2004 Utah State Horticulture Association Research Project Report
"Evaluation of Alternatives for Western Cherry Fruit Fly Control in On-Farm Trials"

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Objective 1.
Develop alternative insect management options for on-farm use (reduce dependency on organophosphate insecticides).

A. Western Cherry Fruit Fly

i. We evaluated the efficacy of the neonicotinoid, Provado (imidacloprid), for western cherry fruit fly control in three commercial orchard sites. Provado was compared to a grower standard program (Guthion, Imidan, or Dimethoate) and plot size ranged from 2-12 acres (Fig. 1). Provado 1.6F was applied at a rate of 6 or 8 oz per acre two to four times per site between early June and mid-July.

Fruit was sampled for injury on seven dates pre-harvest and at harvest cherry bins were checked for floating larvae (Fig. 2). No fruit injury was detected and packing records indicated no infested fruit or down-grading of quality.

Adult cherry fruit fly densities were monitored with Pherocon AM yellow sticky traps plus additional ammonium carbonate bait. Sixteen traps were placed in each plot (Provado and grower standard) evenly divided between borders and interiors on May 18. The first adults were caught in the Payson orchard on May 25. Traps were checked weekly. There was a substantial adult population at Payson (up to 2.3 adults per trap per week), a low population at Genola (up to 0.25 adults per trap per week), and no adults were caught at Santaquin (Fig. 3). At Payson, adult numbers were similar between Provado and Dimethoate plots during June, but higher in the Provado plot in July and August. The majority of adults at Payson were caught on border traps suggesting that sources of cherry fruit fly outside the block influenced the populations in trial plots (Fig. 4).

Multiple applications of neonicotinoids have been implicated in stimulating spider mite reproduction. Spider mite populations reached economically damaging levels at one site, Genola (Fig. 5). Spider mite densities were elevated in the Provado as compared to Guthion plot in mid and late June. A miticide, Apollo, was applied on June 19 and densities eventually declined in July. Predaceous mite densities eventually increased in mid-July; too late to aid suppression of spider mites. At Payson, spider mite densities reached near-economic levels in July and August, but numbers were higher in Dimethoate versus Provado plots (Fig. 6). At the third site, Santaquin, mite densities were low in May and June, Apollo was applied in late June, and populations remained sub-economic throughout the season (Fig. 7).

In conclusion, Provado was demonstrated as a viable alternative to the organophosphate insecticides for western cherry fruit fly control in Utah. A comparison of insecticide costs shows that Provado is more expensive per application (Fig. 8). New restrictions on the Guthion label for cherries (maximum of 3 lb/acre/season and 15 d REI) will encourage use of alternative insecticides. Provado has a good fit for use in insecticide rotations, but caution is urged to avoid multiple applications under environmental conditions that could prompt increase in spider mite densities.

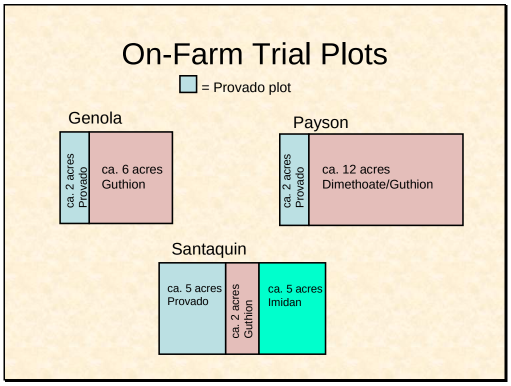


Fig. 1

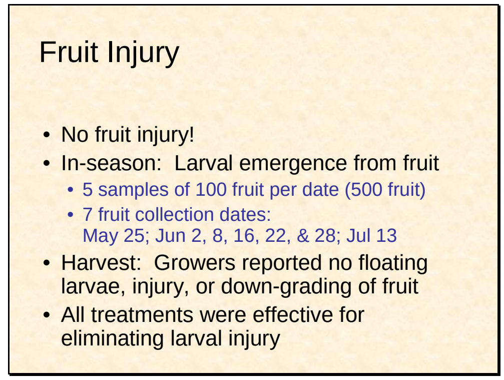


Fig. 2

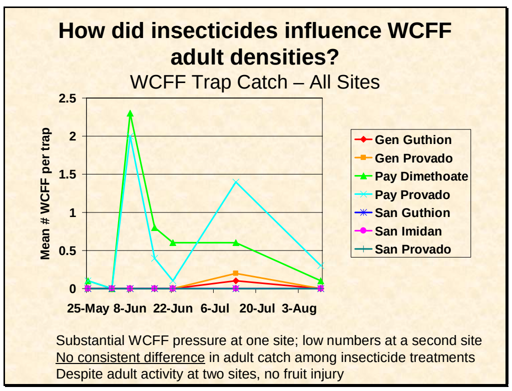


Fig. 3

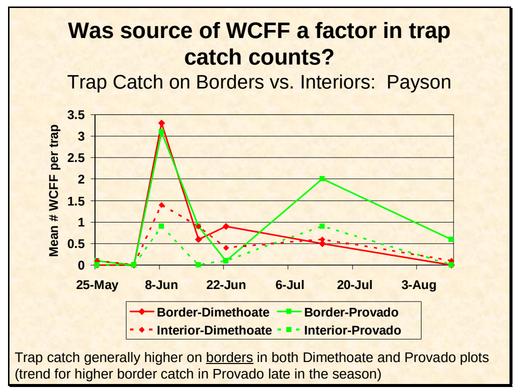


Fig. 4

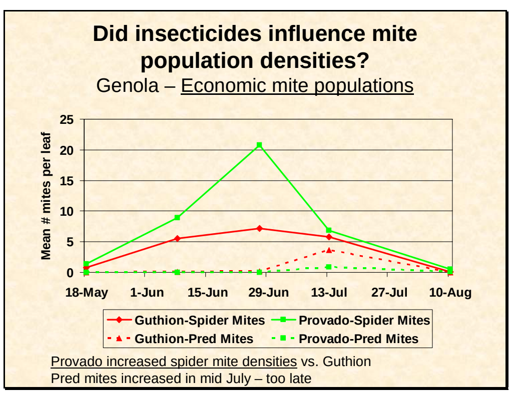


Fig. 5

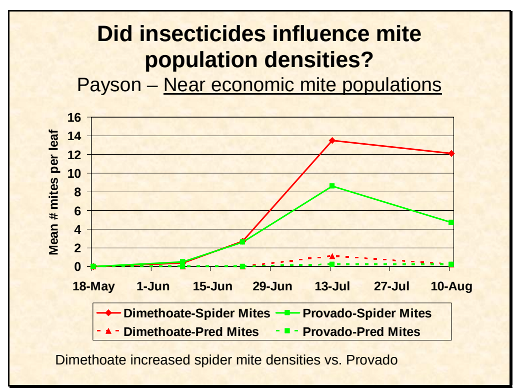
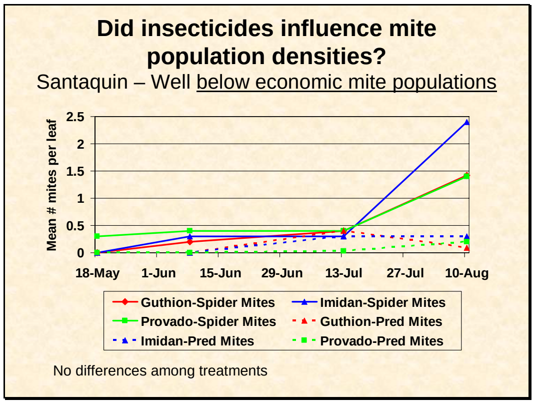


Fig. 6



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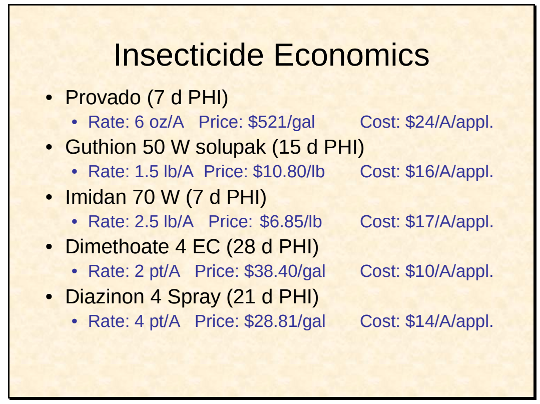


Fig. 8

ii. We evaluated the efficacy of the spinosad fruit fly bait product, GF-120 NF Naturalyte, in a research orchard with extremely high western cherry fruit fly populations. The GF-120 bait was compared to Guthion and an untreated control in adjacent 0.7 acre-sized plots (Fig. 9). The first adult capture was on May 17 and GF-120 was applied weekly beginning on May 26 for a total of five applications at a rate of 20 fl oz per acre (1:4 dilution in water). The bait was applied with a handgun (D-3 nozzle) sprayer mounted on a 4-wheeler driven at 10 mph. Guthion 50WP was applied at 2-week intervals for a total of 3 applications at a rate of 1.5 lb/acre.

Pre-harvest, there was substantial larval infestation in fruit in the untreated check (24 larvae per 100 fruit on June 10 and 17), low injury in the GF-120 bait plot (0.2-1.2 larvae per 100 fruit), and no injury in the Guthion plot (Fig. 10). At harvest on June 30, injured fruit contained predominantly 3rd instar larvae and holes where larvae had exited. Fruit infestation levels were 43.7, 0.7, and 0.3 larvae and exit holes per 100 fruit for untreated, Guthion, and GF-120 bait plots, respectively (Fig. 11). High populations of adults in the untreated check plot and exterior sources of cherry fruit fly appear to have contributed to larval infestation in the Guthion and GF-120 bait plots. The Guthion plot had more fruit injury on the side adjacent to the check while the GF-120 bait plot had more fruit injury on the outside border (Fig. 12). The Guthion plot buffered fruit fly migration from the check plot into the GF-120 bait plot.

Both GF-120 and Guthion significantly lowered adult fruit fly densities as compared to the untreated check and both insecticides kept adult populations suppressed for up to one month post-harvest (Fig. 13). In conclusion, GF-120 NF Naturalyte Bait performed very well in suppressing western cherry fruit fly adult densities and preventing larval infestation of fruit. The extremely high fruit fly populations in this study site and the close proximity of untreated fruit to insecticide plots created a rigorous testing situation. GF-120 shows promise as a viable alternative insecticide to the organophosphates for western cherry fruit fly control. At a cost of approximately $12.80/acre/application for 4-5 applications per season places GF-120 in a similar cost scale to Provado. Attributes of the bait are its organic and low toxicity (0.02% spinosad) status as well as its quick application time (2-5 min. per acre).

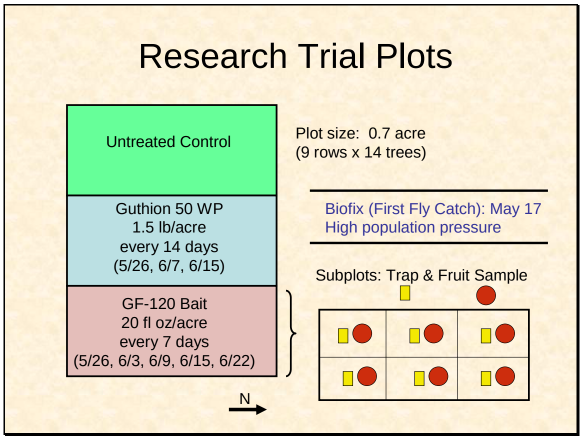


Fig. 9

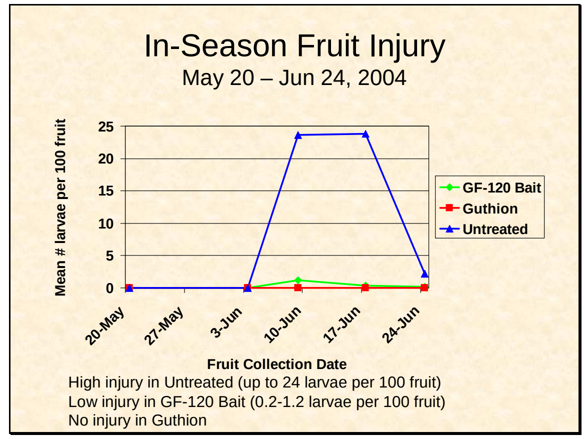


Fig. 10

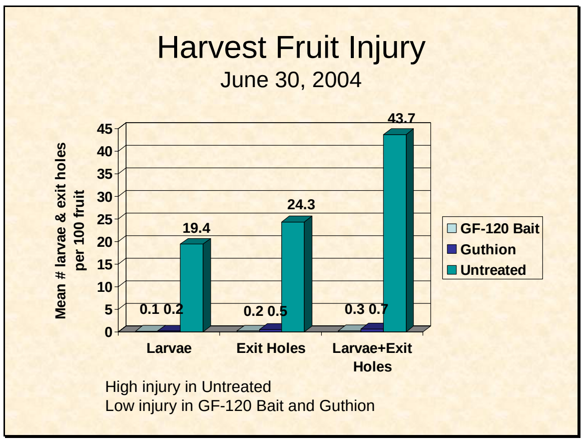
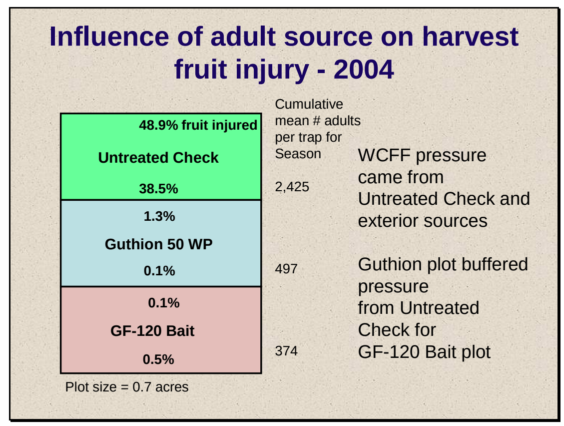


Fig. 11



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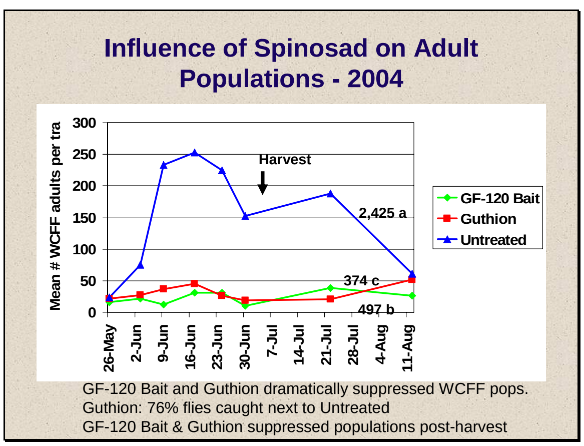

Fig. 13