

TITLE: 1992 Kentucky Apple IPM Program Year-End Report

PROJECT LEADERS: Ric Bessin, Extension Entomologist
Jerry Brown, Extension Horticulturist
John Hartman, Extension Plant Pathologist
Doug Johnson, Extension Entomologist
Terry Jones, Extension Horticulture
John Strang, Extension Horticulturist

SCOUTS: Claudia Cotton
Terry Jones
Diane Perkins

OBJECTIVE: To determine and demonstrate the effectiveness of Integrated Pest Management (IPM) predictive technologies to commercial apple growers through a) the pesticide reduction potential, b) the effect of IPM technology on fruit quality, and c) the cost-effectiveness of IPM technology.

INTRODUCTION:

The 1992 Apple IPM Program was funded by a grant from USDA/ES. The purpose was to demonstrate to Kentucky apple growers the application of Integrated Pest Management practices in the management of their orchards. IPM relies on a number of orchard management practices including pest and tree monitoring and collected weather data to predict the activities of certain insects and diseases.

Using IPM, the grower applies pesticides on an as-needed basis rather than according to a calendar schedule. In addition to saving money, reduced sprays also result in less potential soil compaction, pest resistance development, harm to bees, food pesticide residues, water contamination, applicator exposure, and potential drift to other crops. Where IPM calls for more sprays, increased crop quality should occur.

MATERIALS & METHODS:

A weather station, which consisted of a minimum/maximum thermometer and a rain gauge, was set up in each orchard in the 1992 program. Two growers used automated weather monitors, specifically Envirocaster and METOS. The Envirocaster is the property of the University of Kentucky and was bought with a 1990 program enhancement grant. Weather parameters were recorded daily by the grower onto the scouting log, which would be collected weekly by the scout. Pheromone traps for codling moth and San Jose scale were also placed in the orchards and checked weekly to help monitor these insects.

The weather data was used in several ways. When applied to Mill's Table apple scab infection periods could be determined. Also, the weather data was entered into the Maryblyt predictive computer program to determine infection periods for fireblight. As for insect control, the data was used in conjunction with the recorded pheromone trap catches to determine the time of egg hatch of codling moth and crawler movement of San Jose Scale.

Each orchard in the 1992 program was scouted weekly throughout the main growing season (March 29 - July 8) and once every two weeks during late summer and fall (July 9 - August 20). In both the IPM and standard blocks, the scout would check a random sample of 5 trees for leaf and fruit damage and record any findings on the scouting log.

There were seven grower meetings held this past season, six of them being at various orchards in the program. Excluding the first meeting, all were very informal. At each, several specialists would speak, but mainly the meetings were a time for the growers and specialists to discuss particular problems. Some of the meeting topics discussed were sprayer calibration, thinning procedures, and fireblight control.

Participant Grouping:

Each grower was asked to fill out an orchard history form early in the season that gave some indication of their principal orchard problems. For insect control all growers established an IPM block that controlled insects only when warranted as opposed to the standard spray schedule. From this information, the grower was put on one of three spray schedules for disease control in the IPM block:

- I. A standard spray program if they indicated significant apple scab the previous year; 8 growers.
NOTE: This program was designed to be a "clean up" program so that fungicides could be reduced in future years. The "clean up" standard calendar program may make use of more expensive fungicides.
- II. A "4-spray" system which relied on the fungicide Nova; the grower was put on this schedule if they had no significant apple scab but did have a problem with cedar-apple rust the previous season; 5 growers.
- III. A reduced fungicide program if there was no significant apple scab or cedar-apple rust the previous year; 4 growers.

The 18 participants were further grouped into the following categories at the end of the season for easier analysis:

- I. Growers with definite IPM and standard comparison blocks
10 growers.

- II. Growers with two standard blocks
3 growers.
- III. Growers with orchards entirely on an IPM spray schedule
3 growers.
- IV. Growers without any structured spray program
2 growers.

EVALUATION METHODS:

There were three evaluations performed at the end of the season to determine disease and insect damage on the leaves and fruit. Both the IPM and standard blocks were tested separately so that a comparison could be made.

The first evaluation was the end-of-season pest and disease foliar analysis. Per block, five trees and 100 leaves per tree were randomly selected and examined for cedar apple rust, fireblight strikes, apple scab, frog-eye leafspot, and powdery mildew in the disease category. As for insect damage, the leaves were examined for Japanese beetle, rosy apple aphid, green apple aphid, and European red mite. All orchards were examined.

Secondly, the fruit were graded according to severity of disease and insect defects. Per block, 50 or 100 fruit (depending on orchard size) were randomly selected from five bins. At least one block per orchard was tested in all of the orchards. The modified Russo-Rajotte apple grading scheme was used for the rating. All orchards were, to some degree, evaluated. The following categories contain the defects that were included in the evaluation:

- I. General Class Defects: scald, cracks, hail, punctures, and bruising
- II. Physiological Defects: russetting, stem/calyx cracks, fruitspot, and bruising
- III. Insect Defects: codling moth (calyx tunneling and stings), red banded leaf roller scars, green fruitworm, tarnished plantbug scars, plum curculio scars, scale, and insect sooty mold or spotting
- IV. Disease Defects: rusts, apple scab, sooty blotch, flyspeck, rots (bitter, black, bot), powdery mildew, and birdpeck (decayed and healed)

Tests for pressure and soluble solids were the final tests performed on the fruit. Per block, ten or twenty fruit (depending on orchard size) were tested on both the non-blush and blush side for pressure. The same fruit from both blocks were used to test soluble solids. Not all orchards were tested.

RESULTS:

There were no significant differences in foliar pest and disease levels in IPM versus standard blocks. Furthermore, fruit evaluated revealed that IPM did not decrease quality of the fruit, and the levels of defects were not affected from using IPM. Again, IPM did not make any measurable differences in pressure or soluble solids.

Overall, there were significant savings throughout the orchards. Among the growers with comparison blocks, an average of \$56 per acre was saved. The high grower saved \$209 per acre overall by using IPM, and the low grower spent an extra \$56 per acre. The averaged number of overall sprayer trips through the orchard remained the same; however, there was one less fungicide and three fewer insecticide sprays applied (these are overall averages as well).

Also, results can be seen in terms of education. One of the main objectives of this program was to teach the participants to be self-sufficient in IPM orchard management. Through the workshops, this was partially fulfilled. Everything that the scouts were taught to look for was presented to the growers. At the first meeting, Kentucky Apple IPM Manuals were handed out for a reference, and updates were continually produced and distributed. The manuals have proven to be very helpful because they contain everything that was discussed at the workshops and other miscellaneous information that might be helpful to the grower.

Attendance at the first classroom-type meeting was highest of the seven grower meetings. Forty-eight showed up at Elizabetown for the initial meeting. The remaining six meetings were held at various participant orchards with an average of 25 people attending each.

On December 3 & 4, the results from the 1992 Apple IPM Program were presented to the Kentucky State Horticulture Society. There were indications that growers who were unable to participate in the 1992 program were interested in the upcoming 1993 program. Additionally, all of the present participants want to continue to learn more and implement IPM methods in their orchards.

CASE STUDIES:

Data removed.