

# Comparison of Avaunt versus Guthion in Every-row versus Perimeter-row Sprays Against Key Apple Insect Pests: 2002 Results and Project Summary

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In the 2001 issue of *Fruit Notes*, we presented results from the first year of a planned two-year study comparing the effects of Avaunt versus Guthion in every-row versus perimeter-row sprays against plum curculio (PC), apple maggot (AM), summer leafrollers (LR) and internal Lepidoptera (a combination of codling moth, oriental fruit moth and lesser appleworm). Avaunt is a recently-labelled oxadiazine insecticide for use against these and other orchard pests. Guthion has been our standard organophosphorous material for general-purpose insect control for several decades, but its status for use in orchards beyond 2005 is uncertain. Conceivably, Avaunt might be an effective substitute for Guthion against key orchard insect pests.

Avaunt and most other recently labelled insecticides are substantially more expensive than Guthion and other older insecticides. If the amount of Avaunt needed to achieve effective pest control could be reduced through modification of pattern of spray application (such as limiting application to only peripheral-row trees), then considerable cost savings could be achieved without sacrifice of fruit quality

Here, we present results of our second and final year of research comparing effects of Avaunt versus Guthion in every-row versus perimeter-row sprays against PC, AM, LR, and internal Lepidoptera. We also present combined data from our two years of research on this subject.

## ***Materials & Methods***

In April of 2001, four plots were established in each of six commercial apple orchards in

Massachusetts (24 plots in all). Rootstocks and cultivars varied among orchards, but all trees in a given orchard were on the same rootstock (either M.7, M.26, or M.9) and of the same cultivar (either McIntosh, Empire, Cortland, Gala, or Delicious). Each plot was about 40 x 40 yards in size and consisted of seven rows of apple trees. The perimeter row bordered woods, hedgerow, or open field and was subjected to pressure from immigrating PCs and AM. In 2002, one of the six orchards was so heavily damaged by frost that it could not be used in our 2002 research.

In 2002, as in 2001, growers themselves sprayed all rows of all plots with azinphosmethyl or phosmet through petal fall. Thereafter, all sprays were applied by Andrew Hamilton using our own tractor-mounted mist blower. Plots in each orchard received four sprays after the petal fall spray: 10 days and again in 20 days after petal fall against PC, and on July 19-21 and again on August 9-11 against AM. Spray was delivered at the equivalent of 150 gallons of water per acre. Guthion (50 WP) was applied at the rate of 30 ounces of formulated material per acre against PC and 24 ounces of formulated material per acre against AM. Avaunt (30% WG) was applied at the rate of 6 ounces of formulated material per acre against both PC and AM. After the petal-fall spray, plots designated as “all row” plots received insecticide applied to both sides of trees on all seven rows, whereas plots designated as “perimeter-row” plots received insecticide sprays applied to both sides of trees of the perimeter (=first) and second rows but no insecticide applied to trees of the third through seventh rows (Figure 1). After the petal-fall spray, Andrew Hamilton applied

azinphosmethyl or phosmet to trees in the eighth interior row and to orchard trees bordering plots on either side.

Weekly from petal fall until harvest in September, 100 fruit in each of rows 1, 3, 5, and 7 of each plot were sampled for injury by PC and AM. In addition, two unbaited sticky red sphere traps were hung toward the center of each row of each plot to monitor AM. Finally, at harvest, 100 fruit in each of rows 1,3, 5 and 7 of each plot were sampled for injury by summer LR and internal Lepidoptera.

## Results

Incidence of each pest type, as averaged across all samples of fruit or traps in rows 1, 3, 5, and 7 of each plot, is given in Table 1. As in 2001, results for 2002 show no significant differences among any of the four treatments (all-row versus perimeter-row sprays of Guthion versus Avaunt) in incidence of fruit injury by PC, trap captures of AM, fruit injury by AM, fruit injury by summer LR, or fruit injury by internal Lepidoptera.

Injury by PC in 2002 was sufficiently great to justify comparison of PC damage to fruit on perimeter-row trees with damage to fruit on interior trees. Combined data for all-row plus perimeter-row sprays of Guthion revealed that injury to fruit on perimeter-row trees (row 1) averaged about 10 times greater

(1.275%) than the mean amount of injury to fruit on trees in row 3, 5, and 7 (0.125%). These data suggest that PCs which immigrate into orchards after a petal fall spray has been applied confine their activity to peripheral-row trees and infrequently penetrate into interior rows of orchards.

Figure 2 displays combined data for each pest for 2001 and 2002. All-row sprays of Avaunt were approximately equal to all-row sprays of Guthion in protecting against PC, AM, summer LR and internal Lepidoptera. For both PC and AM, perimeter-row sprays of Guthion performed as well as all-row sprays of Guthion in providing plot-wide control. For PC and especially for AM, perimeter-row sprays of Avaunt were not as effective as all-row sprays of Avaunt in providing plot-wide control. For both summer LR and internal Lepidoptera, perimeter-row sprays were not as effective as all-row sprays in providing plot-wide control in the case of Guthion as well as Avaunt.

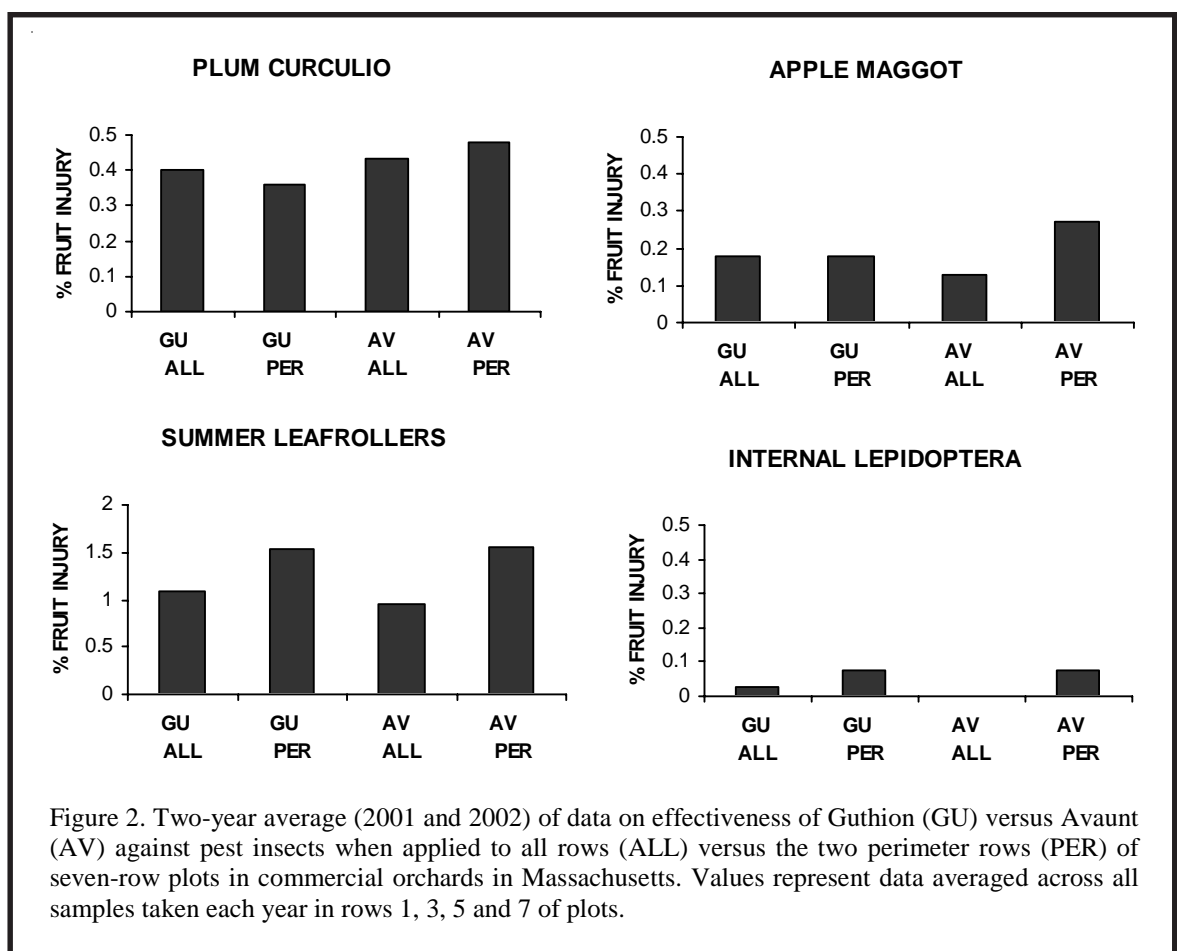
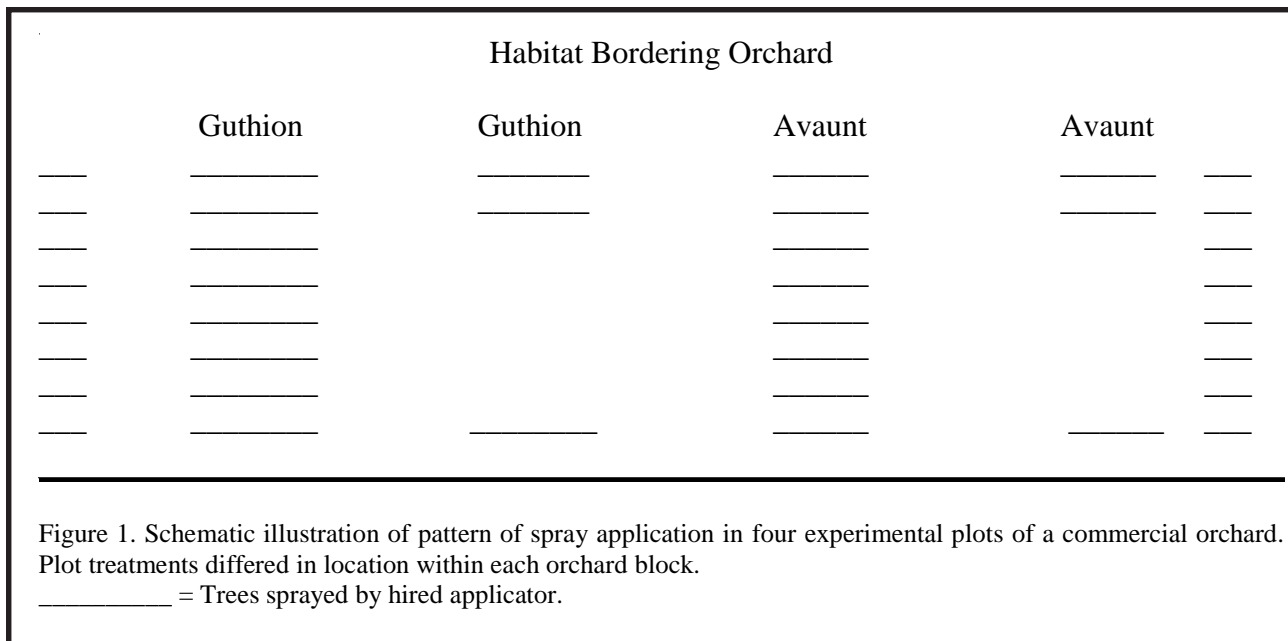
## Conclusions

There were no statistical differences among any of the four treatments evaluated here in ability to control target pests in either 2001 or 2002. Indeed, combined data for both years indicate that all-row sprays of Avaunt were approximately as effective as all-rows sprays of Guthion in ability to control PC,

Table 1. Effectiveness of Guthion versus Avaunt against pest insects when applied to all rows versus the two perimeter rows of seven-row plots in five commercial apple orchards in Massachusetts in 2002. Values represent data averaged across all samples taken in rows 1, 3, 5 and 7 of plots.

Pest	Incidence of pest			
	Guthion		Avaunt	
	All rows sprayed	Perimeter rows sprayed	All rows sprayed	Perimeter rows sprayed
Plum curculio (% fruit with injury)*	0.45	0.30	0.45	0.47
Apple maggot (no. captured per sphere)*	6.58	8.78	7.28	10.83
Apple maggot (% fruit with injury)*	0.13	0.08	0.09	0.18
Summer leafrollers (% fruit with injury)*	1.00	1.70	0.90	1.60
Internal Lepidoptera (% fruit with injury)*	0.05	0.15	0.00	0.15

\*No statistically significant differences among treatments at odds of 19:1.



AM, summer LR, and internal Lepidoptera. Further, combined data for both years indicate that applying Guthion only to perimeter-row trees from the first cover spray onward was just as effective in protecting interior rows against injury by PC and AM as applying Guthion to all trees in a block from the first cover spray onward. In the case of Avaunt, however, all-row sprays were numerically (though not statistically) superior to perimeter-row sprays in providing protection against injury by PC and AM on interior rows.

We conclude that Avaunt can be an effective substitute for Guthion against PC, AM, summer LR,

and internal Lepidoptera when applied to all trees in an orchard but may be less effective than Guthion in providing orchard-wide control of PC and AM if applied only to perimeter-row trees.

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