

SEASONAL ABUNDANCE OF THE CARIBBEAN FRUIT FLY *ANASTREPHA SUSPENS*A IN LOW-CHILL PEACHES IN SW FLORIDA AND MANAGEMENT WITH THE SPINOSAD BAIT SPRAY GF-120

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Abstract. Caribbean fruit fly (*Anastrepha suspensa* Loew) poses a major constraint on low-chill peach production in south and central Florida. Bait sprays, particularly those using malathion as a toxicant, have been the mainstay of fruit fly management until the recent appearance of baits using the "Naturalyte®" insecticide spinosad. These baits have the advantage of greater selectivity, acceptance by the general public, and availability in a formulated product "GF-120" (Dow AgroScience). GF-120 was tested in an experimental and an unpicked commercial-scale peach orchard during spring 2004. Bait sprays were applied by a battery powered hand sprayer, on foot or from the back of a pick-up truck at the labeled rate of 1 oz per tree. Efficacy was evaluated based on captures in McPhail traps using food lure attractants. Captures were reduced or eliminated within two weeks of application, even in the unpicked grove. Bait sprays using GF-120 appear to be an effective method of managing Caribbean fruit fly in peaches in south Florida.

Peach [*Prunus persica* (L.) Batsch] cultivars adapted to the subtropical climatic conditions of central and south Florida have been developed by the low-chill stone fruit breeding program at the University of Florida in Gainesville. Their potential to produce high quality peaches with good flavor and fruit size, and low-chilling requirement (150 chill units) in central and south Florida has been demonstrated (Rouse and Sherman, 1998; Williamson et al., 1995). Yellow flesh cultivars, 'Flordaprince', 'TropicBeauty' (Rouse and Sherman, 1989c; Sherman et al., 1984), and white-flesh cultivars 'Flordaglo' and 'TropicSnow' (Rouse and Sherman, 1989b; Sherman and Lyrene, 1989b), are low-chill cultivars with melting flesh currently recommended for limited commercial plantings and home gardens of central and south Florida (Rouse and Sherman, 1989a, 1998; Williamson et al., 1995). Additionally, 'UFSun' (Rouse and Sherman, 2004), a non-melting, yellow-flesh cultivar, was released in 2004 and is expected to be the first of several new cultivars with extended shelf life following harvest. The adaptation of these low-chill varieties to subtropical climatic conditions places peaches into the range of new pests that may threaten fruit yield and quality.

The Caribbean fruit fly (CFF), or Caribfly, *Anastrepha suspensa* (Loew), was first detected in Key West in 1931, although a polyphagous strain did not appear on the mainland until 1965 (Weems and Hepner, 2001). Native to the West Indies, CFF is now present in most of peninsular Florida, infesting a

wide range of hosts including peaches. However, the actual threat to low-chill peach production posed by Caribbean fruit fly in Southwest Florida has not been documented, and could be mitigated by early ripening of certain low-chill varieties such as 'Flordaprince' or 'UFSun'.

Liquid baits consisting principally of hydrolyzed yeast extract laced with malathion have long been used to control fruit flies (Steiner, 1961), including CFF. However, concern about the environmental and health risks associated with organophosphate insecticides has stimulated interest in alternative toxicants including spinosad, a fermentation product termed "naturlyte". The formulated product, GF-120, is premixed with the bait and commercially available for control of tephritid pests in fruit orchards (Burns et al., 2001). Our objective was to evaluate this product as a component of integrated management of CFF in peach orchards of south Florida.

Material and Methods

Peach Groves

SWFREC. The orchard was planted in 1996 and located in the northwest corner (26°28'N, 81°27'W) of a 60 acre citrus grove consisted of a variety trial 6 rows wide and 15 trees long (15 × 22 ft spacing) flanked on one side by 2 rows of plums and a row each of plum and peach rootstock.

Brooks Tropicals. Peaches were planted in year 2001 at 15 × 20 ft spacing and consisted of five rows each of cultivars, 'TropicBeauty' (306 trees on the east), 'UFGold' (Sherman and Lyrene, 1997) (350 trees in the middle), and 'Flordaprince' 350 trees on the west. Fruit was left unharvested in years 2004 and 2005. Trees of 'UFGold' were removed in 2005.

Harvest for Humanity. Three rows of peaches were monitored. Each row consisted of 58 trees: varieties 'UFGold', 'TropicBeauty' in rows one and two, and a third row of 30 trees 'Flordaprince' and 30 trees 'Flordaglo'.

Monitoring Flies. Glass McPhail traps were used to monitor fly populations in peach groves. Traps were baited with pellets of torula yeast and borax in a ratio of 4:5 (21 g) dissolved in 300 ml of water (Lopez et al., 1971), hung in trees at head level, and emptied weekly to change the bait and recover the flies. Tephritids were identified under a stereoscopic microscope: all were *A. suspensa*. Flies were trapped at SWFREC from 2001 through 2003 to evaluate seasonal abundance patterns using two traps placed in the peaches in 2001, with an additional trap added in an adjacent row of plums in 2003 and 2004. Yet another trap was added in the peaches in 2004 and a fourth in 2005 making a total of five traps distributed uniformly throughout the orchard. Twelve traps were monitored in the peach grove at Brooks Tropicals in 2005: 3 in each of 4 blocks, 2 that were sprayed (SE and NW quadrants) and 2 that were not sprayed (SW and NE quadrants). Three traps were monitored at Harvest for Humanity in 2005.

Applications. GF-120 Naturalyte Fruit Fly Bait (Dow AgroSciences, Indianapolis, Ind.) 0.02% spinosad, 98.98% inert ingredients including water, sugar and attractants was diluted

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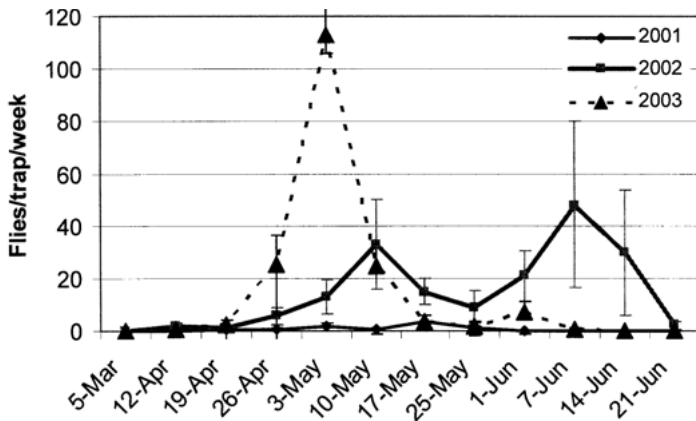


Fig. 1. Captures of *A. suspensa* in McPhail traps baited with torula yeast in a peach planting at SWFREC during 2001, 2002 and 2003.

1:1.5 in warm water. A Black and Decker VP450 cordless 3-gal sprayer with fan nozzle operating at 28 psi was used to apply approximately 1.0 oz of product (2.5 oz spray material) to one side of each tree in a one second burst. Three weekly applications were made at SWFREC beginning 17 May 2004 and at SWFREC and Brooks beginning 28 Apr. 2005. The applications at Brooks were made in 2 quadrants of the orchard, SE ('TropicBeauty') and NW ('UFGold') with NE and SW quadrants unsprayed (same varieties, respectively).

Results and Discussion

Trap captures at SWFREC increased almost an order of magnitude from 2001 to 2002 and half again as much in 2003 (Fig. 1). Two peaks were observed in 2002, on 10 May and 10 June. The 2003 peak occurred on 3 May when an average 113 *A. suspensa* were captured in each of the 3 traps.

In 2004, trap captures at SWFREC rose to a peak of five per trap on 17 May when the first spray of GF-120 was applied (Fig. 2). There were no captures the following two weeks during which the applications continued. On 6 June, one week after applications had ceased, captures went back up to an average of 4.6 per trap, followed by 5.2 on 14 June and 4.4 on 20 June before falling to 0.4 on 27 June. Thus, it appeared that we were headed for peak activity around 24 May but the sprays had shut down trap captures during that period.

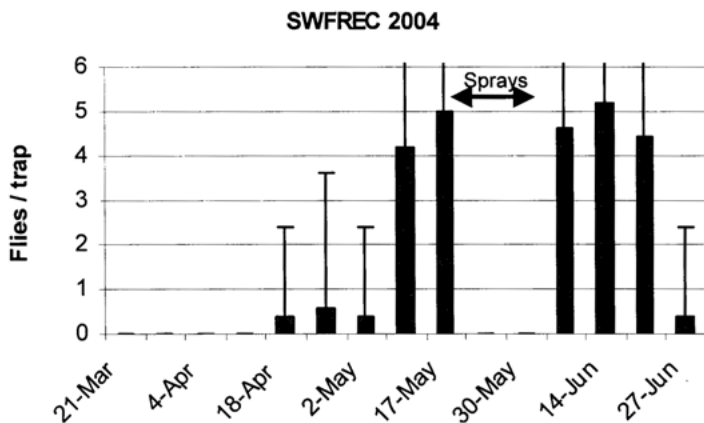


Fig. 2. Captures of *A. suspensa* in McPhail traps baited with torula yeast in a peach planting at SWFREC during spring 2004 before, during and after application of GF-120 Naturalyte fruit fly bait.

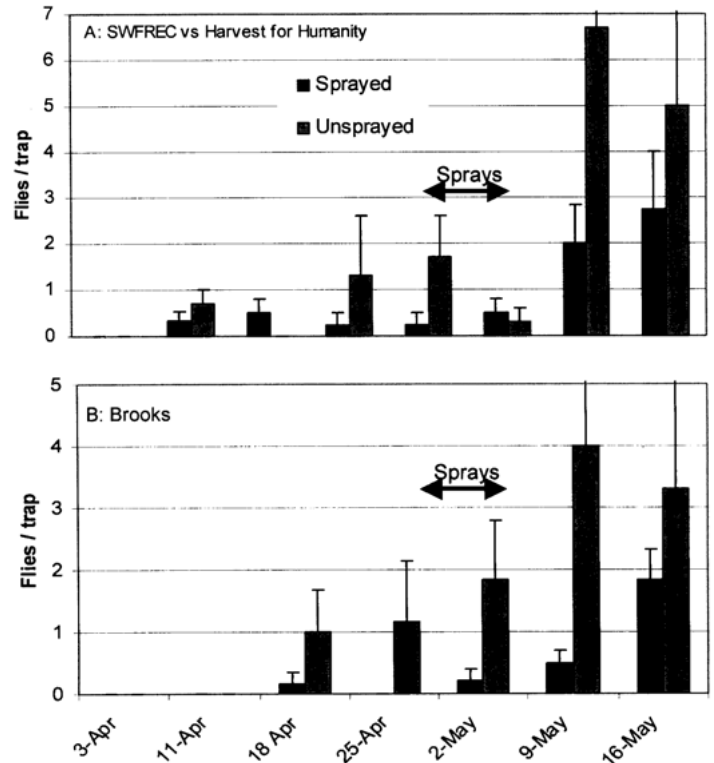


Fig. 3. Captures of *A. suspensa* in McPhail traps baited with torula yeast in blocked sprayed and unsprayed with GF-120 during spring 2005: A. SWFREC (sprayed) and Harvest for Humanity (unsprayed), B. Brooks Tropicals (two sprayed and two unsprayed).

In 2005, captures at SWFREC and Harvest for Humanity were similar early in the season, but began dropping at SWFREC, even before applications were initiated on 28 Apr. However, captures did equalize again in the two groves on 8 May after which twice as many flies were caught in the unsprayed grove (Fig. 3a). Captures at the Brooks grove were lower in sprayed plots during the evaluation period. Thus, it appeared again that the sprays had depressed trap captures, although results were not as clear due to lower pre-spray numbers in sprayed plots.

In conclusion, fly activity in peach groves peaked in May during all 5 years, generally during the first two weeks of the month. One strategy to avoid damage from Caribfly would be selection of early yielding varieties such as 'Floridaprince' or 'UFSun' that could be harvested in April, in preference to varieties such as 'Flordaglo' that ripen in May. The popular variety 'TropicBeauty' would be intermediate in this group and could experience damage during some years. Under these circumstances, CCF could be suppressed with weekly bait sprays of GF-120 initiated when the first flies are captured in baited McPhail traps.

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