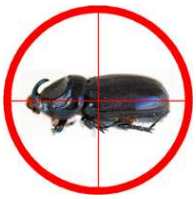
Research in Support of the Guam Coconut Rhinoceros Beetle Eradication Project



Cypermethrin Applied to Coconut Palm Crowns as a Prophylactic Treatment for Prevention of CRB Damage

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November 5, 2013*

After learning that some pest control operators on Guam are attempting to protect high value ornamental palms from CRB damage by spraying crowns with cypermethrin, we decided to test this method as a valid IPM tactic. We applied biweekly spray applications of cypermethrin to the crowns of 32 young coconut palms along the entrance road to the University of Guam Agricultural Experiment Station at Yigo, Guam. As a damage index, we counted how many of the youngest four fronds on each tree showed signs of CRB damage. The damage index fell from 4.00 to 0.62 during 5.5 months of treatment. Speay residue collects at the base of petioles which is the site at which CRB initiates bore holes. In daily inspections of the ground under each treated palm, we found 29 dead or dying CRB adults, indicating that they were knocked down prior to boring into the crowns.

*Revised February 16, 2014
C:/Documents and Settings/Administrator/My Documents/CRB Tech Reports/crownSpray/crownSpray

Figure 1: Applying cypermethrin to crowns of young coconut trees.

1 Methods

A row of 32 young coconut palms planted along the entrance road to the University of Guam Agricultural Experiment Station in Yigo were sprayed with cypermetherin on a biweekly schedule (Table 2, Figure 1). These trees ranges from 8 to 20 feet in height. As an index of CRB damage, I count how many of the four youngest fronds had distinctive CRB damage. If a spear (an unopened frond) was present, this was considered to be the youngest frond. Damage assessments were performed at the start of the experiment on May 19, 2013 and on November 5, 2013. I checked for and collected daead or moribund CRB adults under each tree each morning.

2 Results and Discussion

All trees were very heavily damaged at the start of the experiment. All of the youngest four fronds on each tree bore signs of CRB damage (Table 1). Thus, the average damage index, on a scale of 0 to 4, was 4.000.

When the trees were observed 5.5 months later, the average damage index had dropped to 0.625. Eighteen of the 32 trees (56%) had none of their four newest fronds damaged and only one tree had all four new fronds damaged.

During the same 5.5 month period, 29 dead or dying beetles were collected beneath the treated trees.

This study was more of an emergency control operation than an experiment. Because we did not reserve untreated trees as an experimental control, we do not know if the reduced damage to new fromds is in response to the cypermethrin applications. However, this is probably the case, because we did observe mortality of adult beetles attacking the treated trees. Because cypermethrin has a quick knockdown effect, as with most pyrethroids. It is likely that the beetles were intoxicated shrtly after arriving and before they were able to bore into the crown. It should be noted that when the canopy is sprayed, the liquid runs down the inside of the petioles and collects at the angle between the petioles and the trunk at the location were CRB initiate their bore holes.

Table 1: CRB damage index (number of four youngest fronds damaged).

	tree	damage20130519	damage20131105
1	3434	4	0
2	3433	4	1
3	3432	4	0
4	3431	4	1
5	3430	4	2
6	3429	4	2
7	3428	4	1
8	3427	4	1
9	3425	4	0
10	3424	4	0
11	3423	4	1
12	3422	4	1
13	3421	4	0
14	3420	4	1
15	3419	4	0
16	3418	4	1
17	3417	4	0
18	3416	4	0
19	3415	4	0
20	3413	4	1
21	3412	4	0
22	3411	4	0
23	3410	4	4
24	3409	4	0
25	3408	4	1
26	3407	4	0
27	3406	4	0
28	3405	4	0
29	3404	4	0
30	3403	4	2
31	3402	4	0
32	3401	4	0

Table 2: Cypermethrin treatments.

	date	application
1	2013-05-18	Demon Max; Â$\frac{1}{2}$ oz per gal; 50 gal; no spreader/sticker
2	2013-06-14	Demon Max; Â$\frac{1}{2}$ oz per gal; 40 gal; no spreader/sticker; rained later in day
3	2013-07-01	Demon Max; Â$\frac{1}{2}$ oz per gal; 40 gal; no spreader/sticker
4	2013-07-15	Demon Max; 1 oz per gal; 40 gal; spreader/sticker
5	2013-07-29	Demon Max; 1 oz per gal; 40 gal; spreader/sticker
6	2013-08-12	Demon Max; 1 oz per gal; 40 gal; spreader/sticker
7	2013-08-26	Demon Max; 1 oz per gal; 40 gal; spreader/sticker
8	2013-09-09	Demon Max; 1 oz per gal; 40 gal; spreader/sticker
9	2013-09-23	Demon Max; 1 oz per gal; 40 gal; spreader/sticker
10	2013-10-07	Demon Max; 1 oz per gal; 40 gal; spreader/sticker
11	2013-10-21	Demon Max; 1 oz per gal; 40 gal; spreader/sticker
12	2013-11-04	Demon Max; 1 oz per gal; 40 gal; spreader/sticker

Table 3: Beetles found beneath sprayed trees.

	date	tree
1	2013-05-19	3418
2	2013-05-19	3427
3	2013-05-19	3428
4	2013-05-19	3431
5	2013-05-19	3417
6	2013-05-21	3433
7	2013-05-21	3418
8	2013-05-22	3412
9	2013-05-23	3407
10	2013-05-26	3407
11	2013-05-28	3427
12	2013-06-04	3407
13	2013-06-04	3413
14	2013-06-08	3430
15	2013-06-14	3407
16	2013-06-17	3406
17	2013-06-17	3432
18	2013-06-22	3401
19	2013-07-06	3403
20	2013-07-23	3411
21	2013-08-02	3434
22	2013-08-10	3401
23	2013-08-10	3431
24	2013-08-13	3417
25	2013-09-03	3416
26	2013-09-15	3410
27	2013-09-20	3429
28	2013-10-12	3406
29	2013-10-12	3410

Table 4: Number of dead or moribund beetles found under each tree.

	tree	nbeetles
1	3401	2
2	3403	1
3	3406	2
4	3407	4
5	3410	2
6	3411	1
7	3412	1
8	3413	1
9	3416	1
10	3417	2
11	3418	2
12	3427	2
13	3428	1
14	3429	1
15	3430	1
16	3431	2
17	3432	1
18	3433	1
19	3434	1