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Control of the Caribbean Fruit Fly on Three Peach Cultivars in Adjuntas, Puerto Rico

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Low-chill peach cultivars ('Flordaprince', 'TropicBeauty', and 'Flordaglo') were evaluated in two sites (Beneficiado and Montaña) in Adjuntas, PR. Fruit yield and quality were severely reduced by Caribbean fruit fly [*Anastrepha suspensa* (Loew)], which had not been previously reported in peaches in Puerto Rico. The objective of this study was to evaluate a control method for this species. To evaluate fruit fly control, a paired design was used. Three pairs of trees per cultivar (similar yield) were chosen in the two peach sites. One of the two sites was sprayed weekly with GF-120 NF Naturalyte® (Dow AgroSciences). Mature fruits were harvested randomly from each tree on four sampling dates. A lower number of fruit fly larvae were observed in fruits from treated trees. Differences in the number of fruit fly larvae between pairs within each cultivar were evaluated by a paired *t* test. Statisical analysis results demonstrated the efficiency of the treatment to control *A. suspensa* in the evaluated peach cultivars. By increasing the treated area, efficacy should improve.

The climate in the mountainous zone of Puerto Rico provides the opportunity to produce peaches [*Prunus persica* (L.) Bastch.] adapted to the subtropical climatic conditions, as an alternative crop for local growers. Low-chill peach cultivars, developed by the Deciduous Fruit Breeding Program (University of Florida, Gainesville), have been evaluated in two sites (Beneficiado and Montaña) in Adjuntas, PR (18°N, 66°W; average temperature: 50 °F (10 °C) minimum; 82 °F (27.8 °C) maximum. The cultivars evaluated showed good production in the first harvest year (Rouse et al., 2006). In 2006, fruit yield and quality were severely reduced by caribbean fruit fly [*Anastrepha suspensa* (Loew)]. The peach is one of the preferred hosts of caribbean fruit fly (Weems and Heppner, 2001) but this fruit fly had not been previously reported in peaches in Puerto Rico. *Anastrepha obliqua* (Macquart), found in McPhail traps close to the peach sites, do not attack the peaches. The objective of this study was to evaluate a control method for *A. suspensa*. A biorational insecticide, GF-120 NF Naturalyte, was used for the control of *A. suspensa*. This product is formulated with Spinosad, a toxicant of natural origin composed of a fermentation product of the bacteria *Saccharopolyspora spinosa* (Thompson et al., 1999). This insecticide has proven effective to suppress different fruit flies like *A. ludens* (Loew), *A. obliqua*, and *A. suspensa* (Prokopy et al., 2003).

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Material and Methods

Experimental sites. Both peach sites [Beneficiado: 1606 ft (489.51 m) AMSL and Montaña 1800 ft (548.64 m) m.a.s.l.] were planted in a randomized complete-block design with six repetitions of four cultivars ('Flordaglo', 'Flordaprince', 'TropicBeauty', and 'UF-Gold'). 'UF-Gold' trees were removed in 2006.

Experimental design. For the evaluation of GF-120 NF Naturalyte we used a paired design. Three pairs of trees per cultivar (similar yield) were selected so one tree of each pair was located in the Beneficiado site and the other in the Montaña site.

Applications. Weekly applications were made at the Beneficiado site only. The GF-120 NF was diluted in warm water (1:1.5 GF-120 NF: water). A manual sprayer SOLO® Model 425 (SOLO Inc., Newport News, VA) was used to spray one side of the tree (30–90 mL/tree).

Fruit harvest and evaluation. Five mature fruits per tree (10 per pair of trees) were harvested on four sampling dates (13 and 26 Apr., and 2 and 9 May 2007). Each fruit was placed individually in plastic containers and kept under laboratory conditions. Fruits were opened and number of larvae counted. Then fruits were placed again in the plastic containers. Every 2 d for the next 2 weeks, fruits were inspected for additional larvae. Difference in number of fruit fly larvae between pairs within each cultivar was evaluated by a paired *t* test.

Table 1. Difference in average number of fruit fly larvae per fruit within pairs of three peach cultivars in Adjuntas, Puerto Rico.

Cultivar	N[z]	Media M[y]	Media B[y]	Difference	Probability
Tropic Beauty	12	3.82	0.40	3.42	0.0001
Flordaglo	12	2.58	0.72	1.86	0.0063
Flordaprince	12	2.56	0.06	2.50	0.0028

[z]N = 3 pairs of trees × 4 sampling dates = 12.

[y]Location: M = Montaña (non-treated); B = Beneficiado (treated).

Results and Discussion

A lower number of larvae were observed in fruits of treated trees. Paired *t* test showed difference between treated and non-treated trees in the cultivars evaluated (Table 1). Average number of larvae per fruit in treated trees were below one in all cultivars while non-treated exceeded 2.5. The cultivar Flordaprince showed the lower number of fruit fly larvae per fruit from both treated and non-treated. In many fruit from treated trees this quantity was equal to 0. Just one larva per fruit can decrease the fruit quality and the fruit will not be suitable for fresh market. Sanitation methods like the removal of fruits that appear to be infected, overly mature, or on the ground should be removed in order to maintain the average below 1.

Experimental evidence has shown that Spinosad has a minimal impact on beneficial insects (Burns et al., 2001; Vargas et al., 2002). Research by Williams et al. (2003) indicated that hymenoptera parasitoids are more susceptible to Spinosad than predator insects. The authors point out that Spinosad represents one of the most judicious insecticides currently available.

In conclusion, results demonstrated the efficacy of the GF-120 treatment to control *A. suspensa*. This product has low toxicity and low impact on beneficial insects. This study showed the treatment effective for control of caribbean fruit fly in the evaluated cultivars. GF-120 NF applications should begin 6 weeks after the fruit set and continue through harvest with applications every 7–10 d.

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