

FINAL REPORT

WTFRC Project #AE-01-52

WSU Project # 7089

Project title: Survey of IPM practices in Washington tree fruit crops

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Objectives:

1. Develop and implement an IPM practices survey, including pesticide use on apple, pear and cherry in Washington.
2. Produce a report to the industry comparing changes since the 1989-90 surveys and comparing data with the NASS surveys in 1991, 1993, 1995, 1997 and 1999.
3. Evaluate the processes used to assess crop losses due to different causes and develop guidelines for standardizing these assessments.

Significant findings:

- IPM practices in apple increased in several areas compared to the 1989 survey. For example, the use of pheromone traps as monitoring tools increased from 66% in 1989 to 87% in 2000.
- For the first time, a solid figure for the implementation of pheromones as a pest control tactic has been documented at 56% of apple acres in this survey.
- The survey identified by pesticide the average date of last pesticide application which is valuable in countering assumptions often used by the EPA when making regulatory decisions.
- Regionalized data are available to compare differences in IPM practices and pesticide use, providing greater detail in future assessments of change in these parameters.
- The cost of IPM programs in 2000 is provided and compared with that from 1989.
- Pear - - -
- For the first time, a detailed cherry IPM practices survey has been conducted. The data characterize existing practices and provide a valuable baseline for evaluating changes in these practices.

Methods:

Survey: A pesticide use survey patterned after those conducted in 1989 (apple) and 1990 (pear) was developed in both written and electronic form (web access). An industry mailing list was used to randomly select apple, pear and cherry growers for the survey. Balance between growing regions was achieved by selecting proportional numbers of growers from different areas to respond to the survey. The survey document was reviewed by industry representatives and by the WSU survey center. Complete confidentiality of survey respondents was maintained. The time table was to develop the survey tool by December of 2000, mail and have a web version of the survey form available by early January of 2001, with the goal of receiving returned surveys by March 1. Survey information has been entered into a computer, double checked for accuracy and summarized statistically, and a report will be written and circulated back to the industry by the end of December of 2001.

Report: The report will be completed by the end of December 2001 and summarized at the next WSHA meeting (poster). The report will provide a measure of changes that have taken place in pesticide use and IPM practices over the last decade. Sufficient details will provide comparisons of IPM practices in different growing regions, pointing out the importance of local implementation

differences that occur in pest management relative to pests and environmental conditions. The report will contrast information from a detailed survey with that collected every other year by the NASS. This should bolster the value of national data collection and provide an encouragement for NASS to change some aspects of its survey where it does not reflect adoption of new IPM practices.

Crop loss estimates: The ability of an agricultural industry to document crop losses due to different causes is important when seeking support from external sources (government, granting agencies, etc.) for research or disaster relief. There is no consistent method in Washington for evaluating crop losses. This project proposes to evaluate different methods currently used to estimate crop losses, gather preliminary data on losses affecting the 2000 crop, and develop guidelines to standardize the process in the future. This activity should result in the development of an educational program to train people making crop loss assessments, including materials to help them more accurately categorize damage or defects. These latter objectives would be developed through a separate grant request in 2002-03.

Results:

Apple

Survey returns: Out of nearly 1000 apple surveys mailed, 17% were returned. Of those returned, 57.6% (98) were complete and usable. Several respondents did not participate in the survey for a variety of reasons including that they disagreed that the survey should be conducted, had retired, had gone out of business, had sold or leased the orchard, or were currently not growing apple.

Characterization of farming operations: Seventy percent (70%) of the survey respondents classified themselves as full-time growers. The remaining group classified themselves as part time, deriving most of their income from off-farm activities. The average farm size of full-time growers was 131 acres compared to 28 acres for part-time farmers. The majority of the respondents, 89.5%, characterized themselves as using conventional pest control practices, with 10.5% involved in organic production. These are compared with results from the 1989 survey in Table 1. The increased involvement in organic production is clear.

Table 1. A comparison of the relative proportion of farmers utilizing different farming practices in 1989 and 2000 growing seasons.

Farming practice	1989	2000
Conventional	98.6%	89.5%
Mixed	0.5%	3.2%
Transitional	0.3%	1.0%
Organic	0.6%	6.3%

Growers were also asked to identify the different apple varieties grown in their operations, along with the amount of acreage. In the 1989 survey Red Delicious comprised 68.3% of all varieties while in 2000 this variety comprised only 41.2%.

Pest management advice: In Washington, several different sources of information and advice are available to growers to help them make pest management decisions. Each potential source of advice was listed in the survey for growers to select and rate its relative usefulness in providing advice for making pest control decisions. Grower responses to the question regarding the importance of different information sources in making pest management decisions are summarized in Table 2.

Table 2. Percentage of survey respondents who rated the value of information from different sources in helping them arrive at pest management decisions, 2000.

Information source	Very important	Somewhat important	Not important
Private consultant (PC)	39.2	17.6	38.2
Agricultural chemical industry fieldman (ACF)	40.2	40.2	14.7
Cooperative Extension (CE)	28.4	42.2	24.5
Warehouse fieldman (WF)	37.3	36.3	21.6
Other growers (OG)	14.7	54.9	40.2
WSU Crop Protection Guide (CPG)	51.0	34.3	10.8
<i>Orchard Pest Management</i> (OPM)	21.6	32.3	40.2
Outside management	1.0	0.0	0.0
Own experience	2.9	3.9	0.0

Pest management activities: Orchard monitoring was by far the most frequent pest management activity employed, with 95% of respondents indicating its use. Fifty-nine percent of the growers said they used alternate row spraying, an increase of nearly 30% from the 1989 survey. The percentage of growers using reduced pesticide rates increased from 54% in 1989 to 77% in 2000. In 1989 two-thirds of the growers said they used pheromone traps while 87% of the respondents in 2000 used this monitoring method. In 2000, 66% of growers reported using biological control practices, compared to 34% in 1989. There was a significant increase in the number of growers incorporating use of economic thresholds, from 37% during 1989 to 77% in 2000.

Reporting block information: The average size of the reporting block was 23.2 acres, the smallest being under one acre and the largest being 489 acres. Tree density has increased over time with the introduction of dwarfing rootstocks and new planting systems. This is clearly seen by comparing the average number of trees per acre for the reporting blocks for this survey, 301 (62 to 1340) vs. an average of 194 (64 to 800) in 1989. The average percentage of Red Delicious in the reporting blocks was 72.8%, with Gala, Fuji and Golden Delicious being the next most common varieties represented. Seventy-three percent of respondents indicated use of under-tree irrigation and 18% used over-tree irrigation. There was an even distribution of tree ages represented in the reporting blocks. Airblast sprayers were the dominant pesticide application method, 98.5%; and most growers used spray volumes of between 100 and 300 gallons per acre, 64.4%.

Pesticide use data: An average of 2.56 applications of azinphosmethyl was applied per acre in 2000, a significant increase from data reported by the 1999 NASS survey. Mating disruption was reported to have been used on 56% of acres in the 2000 survey. This is much higher than reported by the 1999 NASS survey for Washington. Bacterial pesticide formulations (Bt products) were used an average of 2.85 times on 34% of the acres in 2000. The most used fungicide was sulfur (57% acres treated) followed by mycobutanil (33%), triflumizole (26%), and oxytetracycline (24%). Carbaryl was the most used plant growth regulator, followed by NAD. Additional specific information on use of pesticides will be provided as a handout at the research review.

Timing of pesticide applications: The time of a last pesticide application is important because regulatory agencies often use default values of the preharvest interval as the last spray date. The average last application, based on the 2000 survey, for each pesticide is shown in Table 3.

Table 3. Average date of last application of a pesticide class during 2000.

Pesticide class	Avg. date of last spray
Insecticide	10 July
Fungicide	10 June
Nutrients	29 June
PGR	13 June

Pear

Eight hundred sixty-six surveys were sent to pear growers and 22% were returned. Of those surveys returned, 67% were complete and usable. Almost 90% of the respondents came from the four main pear growing areas of the state, upper and lower Yakima valley, Wenatchee and Okanogan.

Characterization of farming operations: The percentage of respondents reporting as full-time growers decreased from 84.1% in 1990 to 72.4% in 2000. There was a corresponding increase in respondents reporting as part-time growers, 27.6%, compared with the 1990 survey, 15.9%. The majority of the respondents, 86.1%, characterized themselves as using conventional pest control practices (primarily using synthetic pesticides), 5.4% as using both conventional and organic means (mixed acres), 3.9% as being transitional to organic, and 4.7% as using only organic farming practices. The most significant change from 1990 to 2000 was that only 4.5% of the growers reported being involved in any organic production in 1999, while 14% reported activity in organic production, full time or transition, in 2000.

Pest management advice: As for Washington apple production, several different sources of information and advice are available to pear growers to help them make pest management decisions. Each potential source of advice was listed in the survey for growers to select and rate its relative usefulness in providing advice for making pest control decisions. Grower responses to the question regarding the importance of different information sources in making pest management decisions are summarized in Table 4.

Pest management activities: Whether conducted by the grower, fieldmen or private consultants, orchard monitoring was by far the most frequent pest management activity employed, with 93% of the respondents indicating its use and only one individual reportedly never employing monitoring. The next most frequently used technique was pheromone trapping, with the portion of respondents reporting use as 'often' or 'sometimes' at 78%. Only about 38% of the growers reported using alternate row spraying as a control practice. This was a slight decrease from 1990 in which nearly 44% said they either 'often' or 'sometimes' used this practice. The percentage of growers using reduced pesticide rates remained the same at 68%. Seventy-seven respondents reported the use of degree-day models for timing sprays. There was no change in the number of growers reporting the incorporation of economic thresholds for their management practices, with 68% reporting its use during both survey years. In 2000 there was a slight increase in the use of biological control practices, with 64% reporting their use compared to 50% in 1990. Sixty four percent of the growers reported using integrated mite management.

Table 4. Percentage of survey respondents who rated the value of information from different sources in helping them arrive at pest management decisions, 2000.

Information source	Very important	Somewhat important	Not important
Private consultant (PC)	44.2	13.0	31.9
Agricultural chemical industry fieldman (ACF)	47.8	31.1	14.5
Cooperative Extension (CE)	28.3	45.7	15.2
Packinghouse Reports (PR)	32.6	40.6	18.1
Other growers (OG)	10.9	63.0	17.4
WSU Crop Protection Guide (CPG)	43.5	34.1	12.3
<i>Orchard Pest Management</i> (OPM)	19.6	41.3	29.0
Outside management	0.7	0	0
Own experience	5.8	0	0
Other	0.7	0.7	0

Details on pesticides used are still being summarized. A more complete report will be provided at the research review in January.

Cherry

Five hundred surveys were sent to cherry growers and 22% were returned. Of the surveys returned, 65% were complete and usable. This represents the first detailed IPM practices survey from Washington for cherry.

Only 1.45% of cherry growers indicated that they use organic practices. However, another 1.45% were transitional organic, and 2.9% indicated they had mixed conventional and organic production. The dominant cherry variety produced was Bing (62%) followed by Lambert (14%).

Pest management advice: As for Washington apple and pear production, several different sources of information and advice are available to cherry growers to help them make pest management decisions. Each potential source of advice was listed in the survey for growers to select and rate their relative usefulness in providing advice for making pest control decisions. Grower responses to the question regarding the importance of different information sources in making pest management decisions are summarized in Table 5.

Table 5. Percentage of survey respondents who rated the value of information from different sources in helping them arrive at pest management decisions, 2000.

Information source	Very important	Somewhat important	Not important
Private consultant (PC)	27.40	16.44	39.73
Agricultural chemical industry fieldman (ACF)	43.84	31.51	13.70
Cooperative Extension (CE)	27.40	35.62	21.92
Packinghouse fieldmen (PF)	43.84	36.99	10.96
Other growers (OG)	6.85	64.38	16.44
WSU Crop Protection Guide (CPG)	41.10	34.25	13.70
<i>Orchard Pest Management</i> (OPM)	15.70	24.66	45.21

Pest management activities: Whether conducted by the grower, fieldmen or private consultants, orchard monitoring was by far the most frequent pest management activity employed, with about 90% of respondents indicating its use, either often or sometimes. The use of economic thresholds and reduced pesticide rates ranked next in importance, with both employed by nearly 75% of the growers. The least popular was alternate row spraying, with nearly 65% of the growers seldom or never practicing this activity.

Details on pesticides used are still being summarized. A more complete report will be provided at the research review in January.

Budget:

Survey of IPM practices in Washington tree fruit crops

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Request for 2002: \$0

Year	Year 1 (2001)	Total cost
Total	\$10,000	\$10,000

Current year breakdown

Item	Year 1 (2001)	Total cost
Salaries ¹	0	0
Benefits (30%)	0	0
Wages ¹	2,500	2,500
Benefits (16%)	400	400
Equipment	0	0
Supplies ²	6,600	6,600
Travel ³	500	500
Miscellaneous	0	0
Total	10,000	10,000