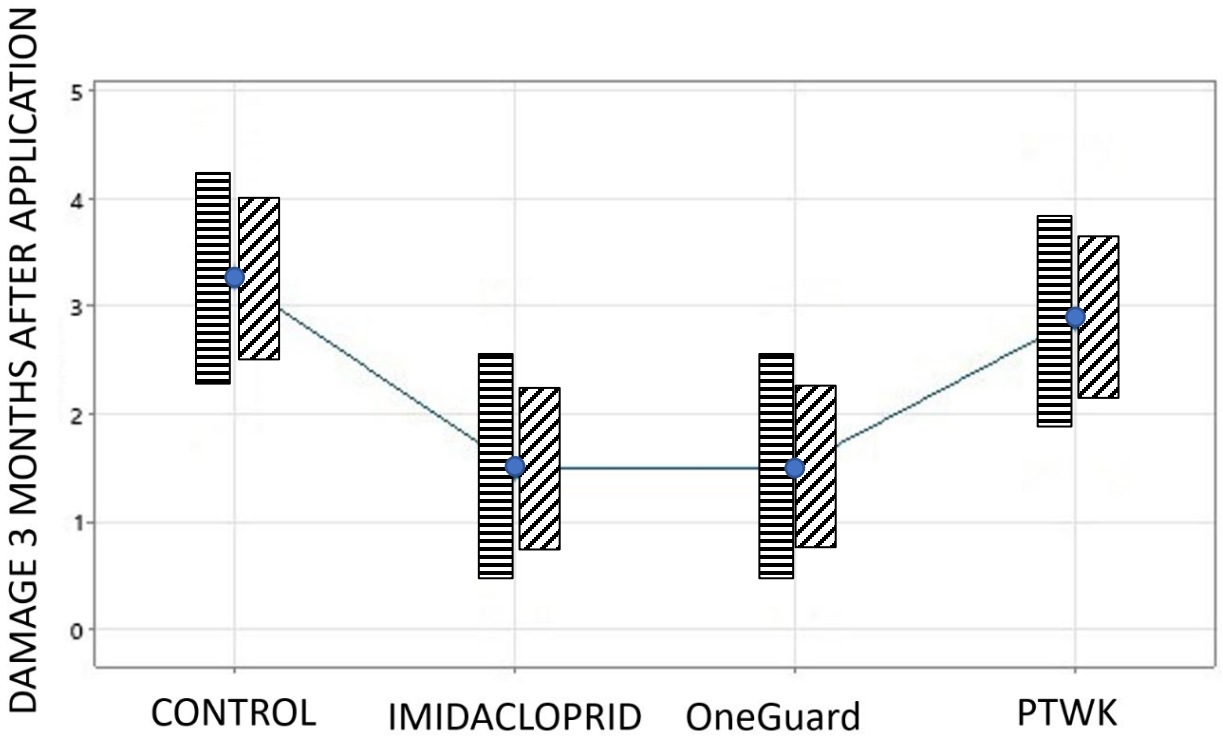

Figure 2. Average scores of coconut rhinocerous beetle in palms trees, 3 months after treatment. Bars with horizontal lines represent the error at 95% confidence. Bars with diagonal lines represent error at 90% confidence.

When visually inspected on June 12, 2024, several palms were found to host live beetles and active borings at the young fronds or spear. Live beetles were observed in palms treated with Imajet10, however, no active boring holes were found. No live beetles were found in the young fronds or spear of palms treated with OneGuard, although several dead beetles were found at the base of palms treated with OneGuard. Several live beetles and boring holes were found in palms treated with PTWK and in control palms (Figure 3).

Figure 3. Two CRB adult beetles feeding from heart of palm treated with PTWK, 3 months and 21 days after treatment.

CONCLUSION

This field study suggests that, under the conditions of this study, palms treated with the canopy spray with a multimode insecticide (OneGuard) and trunk injections of imidacloprid (Imajet10) provided noticeable levels of protection when compared to untreated palms. Palms treated with PTWK (Nanotek2000 Palm Tree Weevil Killer) showed similar level of damage as untreated palms and was ineffective against CRB damage. The statistical significance of the results is not robust likely due to a small sample size and short treatment interval. This study provides some

insight to inform near-term decisions on treatment. Further studies with more samples and a longer term should provide a clearer comparison on the performance of products for control of CRB.

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