Control of the false codling moth with the Isomate mating disruption technology

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INTRODUCTION

The false codling moth *Thaumatotibia leucotreta* (Lepidoptera: Tortricidae) is a pest of avocado in all major production areas. Relative low rates of infestation are typical of general infestation patterns of these moths on subtropical fruit. However, in a number of cases where conditions are favourable, totricid moths are known to become serious economic pests.

The false codling moth is also a major quarantine pest and certain importing nations placed stringent restrictions on fruit from known false codling moth infested areas. Increasingly strict regulations regarding pesticide usage in traditional importing countries are also forcing growers to consider non-pesticide mitigating practices. The avocado industry is in the fortunate position that there are many alternative products to choose from, but according to Anonymous (2007) none of them are currently registered against this insect.

Mating disruption with the product Isomate proved to be effective during the 2006/07 season and this trial was done to reconfirm these results. Male false codling moths largely use pheromones to locate females. This will only work if the male has to move against a gradient of increasingly higher concentrations of the pheromone. The Isomate pheromone dispensers (**Figure 1**) work by saturating the orchard environment with a synthetic derivative of the false codling moth sex pheromone, making it impossible for the male to locate the female. The advantage of this type of control is that no chemical and hence no residues are deposited on the fruit. The availability of this technology comes at an opportune time as overseas organizations such as NutriClean (www.scscertified.com/foodag/nutriclean) are increasingly marketing pesticide residue free fruit.

Figure 1. An example of pheromone dispensers used during this trial to reduce false codling moth damage.

MATERIALS AND METHODS

The trail site was located on the Boschrand Farm of HL Hall & Sons near Nelspruit (25°26' 03 98 S 30° 57' 43.47E). This site was selected because infestation levels of the false codling moth were higher than the industry mean. Approximately 50 ha of avocados (cv. Pinkerton) were treated and one hectare was left as an untreated control. Due to the volatile nature of this pheromone compound a replicated field trial was unfortunately not possible as treated plots in the vicinity of untreated plots will invariably influence results. To minimize this influence on the control plot, care was taken to select these trees upwind of the prevailing wind direction from treated trees.

Approximately 500 dispensers / ha were placed out during October 2007, this treatment was followed up during February 2008 when another 300 dispensers / ha were placed out.

This trial was monitored every fortnight from the 26th of November 2007 to the 27th of May 2008. In the untreated area ten trees from a single row were selected and twenty fruit were visually inspected for FCM damage symptoms on each tree. On the treated sections five areas within the 50 ha treated block were selected. During every monitoring period five rows were randomly selected in these respective areas and twenty fruit were visually inspected on each of ten trees within a row. Approximately 200 fruit were therefore inspected in the control block and approximately 1 000 fruit were examined in the treated areas during the fortnightly monitoring periods.

Incidence of fruit lesions on both treatment sites were then subjected to a student's t test for independent samples to test for statistically significant differences.

RESULTS

Incidence of damaged fruit followed much the same pattern as that of related tortricid moths on macadamias (Schoeman, 2008) and litchis (Schoeman, 2008) and peaches (Daiber, 1980). These insects apparently do not damage small young fruit and when fruit develop beyond a certain phenological stage, larval damage normally ensue. First lesions on the fruit were observed on the 5th of February 2008. According to Grove (personal communications) a similar study during the previous production season yielded similar results, although small amounts of damaged fruit were found even as early as 5 December. If the length of the life cycle of the larvae is considered, first eggs should probably have been laid during the middle of December 2007 and gravid female moths should

be abundant in the orchard a week or two earlier (early December).

This product was applied during October 2007, which was probably a bit early especially if the relative seasonal abundance depicted in **Figure 2** is considered. In future a marginally later application could be considered.

According to **Table 1** there were statistically significant differences between the two treatments from February 2008 onwards. Interestingly a similar trial on the same block of trees during the previous production season had between 9.6 and 16.8 lesions / 100 fruit in the control block. According to **Table 1** damage experienced during the 2007/08 production season was significantly less. Whether this inter seasonal population decline is a result of Isomate usage, is impossible to tell at the moment. Pack house information gathered during subsequent production seasons should provide further insights regarding long term usage of this product.

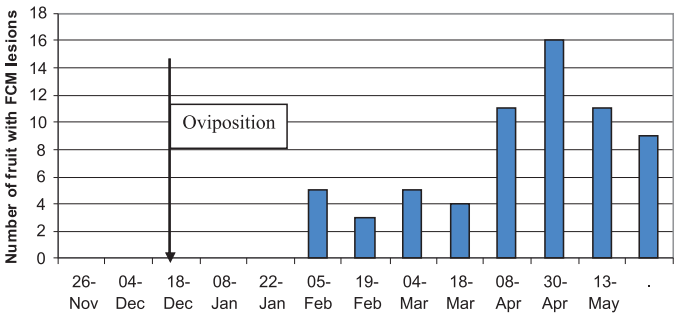

Figure 2. Relative seasonal abundance of false codling moth damage on Pinkerton avocados at Boschrand Farm of HL Hall and Sons near Nelspruit.

LITERATURE CITED

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Table 1. The effect of Isomate mating disruption technology on avocado fruit lesions at Boschrand Farm of H L Hall and Sons near Nelspruit.

	Mean number of fruit lesions/100 fruit				
Date	Control ± SD	N	Isomate	n	T value
5 Feb	4.0 ± 6.324	200	0.6 ± 1.349	1000	0.523
19 Feb	1.0 ± 3.162	200	0.4 ± 0.843	1000	0.591
4 March	4.0 ± 4.216	200	0.6 ± 0.966	1000	0.363
18 March	0	200	0.8 ± 0.699	1000	0.103
8 April	7.0 ± 6.749	200	0.6 ± 0.966	1000	0.016
30 April	4.0 ± 5.164	200	0.4 ± 0.843	1000	0.071
13 May	7.0 ± 8.232	200	0.8 ± 1.032	1000	0.047
27 May	5.0 ± 5.270	200	0.8 ± 1.032	1000	0.035
Total	3.5 ± 2.251	1600	0.626 ± 1.509	8000	0.012