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Pesticide Use on Peaches and Pears Grown in Connecticut: 1991

James L. Turner II
University of Connecticut - Storrs

Candace L. Bartholomew
University of Connecticut - Storrs

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James J. Turner, II
Candace L. Bartholomew

Cooperative Extension System
Storrs Agricultural Experiment Station
College of Agriculture and Naural Resources
University of Connecticut
Storrs, CT 06269

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James J. Turner, II
Research Assistant, II

Candace L. Bartholomew
Cooperative Extension Educator
Pesticide Coordinator

Introduction

Establishing a database of pesticide use by crop is necessary to respond to numerous issues including groundwater quality, protection of endangered species and pesticide residues on food. State-level pesticide use data are also needed to respond to benefits assessments of pesticides in the EPA special review process.

The objective of this project was to collect information on the types and amounts of pesticides used to control peach and pear pests in Connecticut during 1991. Growers' opinions on value and cost of alternative pest control measures were also collected for comparative purposes.

The pear survey was not part of the original NAPIAP (National Agricultural Pesticide Impact Assessment Program) proposal. While data were being collected for the survey on apples grown in Connecticut, growers expressed a concern about the lack of pesticide options available for use on pears. Since many tree fruit growers grow both peaches and pears, information about pesticide use on pears was collected in conjunction with the peach survey.

Materials And Methods

Written surveys, one for peaches and one for pears, were determined to be the most cost effective and least time consuming method of data collection. Several state organizations and individuals were contacted for ideas on data collection and survey design. The most useful information on collecting alternative pest control methods was found in Tom Feurer's sweet corn survey, designed for the Delaware Agricultural Statistics Service (Feurer, 1990). For pesticide application information, the survey designed by Steve Wood for the New England Fruit Growers' Association, Committee on the Environment was useful (Wood, 1989). Information gained from previous NAPAP surveys conducted in Connecticut was also useful (Turner and Bartholomew, in press). Dave Kollas, Pomologist, and Lorraine Los, Fruit IPM Program Leader, at the University of Connecticut Cooperative Extension System, were helpful in designing the final surveys. See Appendices A and B.

The *1989 Connecticut Tree Fruit Survey* (USDA, 1991) reports 91 peach growers with 509 acres of bearing peach trees and 83 pear growers with 313 acres of bearing pear trees in Connecticut. Names and addresses of 105 peach and/or pear growers were obtained from *Connecticut Apples: A Guide* (CT Dept. of Ag., 1990), *Histories of Connecticut Orchards* (Brusic and Brusic, 1990), *Connecticut Agricultural Marketing Directory* (CT Dept. of Ag., 1990) and a list of growers who had participated in the University of Connecticut Cooperative Extension System Integrated Pest Management (IPM) program for tree fruit. Names and addresses of certified private applicators in the orchard category were obtained from the Connecticut Department of Environmental Protection, Pesticide Management Division and used as a cross reference when developing the survey mailing list.

Retail prices for most formulations were obtained in December 1991 from three agricultural chemical retailers in Connecticut. The price for Mitac WP is from 1990 and prices for Zolone EC and Phygon 50 WP are from 1987 (L. Los, University of Connecticut Cooperative Extension System, personal communication). These were the last years these materials were marketed in Connecticut. The price for Botran 75WDG was obtained in 1992 from a retailer in Massachusetts because no price was available from a Connecticut retailer.

The surveys were designed to collect the following information:

A. Acres planted and average yield
B. Chemicals used for control of each pest
   1. Number of treatments and rates
   2. Cost of chemicals per acre
   3. Method of applications

4. Time of applications

C. Alternative control methods

D. Potential changes from alternatives.

Both survey forms were divided into the following three sections:

Section A: General Instructions. Growers were asked to report each application of every pesticide, the name of the pest targeted by the application, the actual area treated and amount of formulation applied, including unit of measurement. They were instructed to fill out the form as completely as possible even if there were questions they could not answer.

Section B: 1991 Regular Spray Program Information. The first part of this section requested information about the number of acres sprayed, number of 16 qt. baskets (1/2 bushels) harvested, number of 16 qt. baskets not harvested and the average gross income per 16 qt. basket. In the pear survey, the unit of measurement for yields was bushels (40 lb. bushels). In the second part of Section B, a table format was used to collect pesticide application data. Information requested included date of application and growth stage of trees, trade name and formulation, pest treated, actual rate per 100 gallons, gallons of mix per acre, acres treated and type of application.

Section C: Alternative Program Information. A table format was used to collect information and opinions on alternative methods and/or pesticides which could be used in lieu of the pesticides reported in Section B. To indicate what effect on the value of the crop and change in cost an alternative would have, growers checked "no change", "increase", "decrease", or "don't know."

Several steps were taken to encourage growers to return the survey. First, an explanation of the purpose of the surveys and the need for participation was included in a cover letter. Second, language familiar to peach/pear growers was used on the surveys so that questions were easily understood. Third, both surveys were kept short. Each survey took less than one hour to complete.

Two newsletter articles explaining the survey and the need for grower participation were printed in the *Fruit Growers Newsletter* (March, 1992) and the *Connecticut Weekly Agricultural Report* (March 11, 1992).

On February 6, 1992 the peach and pear surveys were mailed together with a cover letter. Follow-up post cards were sent two weeks later reminding growers that their input was needed. Phone calls were made five weeks after the survey was mailed to all growers who had not responded. Where messages could not be left, duplicate surveys were sent. Six weeks after the first mailing, handwritten letters were sent encouraging response. Growers known to have more then one acre in peaches or pears were sent a duplicate survey at eight weeks and the other growers were sent a handwritten post card. Post

cards and letters were handwritten in order to personalize them and to keep them from looking like "junk mail."

In preparing Tables 1.a. to 1.d. for peaches and 5.a. to 5.e. for pears, the method of calculating formulation rate/acre/application was: (total amount of formulation reported used for the year) ÷ (**total** acres treated). The amount of formulation in this equation is obtained by adding (acres treated with a given formulation) x (application rate/acre) x (number of treatments). Total acres treated is calculated by adding (number of acres a grower treated one time with a given formulation) x (number of treatments). By way of example, if 10 acres were sprayed three times with Captan 50W, the total number of acres treated is 30.

The formulation rate/acre/year was calculated as: (total amount of formulation reported used for the year) ÷ (acres treated). The only difference between this equation and the equation for determining the formulation rate/acre/application is **total** acres treated. Acres treated is obtained by adding together all of the acres growers treated one time with a given formulation. If 10 acres were sprayed three times with Captan 50W, the actual number of acres treated is 10.

In preparing Tables 2.a. to 2.d. for peaches and Tables 6.a. to 6.e. for pears, the "rate (lb. a.i./A) per application (average)" and "rate (lb. a.i./A) per year (average)" were calculated by converting the amount of formulation rate/acre/application and formulation rate/acre/year from Tables 1 and 5 into pounds of pesticide active ingredient.

Results and Discussion: Peaches

Regular spray program

Sixty-four surveys (62%) were returned out of one hundred and four mailed. Thirty-one of the returned surveys contained data for 260 acres, representing 51% of the 509 acres of peach production reported in the 1989 *Connecticut Tree Fruit Survey* (USDA, 1991). The remaining thirty-three surveys were returned because 21 did not grow peaches, 6 had less then 10 trees, five were out of business and one had no mailbox.

Of the 260 acres surveyed, one grower used only fish oil on 1/8 acre to control scale and overwintering insect eggs. The grower harvested eight to 10, 16 qt. baskets and sold each basket for an average of $20.00. The remaining acreage reported by the other 30 growers, had pesticides applied to them. Since virtually all peach production acreage reported in the survey was sprayed with pesticides, no comparisons can be drawn between pesticide and nonpesticide methods of control.

Twenty-two surveys, representing 193 acres, had usable information about yield. The average number of 16 qt. baskets harvested per acre was 279. The median yield was 200, 16 qt. baskets/acre with a range of 10 to 500.

Twenty-three surveys, representing 185 acres, had usable information about the average price per 16 qt. basket. The average gross income/16 qt. basket was $11.12. Median price was $11.00 with a range of $6.00 to $20.00. Average gross income/bearing acre was $3,256.

Complete pesticide use information was reported for 228 acres, 45% of the 509 acres of peach production in 1989 (USDA, 1991). Therefore, information about chemical use on peaches is based on data collected for 228 acres.

Tables 1.a. to 1.d. present information on the rate of pesticide applied by formulation per acre and per year, and the formulation cost per acre for both a single application and for the year. Growers spent $34,021 on pesticides to treat 228 acres. Fungicides and bactericides cost $23,672 (69.6%) (Table 1.a.), insecticides and miticides cost $9,899 (29.1%) (Table 1.c.), herbicides cost $351 (1%) (Table 1.b.) and rodenticides cost $99 (0.3%) (Table 1.d.).

Tables 2.a. to 2.d. present the number of acres treated with each pesticide, the time frame during which each pesticide was applied, the number of applications of each pesticide, the rates of active ingredients used per application and per year and the total pounds of active ingredient per year for each chemical used. Peach growers surveyed

used 4,785 lbs. of pesticide active ingredient (a.i.) to treat 228 acres. Of the 4,785 lbs. a.i. used, fungicides and bactericides accounted for 3,704 lbs. a.i. (77.4%) (Table 2.a.), insecticides and miticides 1,033 lbs. a.i. (21.6%) (Table 2.c.), herbicides 47 lbs. a.i. (1%) (Table 2.b.) and rodenticides 1 lb. a.i. (.02%) (Table 2.d.).

All 228 acres were treated with a fungicide and/or bactericide. Fungicides and bactericides are reported together since growers used both interchangeably to control fungal and bacterial problems. The three major fungicides/bactericides used were captan, sulfur and thiophanate-methyl (Tables 1.a. and 2.a.). These were used on 203 acres, 89% of the acreage treated for disease control. These three materials comprised 2,405 lbs. a.i., 65% of the 3,704 lbs. a.i. of fungicide/bactericide used, and accounted for $7,852, 33% of the $23,672 spent for disease control. Sulfur alone accounted for 1,489 lbs. a.i., 40% of the fungicides/bactericides applied.

Insecticides and/or miticides were also used on all 228 acres. The most heavily used insecticides/miticides were azinphosmethyl, endosulfan and phosmet (Tables 1.c. and 2.c.). They comprised 664 lbs. a.i., 85% of the 783 lbs. a.i. of insecticides/miticides, and were used on 212 acres (94%). The total cost of these chemicals was $7,299, 75% of the $9,683 spent on all insecticides/miticides. Azinphosmethyl alone accounted for 309 lbs. a.i., 40% of the insecticides/miticides used.

Herbicides were used on 41 acres, 18% of the 228 acres reported. Forty-one acres represents the area within which spot and/or band applications were made. The actual area treated would be smaller. The two primary herbicides applied were paraquat and simazine (Tables 1.b. and 2.b.). These were applied to 25 acres, 61% of the 41 acres treated with herbicides. They comprised 43 lbs. a.i., 92% of the 47 lbs. a.i. of herbicide used, and accounted for $295, 84% of the $351 spent on weed control. Simazine alone accounted for 35 lbs. a.i. or 75% of the herbicides applied.

Rodenticides were used on 23 acres, 10% of the 228 acres reported, and totaled 1 lb. a.i. at a cost of $99 (Tables 1.d. and 2.d.). Superior oils were used on 8 acres, 4% of the 228 acres, and totaled 250 lbs. a.i. at a cost of $216 (Tables 1.c. and 2.c.).

The methods of pesticide application for fungicides/bactericides and insecticides/miticides were an air blast sprayer on 89% of the acres, a hand gun 7% and a mist sprayer 4%. For herbicides, a boom sprayer was used on 48% of the acres and a backpack sprayer on 29%. The balance of methods for applying herbicides was undetermined. For rodenticides, baiting traps by hand was done on 65% of the acres and a rotary spreader was used on the remaining 35%.

Alternative control measures

Tables 3.a. and 3.b. show how individual growers think the use of alternative methods and pesticides on certain pests would change the value and cost of producing their crop. Ninety-four alternatives were listed; 36 for different fungicides/bactericides (Table 3.a.) and 58 for insecticides/miticides (Table 3.b.). No alternatives were given for herbicides and rodenticides. Of the alternatives listed, 88 were other pesticides, three were disking/harrowing for the control of brown rot and three were the use of predatory mites for controlling mites. Two growers stated that there were no alternatives for DCNA when controlling rhizopus rot.

Of the 94 alternatives listed in Tables 3.a. and 3.b., growers felt none of them would increase the value of the peaches, 28 would decrease the value, 37 would have no effect on the value and 29 did not know what effect the alternative would have on the value. As for the effect of alternatives on the cost of producing peaches, growers felt 30 would increase the cost, 20 would decrease the cost, 16 would have no effect on the cost and 28 did not know what effect the alternatives would have on the cost.

Two conclusions can be drawn from Tables 3.a. and 3.b. First, peach growers are heavily dependent on chemicals. Second, there is no consistent opinion among growers except that there were no alternatives which would increase the value of the crop.

Pests targeted

Tables 4.a. to 4.c. list which pesticides were used to treat each pest and how many acres were treated. Total amounts of individual pesticides used for a given pest cannot be determined from data collected since growers reported targeting multiple pests with a single application. Twenty-two of the surveys returned by growers contained usable information on the control of various pests. This information represents 209 acres. The two diseases affecting the greatest acreage were brown rot on 198 acres and powdery mildew/rusty spot on 107 acres (Table 4.a.). The four primary insect pests treated were plum curculio on 183 acres, plant bugs on 173 acres, borers on 166 acres and oriental fruit moth on 154 acres (Table 4.c.). Weeds (i.e., broadleaf and grass types) were treated with spot applications on 25 acres (Table 4.b.). Voles and mice were treated on eight acres.

Results and Discussion: Pears

Regular spray program

Sixty-four surveys (62%) were returned out of one hundred and four mailed. Thirty-two of the returned surveys contained data for 184 acres, representing 59% of the 313 acres of pear production reported in the *1989 Connecticut Tree Fruit Survey* (USDA, 1991). The remaining thirty-two surveys were returned because 20 did not grow pears, six had less then 10 trees, five were out of business and one had no mailbox.

Of the 184 acres, one grower used only superior oil on 1/10 acre to control pear psylla. This grower harvested 10 bushels (40 lb. bushels) and sold each bushel for an average of $20.00. The same grower did use pesticides on his/her peach trees. The remaining acreage reported in the survey had pesticides applied. Since virtually all pear production acreage reported in the survey was sprayed with pesticides, no comparisons can be drawn between pesticide and nonpesticide methods of control.

Nineteen surveys, representing 133 acres, had usable information about yield. The average number of bushels harvested per acre was 190. The median yield was 133 bushels/acres with a range of 16 to 387.

Twenty-one surveys, representing 123 acres, had usable information about the average price per bushel. The average gross income/bushel was $10.17. Median price was $12.00 with a range of $3.00 to 25.00. Average gross income/bearing acre was $1,958.

Chemical use on pears, except for herbicide use, is based on data representing 182 acres. Herbicide use is based on 162 acres because reports for 20 acres had incomplete information on rates of herbicides applied.

Tables 5.a. to 5.e. present information on the rate of pesticide applied by formulation per acre and per year, and the formulation cost per acre for both a single application and for the year. Growers spent $40,944 on pesticides to treat 182 acres. Insecticides and miticides cost $30,815 (75.3%) (Table 5.d.), fungicides and bactericides $9,132 (22.3%) (Table 5.a.), herbicides $489 (1.2%) (Table 5.c.), rodenticides $415 (1%) (Table 5.e.) and growth regulators $93 (0.2%) (Table 5.b.).

Tables 6.a. to 6.e. present the number of acres treated with each pesticide, the time frame during which each pesticide was applied, the number of applications of each pesticide, the rates of active ingredients used per application and per year and the total pounds of active ingredient per year for each chemical used. Pear growers surveyed used 8,319 lbs. of pesticide active ingredient (a.i.) to treat 182 acres.

Of the 8,319 lbs. ai used, insecticides and miticides accounted for 6,979 lbs. a.i. (83.9%) (Table 6.d.), fungicides and bactericides 1,274 lbs. ai (15.3%) (Table 6.a.), herbicides 60 lbs. a.i. (0.7%) (Table 6.c.), rodenticides 6 lbs. ai (.07%) (Table 6.e.) and growth regulators 0.2 lb. a.i. (.002%) (Table 6.b.).

Insecticides and/or miticides were used on all 182 acres. The three major insecticides/miticides used were amitraz, azinphosmethyl and endosulfan (Tables 5.d. and 6.d.). These were used on 167 acres (92%). They comprised 700 lbs. a.i., 69% of the 1,010 lbs. a.i. of insecticides/miticides used and accounted for $17,514, 74% of the $23,777 spent on insecticides/miticides. Endosulfan alone accounted for 319 lbs. a.i. or 32% of the insecticides/miticides applied.

Fungicides and/or bactericides were used on 179 acres, 98% of the 182 acres reported. Fungicides and bactericides are reported together since growers used both interchangeably to control fungal and bacterial problems. The three major fungicides/bactericides used were benomyl, copper hydroxide and ferbam (Tables 5.a. and 6.a.). These were used on 155 acres, 87% of the acreage treated with fungicides/bactericides. These three materials comprised 1,029 lbs. a.i., 81% of the 1,274 lbs. a.i. of fungicide/bactericide used and accounted for $6,992, 77% of the $9,132 spent on disease control. Ferbam alone accounted for 643 lbs. a.i., 51% of the fungicides/bactericides applied.

Superior oils were used on 159 acres, 87% of the 182 acres reported, and totaled 5,374 lbs. a.i. at a cost of $4,683 (Tables 5.d. and 6.d.). Insecticidal soap was used on 67 acres (37%) and totaled 595 lbs. ai at a cost of $2,355 (Tables 5.d. and 6.d.). Rodenticides were used on 30 acres (17%) and totaled 6 lbs. a.i. at a cost of $415 (Tables 5.e. and 6.e.). Growth regulators were used on 17 acres (9%) and totaled 0.2 lb. a.i. at a cost of $93 (Tables 5.b. and 6.b.).

Complete information on herbicide use was reported for 162 acres, within which only spot and/or band applications were made. The actual area treated with herbicides was 12 acres. The two major herbicides used were diuron and simazine (Tables 5.c. and 6.c.). These were used on 11 acres, 92% of the acreage treated with herbicides. The two materials comprised 37 lbs. a.i., 62% of the total 60 lbs. a.i. of herbicide used, and accounted for $191, 39% of the $489 spent on weed control. Simazine alone accounted for 20 lbs. a.i., 33% of the herbicides applied.

The most common method of pesticide application was with an air blast sprayer. Fungicides/bactericides, growth regulators and insecticides/miticides were all applied by this method. A handgun was used occasionally to apply insecticides/miticides. For herbicides, a boom sprayer and a backpack sprayer were used in combination on 42% of the acres, a boom sprayer 37% and a handgun 21%. For rodenticides,

a rotary spreader was used on 60% of the acreage treated, a rotary spreader in combination with baiting traps by hand on 33% and baiting traps by hand was used on the balance.

Alternative control measures

Tables 7.a. to 7.c. show how individual growers think the use of alternative methods and pesticides on certain pests would change the value and cost of producing their crop. Seventy-six alternatives were listed, 16 for different fungicides/bactericides (Table 7.a.), three for herbicides (Table 7.b.) and 57 for insecticides/miticides (Table 7.c.). No alternatives were given for growth regulators or rodenticides. Seventy-two of the alternatives were other pesticides, three were insecticidal soap, and one was dormant oil.

Of the alternatives listed in Tables 7.a. to 7.c., growers felt seven would increase the value of the pears, 14 would decrease the value, 34 would have no effect on the value and 21 did not know what effect the alternative would have on the value. As for the effect of alternatives on the cost of producing pears, growers felt 26 would increase the cost, 14 would decrease the cost, 13 would have no effect on the cost, and 23 did not know what effect the alternatives would have on the cost.

Two conclusions can be drawn from Tables 7.a. to 7.c. First, pear growers are heavily dependent on chemicals. Second, the majority of growers felt there would be no effect or did not know what effect the alternatives would have on value or cost.

Pests targeted

Tables 8.a. to 8.c. list which pesticides were used to treat each pest and how many acres were treated. Total amounts of individual pesticides used for a given pest cannot be determined from data collected since growers reported targeting multiple pests with a single application. Twenty-two of the surveys returned by growers contained usable information on the control of various pests. This information represents 128 acres. The three insects affecting the greatest acreage were pear psylla on 126 acres, plant bugs on 108 acres and plum curculio on 99 acres (Table 8.c.). The two primary diseases treated were pear scab on 110 acres and fabrea leaf spot on 95 acres (Table 8.a.). Voles and mice were treated on 20 acres with zinc phosphide. Weeds (i.e., broadleaf and grass types) were treated on nine acres (Table 8.b.). Drops were controlled on five acres.

Summary

Of the 64 people who responded to the survey, 41 grew either peaches and/or pears. Fifty-four percent of the growers grew both peaches and pears.

Using a written survey as the means of collecting information was received well by the growers. Two growers mailed in copies of spray records required by the state regulatory agency in place of completing the "Regular Spray Program Information" section of the survey.

Growers are dependent on chemicals to grow peaches and pears. Less than one acre of the acreage surveyed was not treated with pesticides. Peach growers used an average of 21 lbs. a.i. of pesticides per acre at a cost of $149/acre, 5% of the average gross income/bearing acre. Pear growers used an average of 46 lbs. a.i. of pesticides per acre at a cost of $225/acre, 12% of the average gross income/bearing acre.

When peach/pear growers were asked to list alternative control measures to what they had used, only 10 of the 170 alternatives listed were nonpesticide treatments. Interestingly, there was no consistent opinion among growers as to what effect alternatives would have on the value or cost of the crop.

Growers' comments further revealed a dependency on pesticides. As one grower stated, "We need as many chemical alternatives as possible to reduce the chance of resistance and to keep our costs down by keeping chemical companies competitive. This will help us stay in business in Connecticut."

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Table 1.a. Fungicides and Bactericides: Formulations used on **PEACHES**, amount used, and cost.[a]

Fungicide and Bactericide	Trade Name and Formulation	Formulation Cost/Unit	Formulation Rate/A/ Application (Average)	Formulation Cost/A/ Application	Formulation Rate/A/ Year (Average)	Formulation Cost/A/ Year	Acres Treated[b]	Total Amount of Formulation Applied/Year	Total Formulation Cost/Year
benomyl	Benlate DF, Benalte 50WP	$ 16.76 lb	.57 lb	$ 9.55	2.05 lb	$ 34.36	66	134 lb	$ 2,246
calcium polysulfide	Lime-Sulfur (FL)	7.52 gl	10.0 gl	75.20	10.0 gl	75.20	12	120 gl	902
captan	Captan 50WP	2.42 lb	2.13 lb	5.16	8.32 lb	20.13	166	1,385 lb	3,352
	Captan 80WP	3.88 lb	1.77 lb	6.87	2.74 lb	10.63	44	119 lb	462
	Captec 4L	21.94 gl	2.0 qt	10.97	2.0 qt	10.97	5	10 qt	55
	Total captan	-	-	-	-	-	203[c]	-	3,869
chlorotha-lonil	Bravo 720 (FL)	48.52 gl	1.27 qt	15.41	3.5 qt	42.46	44	39 gl	1,892
copper hydroxide	Kocide 101 (WP)	2.47 lb	3.0 lb	7.41	3.0 lb	7.41	3	9 lb	22
copper salts of fatty and rosin acids	Tenn-Cop 5E	12.35 gl	1.27 pt	1.96	2.67 pt	4.12	20	7 gl	86
DCNA	Botran 75WDG	8.00 lb[d]	2.2 lb	17.60	2.2 lb	17.60	61	134 lb	1,072
dichlone	Phygon 50WP	6.95 lb[e]	1.5 lb	10.43	1.5 lb	10.43	10	15 lb	104
dodine	Cyprex 65W	9.45 lb	2.25 lb	21.26	4.5 lb	42.53	2	9 lb	85
ferbam	Carbamate WDG	3.29 lb	2.31 lb	7.60	2.43 lb	8.00	97	236 lb	776
iprodione	Rovral 4F	170.29 gl	1.5 pt	31.93	1.5 pt	31.93	6	9 pt	192
	Rovral 50WP	23.75 lb	.97 lb	23.04	2.01 lb	47.74	66	133 lb	3,159
	Total iprodione	-	-	-	-	-	66[c]	-	3,351

Table 1.a. Fungicides and Bactericides (continued)

Fungicide and Bactericide	Trade Name and Formulation	Formulation Cost/Unit	Formulation Rate/A/ Application (Average)	Formulation Cost/A/ Application	Formulation Rate/A/ Year (Average)	Formulation Cost/A/ Year	Acres Treated[b]	Total Amount of Formulation Applies/Year	Total Formulation Cost/Year
oxytetra-cycline calcium complex	Mycoshield (WP) (used as a spray)	$ 8.85 lb	1.53 lb	$ 13.54	5.78 lb	$ 51.15	15	87 lb	$ 770
	Mycoshield (WP) (used as an injection)	8.85 lb	23.8 oz/ tree	13.16/tree	23.8 oz/ tree	13.16/tree	116 trees	173 lb	1,531
	Total oxytetracycline calcium complex		-	-	-	-	-	-	2,301
sulfur	Sulfur (WP)	.50 lb	3.13 lb	1.57	13.7 lb	6.85	136	1,862 lb	931
thiophanate-methyl	Topsin M 4.5F	118.58 gl	7.18 fl oz	6.65	11.33 fl oz	10.50	36	3 gl	356
	Topsin M 70W	16.47 lb	5.54 oz	5.70	14.58 oz	15.01	125	114 lb	1,878
	Topsin M 85WDG	16.70 lb	.58 lb	9.69	4.06 lb	67.80	12	49 lb	818
	Total thio-phanate-methyl	-	-	-	-	-	173	-	3,052
thiram	Thiram 65WP	3.18 lb	.58 lb	1.84	2.72 lb	8.65	39	107 lb	340
triforine	Funginex (EC)	78.82 gl	1.09 pt	10.74	2.01 pt	19.80	114	29 gl	2,286
vinclozolin	Ronilan 50WP	23.78 lb	1.0 lb	23.78	5.0 lb	118.90	3	15 lb	357
Total fungicide/bactericide		-	-	-	-	-	-	-	$ 23,672

[a] Prices listed are for 1991 unless otherwise indicated.

[b] Acres treated is the number of acres treated with one application of a given material. Example: If 10 A were sprayed three times with Captan 50W, the actual number of acres treated is 10.

[c] This figure is less than the total of the above acres; two formulations of the same active ingredient were used on the same acreage.

[d] Price listed is for 1992.

[e] Price listed is for 1987.

Table 1.b. Herbicides: Formulations used on PEACHES, amount used, and cost.[a]

Herbicide	Trade Name and Formulation	Formulation Cost/Unit	Formulation Rate/A/ Application (Average)	Formulation Cost/A/ Application	Formulation Rate/A/ Year (Average)	Formulation Cost/A/ Year	Acres Treated[b]	Total Amount of Formulation Applied/Year	Total Formulation Cost/Year
diuron	Karmex DF	$ 5.17 lb	3.0 lb	$ 15.51	6.0 lb	$ 31.02	1	3 lb	$ 16
glyphosate	Roundup (liquid)	53.38 gl	5.3 fl oz	2.21	5.4 fl oz	2.25	17	3 qt	40
paraquat	Gramoxone Super (liquid)	38.00 gl	1.26 pt	5.99	1.26 pt	5.99	22	3 gl	114
	Gramoxone Extra (liquid)	33.85 gl	1.5 qt	12.69	1.5 qt	12.69	3	5 qt	42
	Total paraquat	-	-	-	-	-	25	-	156
simazine	Princep Caliber 90 (WDG)	3.57 lb	1.6 lb	5.71	1.6 lb	5.71	25	39 lb	139
Total herbicide		-	-	-	-	-	-	-	$ 351

[a] Prices listed are for 1991.

[b] Acres treated is the entire orchard(s) where herbicides were applied. Spot and/or band treatments were made within these orchard(s).

Table 1.c. Insecticides and Miticides: Formulations used on PEACHES, amount used, and cost.[a]

Insecticide and Miticide	Trade Name and Formulation	Formulation Cost/Unit	Formulation Rate/A/ Application (Average)	Formulation Cost/A/ Application	Formulation Rate/A/ Year (Average)	Formulation Cost/A/ Year	Acres Treated[b]	Total Amount of Formulation Applied/Year	Total Formulation Cost/Year
azinphos-methyl	Azinphos-methyl 35WP, Guthion 35WP	$ 4.83 lb	1.84 lb	$ 8.89	5.05 lb	$ 24.39	83	419 lb	$ 2,024
	Azinphos-methyl 50WP, Guthion 50WP	6.76 lb	.75 lb	5.07	3.1 lb	20.96	105	324 lb	2,190
	Total azinphos-methyl	-	-	-	-	-	188	-	4,214
carbaryl	Sevin 50W	2.90 lb	.8 lb	2.32	1.6 lb	4.64	5	8 lb	23
chlorpyrifos	Lorsban 50W	6.00 lb	1.5 lb	9.00	1.5 lb	9.00	1	2 lb	12
dicofol	Kelthane 35WP	7.95 lb	1.88 lb	14.95	1.88 lb	14.95	35	66 lb	525
endosulfan	Thiodan 50WP	6.00 lb	1.76 lb	10.56	2.08 lb	12.48	110	228 lb	1,368
esfenvalerate	Asana XL (EC)	130.11 gl	2.0 fl oz	2.03	2.03 fl oz	2.06	35	70 fl oz	71
fenvalerate	Pydrin 2.4EC	65.00 gl	4.8 fl oz	2.44	4.8 fl oz	2.44	1	5 fl oz	3
formetanate hydrochloride	Carzol SP	32.78 lb	5.19 oz	10.63	5.19 oz	10.63	7	2 lb	66
methomyl	Lannate SP	20.51 lb	1.04 lb	21.33	1.17 lb	24.00	23	27 lb	554
methoxychlor	Marlate 50W	4.11 lb	3.0 lb	12.33	3.0 lb	12.33	1	2 lb	8
methyl parathion	Penncap-M (F)	22.35 gl	1.6 qt	8.94	8.0 qt	44.70	12	24 gl	536
oil	Superior Oil, Spray Oil 6E	6.17 gl	4.42 gl	27.27	4.42 gl	27.27	8	35 gl	216
	Fish Oil	5.19 gl	.5 gl	2.60	.5 gl	2.60	.1	8 fl oz	.32
	Total oil	-	-	-	-	-	8	-	216

Table 1.c. Insecticides and Miticides (continued)

Insecticide and Miticide	Trade Name and Formulation	Formulation Cost/Unit	Formulation Rate/A/ Application (Average)	Formulation Cost/A/ Application	Formulation Rate/A/ Year (Average)	Formulation Cost/A/ Year	b Acres Treated	Total Amount of Formulation Applied/Year	Total Formulation Cost/Year
permethrin	Pounce 3.2EC	$187.05 gl	3.31 fl oz	$ 4.84	3.74 fl oz	$ 5.47	91	21 pt	$ 491
phosmet	Imidan 50WP	3.57 lb	3.33 lb	11.89	11.33 lb	40.45	43	481 lb	1,717
propargite	Omite 6E	90.17 gl	12.96 fl oz	9.13	25.92 fl oz	18.26	1	26 fl oz	18
	Omite 30W	5.11 lb	6.0 lb	30.66	6.0 lb	30.66	3	15 lb	77
	Total propargite	-	-	-	-	-	4	-	95
Total insecticide/miticide		-	-	-	-	-	-	-	$ 9,899

a Prices listed are for 1991.

b Acres treated is the number of acres treated with one application of a given material. Example: If 10 A were sprayed three times with Captan 50W, the actual number of acres treated is 10.

Table 1.d. Rodenticides: Formulations used on **PEACHES**, amount used, and cost.[a]

Rodenticide	Trade Name and Formulation	Formulation Cost/Unit	Formulation Rate/A/ Application (Average)	Formulation Cost/A/ Application	Formulation Rate/A/ Year (Average)	Formulation Cost/A/ Year	b Acres Treated	Total Amount of Formulation Applied/Year	Total Formulation Cost/Year
chlorpha-cinone	Rozol (P)	$ 1.41 lb	2.07 lb	$ 2.92	2.07 lb	$ 2.92	15	31 lb	$ 44
zinc phosphide	Zinc Phosphide (G)	.76 lb	9.0 lb	6.84	9.0 lb	6.84	8	72 lb	55
Total rodenticide		-	-	-	-	-	-	-	$ 99

a Prices listed are for 1991.

b Acres treated is the number of acres treated with one application of a given material. Example: If 10 A were sprayed three times with Captan 50W, the actual number of acres treated is 10.

Table 2.a. Fungicides and Bactericides: Active ingredient used on **PEACHES**, acreage treated, timing, number and rate of application.

Fungicide and Bactericide	Trade Name and Formulation	Acres Treated[a]	Time of Application	No. of Applications (Range)	Rate (lb ai/A) Per Application (Range)	Rate (lb ai/A) Per Application (Average)	Rate (lb ai/A) Per Year (Average)	Total Pounds Active Ingredient/Year
benomyl	Benlate DF, Benlate 50WP	66	bloom-11/14	1-8	.04-.5	.29	1.03	67
calcium polysulfide	Lime-Sulfur (FL)	12	dormant	1	30.74	30.74	30.74	369
captan	Captan 50WP	166	pink-8/2	1-11	.29-2.93	1.04	4.07	677
	Captan 80WP	44	pink-8/20	1-3	.47-3.52	1.39	2.15	94
	Captec 4L	5	7/9	1	2.0	2.0	2.0	10
	Total captan	203[b]	pink-8/20	1-11	.29-3.52	1.09	3.85	781
chlorothalonil	Bravo 720 (FL)	44	bloom-6/29	1-5	.75-3.00	1.91	5.25	231
copper hydroxide	Kocide 101 (WP)	3	dormant	1	2.31	2.31	2.31	7
copper salts of fatty and rosin acids	Tenn-Cop 5E	20	5/25-11/14	1-2	.26-3.77	1.33	2.79	56
DCNA	Botran 75WDG	61	7/11-8/12	1	1.50-2.25	1.65	1.65	101
dichlone	Phygon 50WP	10	pink	1	.75	.75	.75	8
dodine	Cyprex 65W	2	1/2"-2"	2	1.46	1.46	2.93	6
ferbam	Carbamate WDG	97	dormant-11/18	1-2	.46-3.28	1.76	1.85	179
iprodione	Rovral 4F	6	7/9	1	.75	.75	.75	5
	Rovral 50WP	66	bloom-9/5	1-6	.13-1.0	.49	1.01	66
	Total iprodione	66[b]	bloom-9/5	1-6	.13-1.0	.50	1.07	71

[a] Acres treated is the number of acres treated with one application of a given material. Example: If 10 A were sprayed three times with Captan 50W, the actual number of acres treated is 10.

[b] This figure is less than the total of the above acres; two formulations of the same active ingredient were used on the same acreage.

Table 2.a. Fungicides and Bactericides (continued)

Fungicide and Bactericide	Trade Name and Formulation	Acres Treated[a]	Time of Application	No. of Applications (Range)	Rate (lb ai/A) Per Application (Range)	Rate (lb ai/A) Per Application (Average)	Rate (lb ai/A) Per Year (Average)	Total Pounds Active Ingredient/Year
oxytetra-cycline calcium complex	Mycoshield (WP) (used as a spray)	15	petal fall-8/7	4	.47-.50	.48	1.82	27
	Mycoshield (WP) (used as an injection)	116 trees	10/9	1	.47/tree	.47/tree	.47/tree	54
	Total oxytetracycline calcium complex	-	-	-	-	-	-	81
sulfur	Sulfur (WP)	136	pink-8/7	2-8	.4-9.6	2.50	11.0	1,489
thiophanate-methyl	Topsin M 4.5F	36	pink-7/15	1-2	.21-1.13	.25	.40	14
	Topsin M 70W	125	pink-7/3	1-3	.05-.56	.25	.64	80
	Topsin M 85WDG	12	shuck split-11/18	7	.49	.49	3.45	41
	Total thiophanate-methyl	173	pink-11/18	1-7	.05-1.13	.29	.78	135
thiram	Thiram 65WP	39	swollen bud-7/27	2-5	.33-2.11	.38	1.77	69
triforine	Funginex (EC)	114	pink-8/8	1-9	.08-.4	.22	.40	46
vinclozolin	Ronilan 50WP	3	6/1-7/20	5	.5	.5	2.5	8
Total fungicide/bactericide		-[b]	-	-	-	-	-	3,704

[a] Acres treated is the number of acres treated with one application of a given material. Example: If 10 A were sprayed three times with Captan 50W, the actual number of acres treated is 10.

[b] This figure is less than the total of the above acres; two formulations of the same active ingredient were used on the same acreage.

Table 2.b. Herbicides: Active ingredient used on **PEACHES**, acreage treated, timing, number and rate of application.

Herbicide	Trade Name and Formulation	Acres Treated[a]	Time of Application	No. of Applications (Range)	Rate (lb ai/A) Per Application (Range)	Rate (lb ai/A) Per Application (Average)	Rate (lb ai/A) Per Year (Average)	Total Pounds Active Ingredient/Year
diuron	Karmex DF	1	6/8, 10/13	2	2.4	2.4	4.8	2
glyphosate	Roundup (liquid)	17	5/2-12/2	1-2	.005-.75	.12	.13	2
paraquat	Gramoxone Super (liquid)	22	6/20	1	.24	.24	.24	5
	Gramoxone Extra (liquid)	3	6/8	1	.94	.94	.94	3
	Total paraquat	25	6/8, 6/20	1	.24-.94	.32	.32	8
simazine	Princep Caliber 90 (WDG)	25	6/8, 6/20	1	1.44	1.44	1.44	35
Total herbicide		-	-	-	-	-	-	47

[a] Acres treated is the entire orchard(s) where herbicides were applied. Spot and/or band treatments were made within these orchards.

Table 2.c. Insecticides and Miticides: Active ingredient used on **PEACHES**, acreage treated, timing, number and rate of application.

Insecticide and Miticide	Trade Name and Formulation	a Acres Treated	Time of Application	No. of Applications (Range)	Rate (lb ai/A) Per Application (Range)	Rate (lb ai/A) Per Application (Average)	Rate (lb ai/A) Per Year (Average)	Total Pounds Active Ingredient/Year
azinphos-methyl	Azinphos-methyl 35WP, Guthion 35WP	83	pink-7/21	1-6	.16-1.23	.64	1.77	147
	Azinphos-methyl 50WP Guthion 50WP	105	5/15-8/7	1-8	.13-1.25	.37	1.55	162
	Total azinphosmethyl	188	pink-8/7	1-8	.13-1.25	.47	1.65	309
carbaryl	Sevin 50W	5	7/5-7/20	2	.4	.4	.80	4
chlorpyrifos	Lorsban 50W	1	7/13	1	.75	.75	.75	1
dicofol	Kelthane 35WP	35	7/31	1	.66	.66	.66	23
endosulfan	Thiodan 50WP	110	petal fall-8/3	1-3	.3-2.5	.88	1.04	114
esfenvale-rate	Asana XL (EC)	35	pink	1	.01	.01	.01	.4
fenvalerate	Pydrin 2.4EC	1	petal fall	1	.09	.09	.09	.1
formetanate hydrochloride	Carzol SP	7	pink-8/12	1	.23-.35	.3	.3	2
methomyl	Lannate (SP)	23	6/1-6/20	1-2	.81-1.35	.94	1.05	24
methoxychlor	Marlate 50W	1	10/26	1	1.5	1.5	1.5	1
methyl parathion	Penncap-M (F)	12	5/18-7/7	5	.8	.8	4	48
oil	Superior Oil, Spray Oil 6E	8	dormant-swollen bud	1	14.16-56.64	31.29	31.29	250
	Fish Oil	.1	dormant	1	3.54	3.54	3.54	.4
	Total oil	8	dormant-swollen bud	1	3.54-56.64	30.81	30.81	250

Table 2.c. Insecticides and Miticides (continued)

Insecticide and Miticide	Trade Name and Formulation	Acres Treated[a]	Time of Application	No. of Applications (Range)	Rate (lb ai/A) Per Application (Range)	Rate (lb ai/A) Per Application (Average)	Rate (lb ai/A) Per Year (Average)	Total Pounds Active Ingredient/Year
permethrin	Pounce 3.2EC	91	pink-6/10	1-2	.04-.3	.08	.09	9
phosmet	Imidan 50WP	43	pink-8/20	1-7	.3-3.0	1.67	5.67	241
propargite	Omite 6E	1	7/6, 7/17	2	.61	.61	1.22	1
	Omite 30W	3	7/9, 7/10	1	1.8	1.8	1.8	5
	Total propargite	4	7/6, 7/17	1-2	.61-1.8	1.28	1.65	6
Total insecticide/miticide		-	-	-	-	-	-	1,033

[a] Acres treated is the number of acres treated with one application of a given material. Example: If 10 A were sprayed three times with Captan 50W, the actual number of acres treated is 10.

Table 2.d. Rodenticides: Active ingredient used on **PEACHES**, acreage treated, timing, number and rate of application.

Rodenticide	Trade Name and Formulation	Acres Treated[a]	Time of Application	No. of Applications (Range)	Rate (lb ai/A) Per Application (Range)	Rate (lb ai/A) Per Application (Average)	Rate (lb ai/A) Per Year (Average)	Total Pounds Active Ingredient/Year
chlorphacinone	Rozol (P)	15	12/2	1	.0001	.0001	.0001	.002
zinc phosphide	Zinc Phosphide (G)	8	11/6	1	.18	.18	.18	1
Total rodenticide		-	-	-	-	-	-	1

[a] Acres treated is the number of acres treated with one application of a given material. Example: If 10 A were sprayed three times with Captan 50W, the actual number of acres treated is 10.

Table 3.a. Alternative fungicides, bactericides and/or methods suggested by growers for disease control on **PEACHES**, with expected affect on value of crop and cost of control.

Pest Targeted	Name of Fungicide/Bactericide Used	Alternative Method and/or Pesticide	Expected Change In Value of Crop with Alternative				Expected Change In Cost with Alternative			
			No. Chg.	Inc. (+)	Dec. (-)	Don't Know	No. Chg.	Inc. (+)	Dec. (-)	Don't Know
Bacterial leaf spot (*Xanthomonas campestris* pv. *pruni*)	thiophanate-methyl	Oxytetracyclin	x					x		
Brown rot (*Monilinia fructicola*)	calcium polysulfide	Benlate/Captan				x	x			
		Funginex				x	x			
	captan	Bravo			x					x
		Disking/Harrowing	x					x		
	chlorothalonil	Benlate/Captan				x	x			
		Disking/Harrowing	x					x		
	iprodione	Benlate/Captan			x		x			
		Captan			x		x			
		Disking/Harrowing	x					x		
	sulfur	Bravo			x				x	
		Bravo			x					x
		Captan/Topsin			x				x	
		Rovral			x				x	
		Ronilan			x				x	
	thiophanate-methyl	Captan				x				x
		Captan				x				x
		Benlate	x					x		
	triforine	Bravo			x				x	
		Captan/Topsin			x				x	
		Rovral			x				x	
		Ronilan			x				x	
		Ronilan				x		x		
	benomyl/ferbam	Captan				x				x

Table 3.a. Alternative fungicides, bactericides, and/or methods (continued)

Pest Targeted	Name of Fungicide/Bactericide Used	Alternative Method and/or Pesticide	Expected Change In Value of Crop with Alternative: No. Chg.	Inc. (+)	Dec. (-)	Don't Know	Expected Change In Cost with Alternative: No. Chg.	Inc. (+)	Dec. (-)	Don't Know
	thiophanate-methyl/captan	Bravo			x					x
		Bravo			x				x	
		Rovral			x				x	
		Ronilan			x				x	
	thiophanate-methyl/sulfur	Bravo			x					x
		Captan	x					x		
Peach leaf curl (Taphrina deformans)	ferbam	Bravo				x				x
		Bravo				x		x		
		COCS				x				x
	ferbam/thiophanate-methyl	Bravo	x							x
		Copper Sulfate	x							
Rhizopus rot	thiophanate-methyl	Benlate	x					x		

Table 3.b. Alternative insecticides, miticides, and/or methods suggested by growers for insect/mite control on **PEACHES**, with expected affect on value of crop and cost of control.

Pest Targeted	Name of Insecticide/Miticide Used	Alternative Method and/or Pesticide	Expected Change In Value of Crop with Alternative				Expected Change In Cost with Alternative			
			No. Chg.	Inc. (+)	Dec. (-)	Don't Know	No. Chg.	Inc. (+)	Dec. (-)	Don't Know
Aphids	endosulfan	Lannate				x				x
	methomyl	Synthetic pyrethroids	x				x			
Lesser peach tree borer (Synanthedon pictipes)	methyl parathion	Imidan	x					x		
Mites		Stethorus punctum provide control				x		x		
	clofentezine	Morestan				x				x
	formetanate hydrochloride	Vendex				x				x
		Predatory mites				x		x		
		Predatory mites				x			x	
Oriental fruit moth (Grapholita molesta)	azinphosmethyl	Imidan	x					x		
		Imidan	x						x	
		Imidan				x				x
		Imidan	x					x		
		Sevin			x				x	
	endosulfan	Sevin			x				x	
	methomyl	Imidan	x						x	
	methyl parathion	Imidan	x					x		
	permethrin	Imidan				x				x
	phosmet	Lannate				x				x
		Penncap-M	x					x		

Table 3.b. Alternative insecticides, miticides, and/or methods (continued)

Pest Targeted	Name of Insecticide/Miticide Used	Alternative Method and/or Pesticide	Expected Change In Value of Crop with Alternative				Expected Change In Cost with Alternative			
			No. Chg.	Inc. (+)	Dec. (-)	Don't Know	No. Chg.	Inc. (+)	Dec. (-)	Don't Know
Peach tree borer (Synanthedon exitiosa)	azinphosmethyl	Imidan	x					x		
		Lorsban				x				x
		Lorsban	x					x		
		Lorsban				x	x			
		Thiodan	x				x			
	chlorpyrifos	Guthion			x					x
	endosulfan	Guthion	x					x		
		Imidan	x					x		
		Lorsban	x					x		
		Lorsban				x				x
Plant bugs	azinphosmethyl	Carzol	x					x		
		Imidan	x					x		
		Imidan			x		x			
		Imidan	x						x	
		Imidan			x		x			
		Imidan	x					x		
		Lannate				x				x
		Lannate	x					x		
	methomyl	Imidan	x						x	
	methyl parathion	Imidan	x					x		
	permethrin	Guthion			x		x			
		Imidan			x		x			
	phosmet	Carzol	x					x		
		Lannate				x				x
		Lannate	x					x		

Table 3.b. Alternative insecticides, miticides, and/or methods (continued)

Pest Targeted	Name of Insecticde/Miticide Used	Alternative Method and/or Pesticide	Expected Change In Value of Crop with Alternative				Expected Change In Cost with Alternative			
			No. Chg.	Inc. (+)	Dec. (-)	Don't Know	No. Chg.	Inc. (+)	Dec. (-)	Don't Know
Plum curculio (*Conotrachelus nenuphar*)	azinphosmethyl	Imidan	x					x		
		Imidan			x		x			
		Imidan	x						x	
		Imidan			x		x			
		Imidan	x					x		
		Imidan				x				x
		Imidan	x							x
	endosulfan	Imidan				x				x
	methomyl	Imidan	x						x	
	permethrin	Imidan			x		x			
		Imidan			x		x			
		Imidan				x				x
	phosmet	Penncap-M				x				x
		Methoxychlor				x				x

Comments: "We are heavily involved with the IPM [Integrated Pest Management] program and firmly believe that for our situation, our spray program is the most effective both cost wise and in practical application."

"We need as many chemical alternatives as possible to reduce the chance of resistance and to keep our costs down by keeping chemical companies competitive, so that we can continue to stay in business in Connecticut!"

"We have been minimizing the use of restricted-use pesticides and have employed IPM program for monitoring."

"I try to be organic. However, I have considered using Imidan this year to deal with plum curcullio. I do use a flowable sulfur against scab some years."

Table 4.a. Fungicides and Bactericides used to control diseases on **PEACHES**.

Disease	Fungicide/Bactericide	Trade Name and Formulation	[a] Acres Treated
Bacterial leaf spot (*Xanthomonas campestris* pv. *pruni*)	copper salts of fatty acids and rosin acids	Tenn-Cop 5E	5
	thiophanate-methyl	Topsin M 70W	6
	Actual acres treated for bacterial spot		11
Brown rot (*Monilinia fructicola*)	benomyl	Benlate DF, Benlate 50WP	51
	calcium polysulfide	Lime-Sulfur	12
	captan	Captan 50WP	163
		Captan 80WP	28
		Captec 4L	5
		Total captan [b]	186
	chlorothalonil	Bravo 720 (FL)	26
	dichlone	Phygon 50WP	10
	dodine	Cyprex 65W	2
	ferbam	Carbamate WDG	10
	iprodione	Rovral 4F	6
		Rovral 50WP	48
		Total iprodione [b]	48
	sulfur	Sulfur (WP)	120
	thiophanate-methyl	Topsin M 4.5F	20
		Topsin M 70W	129
		Topsin M 85WDG	12
		Total thiophanate-methyl	161

Table 4.a. Diseases (continued)

Disease	Fungicide/Bactericide	Trade Name and Formulation	Acres Treated[a]
	thiram	Thiram 65WP	38
	triforine	Funginex (EC)	118
	Actual acres treated for brown rot		198[c]
Peach leaf curl (Taphrina deformans)	benomyl	Benlate DF, Benlate 50WP	2
	captan	Captan 80WP	2
	copper hydroxide	Kocide 101 (WP)	3
	dodine	Cyprex 65W	2
	ferbam	Carbamate WDG	73
	Actual acres treated for peach leaf curl		78[c]
Rhizopus rot	calcium polysulfide	Lime-Sulfur	12
	DCNA	Botran 75WDG	61
	thiophanate-methyl	Topsin M 70W	6
	Actual acres treated for rhizopus rot		75[c]
Cystospora canker	thiophanate-methyl	Topsin M 70W	6
		Topsin M 85WDG	12
		Total thiophanate-methyl	18
	Actual acres treated for cystospora canker		18

Table 4.a. Diseases (continued)

Disease	Fungicide/Bactericide	Trade Name and Formulation	Acres Treated[a]
Peach scab (*Cladosporium carpophilum*)	benomyl	Benlate DF, Benlate 50WP	12
	captan	Captan 50W	34
	chlorothalonil	Bravo 720	12
	sulfur	Sulfur WP	47
	thiophanate-methyl	Topsin M 4.5F	20
		Topsin M 70W	7
		Total thiophanate-methyl	27
	thiram	Thiram 65WP	36
	Actual acres treated for peach scab		88[c]
Powdery mildews/ rusty spot	benomyl	Benlate DF, Benlate 50WP	12
	captan	Captan 50W	48
	sulfur	Sulfur (WP)	95
	thiophanate-methyl	Topsin M 70W	48
	thiram	Thiram 65WP	35
	Actual acres treated for powdery mildews/rusty spot		107[c]

[a] Acres treated is the number of acres treated with one application of a given material. Example: If 10A were sprayed three times with Captan 50W, the actual number of acres treated is 10.

[b] This figure is less than the total of the above acres; two formulations of the same active ingredient were used on the same acreage.

[c] Acres treated for this pest is less than the total of the above acres. Some acres were treated with more than one active ingredient.

Table 4.b. Herbicides used to control weeds on **PEACHES**.

Weeds	Herbicides	Trade Name and Formulation	Acres Treated[a]
Weeds	paraquat	Gramoxone (liquid)	25
	simazine	Princep Caliber 90 (WDG)	3
Actual acres treated for weeds			25[b]

a
Acres treated is the entire orchard(s) where herbicides were applied. Spot and/or band treatments were made within these orchard(s).

b
Acres treated for this pest is less than the total of the above acres. Some acres were treated with more than one herbicide.

Table 4.c. Insecticides and Miticides used to control insects and mites on PEACHES.

Insect	Insecticide/Miticide	Trade Name and Formulation	Acres Treated[a]
Aphids	azinphosmethyl	Guthion 50W	6
	endosulfan	Thiodan 50WP	66
	methomyl	Lannate (SP)	20
	phosmet	Imidan 50WP	2
	Actual acres treated for aphids[b]		88
Borers (synanthedon exitiosa, Synanthedon pictipes)	azinphosmethyl	Azinphosmethyl 35W, Guthion 35W	59
		Guthion 50W	53
		Total azinphosmethyl	102
	chlorpyrifos	Lorsban 50W	1
	endosulfan	Thiodan 50WP	89
	methyl parathion	Penncap-M (F)	12
	phosmet	Imidan 50WP	20
	Actual acres treated for borers[b]		166
Japanese beetle (Popillia japanica)	carbaryl	Sevin 50W	5
	methyl parathion	Penncap-M (F)	12
	Actual acres treated for Japanese beetles		17
Leafhoppers	endosulfan	Thiodan 50WP	6

Table 4.c. Insects and Mites (continued)

Insect	Insecticide/Miticide	Trade Name and Formulation	Acres Treated[a]
Leafrollers	azinphosmethyl	Guthion 35W	1
		Guthion 50W	35
		Total azinphosmethyl	36
	methyl parathion	Penncap-M (F)	12
	phosmet	Imidan 50WP	1
	Actual acres treated for leafrollers		48[b]
Mites	dicofol	Kelthane 35WP	35
	formetanate hydrochloride	Carzol SP	4
	oil	Superior Oil, Spray Oil 6E	4
	propargite	Omite 30W	2
	Actual acres treated for mites		43[b]
Oriental fruit moth (Grapholita molesta)	azinphosmethyl	Azinphosmethyl 35W, Guthion 35W	69
		Azinphosmethyl 50W, Guthion 50W	65
		Total azinphosmethyl	134

Table 4.c. Insects and Mites (continued)

Insect	Insecticide/Miticide	Trade Name and Formulation	Acres Treated[a]
	endosulfan	Thiodan 50WP	48
	methomyl	Lannate (SP)	20
	methyl parathion	Penncap-M (F)	12
	permethrin	Pounce 3.2EC	12
	phosmet	Imidan 50WP	21
	Actual acres treated for oriental fruit moth		154[b]
Plant bugs	azinphosmethyl	Azinphosmethyl 35W, Guthion 35W	81
		Azinphosmethyl 50W, Guthion 50W	86
		Total azinphosmethyl	167
	endosulfan	Thiodan 50WP	53
	esfenvalerate	Asana XL (EC)	35
	fenvalerate	Pydrin 2.4EC	1
	formetanate hydrochloride	Carzol SP	3
	methomyl	Lannate (SP)	23
	methyl parathion	Penncap-M (F)	12
	permethrin	Pounce 3.2EC	66
	phosmet	Imidan 50WP	21
	Actual acres treated for plant bugs		173[b]

Table 4.c. Insects and Mites (continued)

Insect	Insecticide/Miticide	Trade Name and Formulation	Acres Treated[a]
Plum curculio (Conotrachelus nenuphar)	azinphosmethyl	Azinphosmethyl 35W, Guthion 35W	78
		Azinphosmethyl 50W, Guthion 50W	77
		Total azinphosmethyl	155
	endosulfan	Thiodan 50WP	53
	methomyl	Lannate (SP)	20
	permethrin	Pounce 3.2EC	75
	phosmet	Imidan 50WP	24
	Actual acres treated for plum curculio[b]		183
Scales	azinphosmethyl	Guthion 50W	35
	oil	Superior Oil	3
		Fish Oil	.1
		Total oil	3
	Actual acres treated for scales		38
Tent caterpillars	phosmet	Imidan 50WP	8

[a] Acres treated is the number of acres treated with one application of a given material. Example: If 10 A were sprayed three times with Captan 50W, the actual number of acres treated is 10.

[b] Acres treated for this pest is less than the total of the above acres. Some acres were treated with more than one insecticide.

Table 5.a. Fungicides and Bactericides: Formulations used on PEARS, amount used, and cost.[a]

Fungicide and Bactericide	Trade Name and Formulation	Formulation Cost/Unit	Formulation Rate/A/ Application (Average)	Formulation Cost/A/ Application	Formulation Rate/A/ Year (Average)	Formulation Cost/A/ Year	Acres Treated[b]	Total Amount of Formulation Applied/Year	Total Formulation Cost/Year
benomyl	Benlate DF, Benlate 50WP	$16.76 lb	.5 lb	$ 8.38	1.45 lb	$24.30	135	196 lb	$ 3,285
captan	Captan 50WP	2.42 lb	2.63 lb	6.37	5.93 lb	14.35	12	71 lb	172
	Captan 80WP	3.88 lb	1.83 lb	7.10	3.67 lb	14.24	3	11 lb	43
	Captec 4L	21.94 gl	1.25 gl	27.43	3.75 gl	82.28	2	30 qt	165
	Total captan	-	-	-	-	-	17	-	380
copper hydroxide	Kocide 101 (WP)	2.47 lb	4.38 lb	10.82	5.39 lb	13.31	70	374 lb	924
dodine	Cyprex 65W	9.45 lb	.5 lb	4.73	3.0 lb	28.35	3	9 lb	85
fenarimol	Rubigan EC	72.94 qt	3.0 fl oz	6.84	3.0 fl oz	6.84	3	8 fl oz	18
ferbam	Carbamate WDG	3.29 lb	2.42 lb	7.96	7.58 lb	24.94	112	846 lb	2,783
mancozeb	Dithane M-45 (WP)	2.46 lb	4.44 lb	10.92	13.3 lb	32.72	2	30 lb	74
	Manzate 200DF	2.90 lb	2.65 lb	7.69	2.91 lb	8.44	21	61 lb	177
	Total mancozeb	-	-	-	-	-	23	-	251
strepto-mycin	Streptomycin C-17 (SP)	11.35 lb	1.5 lb	17.03	1.5 lb	17.03	3	5 lb	57
sulfur	Sulfur (WP)	.50 lb	1.0 lb	.50	4.0 lb	2.00	2	8 lb	4
thiophanate-methyl	Topsin M 4.5F	118.58 gl	7.25 fl oz	6.72	21.75 fl oz	20.15	2	44 fl oz	41
	Topsin M 70W	16.47 lb	.99 lb	16.31	3.73 lb	61.43	18	68 lb	1,120
	Total thiophanate-methyl	-	-	-	-	-	20	-	1,161
thiram	Thiram 65WP	3.18 lb	1.23 lb	3.91	2.23 lb	7.09	26	58 lb	184
Total fungicide/bactericide		-	-	-	-	-	-	-	$ 9,132

[a] Prices listed are for 1991.

[b] Acres treated is the number of acres treated with one application of a given material. Examples: If 10 A were sprayed three times with Captan 50W, the actual number of acres treated is 10.

Table 5.b. Growth Regulators: Formulations used on PEARS, amount used, and cost.[a]

Growth Regulator	Trade Name and Formulation	Formulation Cost/Unit	Formulation Rate/A/ Application (Average)	Formulation Cost/A/ Application	Formulation Rate/A/ Year (Average)	Formulation Cost/A/ Year	Acres Treated[b]	Total Amount of Formulation Applied/Year	Total Formulation Cost/Year
naphthale-neacetamide	Amid-Thin W	$ 44.69 lb	6 oz	$ 16.76	6 oz	$ 16.76	2	12 oz	$ 34
napthale-neacetic acid	Fruitone N (WP)	19.52 lb	3.68 oz	4.49	3.68 oz	4.49	15	3 lb	59
Total growth regulator		-	-	-	-	-	-	-	$ 93

[a] Prices listed are for 1991.

[b] Acres treated is the number of acres treated with one application of a given material. Example: If 10 A were sprayed three times with Captan 50W, the actual number of acres is 10.

Table 5.c. Herbicides: Formulations used on PEARS, amount used, and cost.[a]

Herbicides	Trade Name and Formulation	Formulation Cost/Unit	Formulation Rate/A/ Application (Average)	Formulation Cost/A/ Application	Formulation Rate/A/ Year (Average)	Formulation Cost/A/ Year	Acres Treated[b]	Total Amount of Formulation Applied/Year	Total Formulation Cost/Year
2,4-D	Dacamine 4D (OL)	$ 23.00 gl	1.5 qt	$ 8.63	3.0 qt	$ 17.25	3	2 gl	$ 46
dichlobenil	Casoron 4G	1.74 lb	250.0 lb	435.00	250.0 lb	435.00	.04	10 lb	17
diuron	Karmex DF	5.17 lb	2.68 lb	13.86	2.68 lb	13.86	8	21 lb	109
glyphosate	Roundup (liquid)	53.38 gl	3.68 qt	49.11	3.68 qt	49.11	3	10 qt	133
paraquat	Gramaxone Extra (liquid)	33.85 gl	1.11 qt	9.39	1.24 qt	10.49	10	3 gl	102
simazine	Princep 4L	17.70 gl	1.25 gl	22.13	1.25 gl	22.13	1	1 gl	18
	Princep Caliber 90 (WDG)	3.57 lb	2.13 lb	7.60	2.13 lb	7.60	9	18 lb	64
	Total simazine	-	-	-	-	-	10	-	82
Total herbicide		-	-	-	-	-	-	-	$ 489

[a] Prices listed are for 1991.

[b] Acres treated is the area spot and/or band treated with one application of a given material. Example: If 2 A were sprayed three times with Roundup, the actual number of acres is 2.

Table 5.d. Insecticides and Miticdes: Formulations used cn PEARS, amount used, and cost.[a]

Insecticide and Miticide	Trade Name and Formulation	Formulation Cost/Unit	Formulation Rate/A/ Application (Average)	Formulation Cost/A/ Application	Formulation Rate/A/ Year (Average)	Formulation Cost/A/ Year	Acres Treated[b]	Total Amount of Formulation Applies/Year	Total Formulation Cost/Year
amitraz	Mitac 1.5EC	$ 77.58 gl	2.28 qt	$ 44.22	3.52 qt	$ 68.27	149	131 gl	$ 10,163
	Mitac WP	19.85 lb[c]	1.64 lb	32.55	2.44 lb	48.43	32	77 lb	1,528
	Total amitraz	-	-	-	-	-	160[e]	-	11,691
azinphos-methyl	Azinphos-methyl 35W, Guthion 35W	4.83 lb	1.53 lb	7.39	3.0 lb	14.49	6	19 lb	92
	Azinphos-methyl 50W, Guthion 50W	6.76 lb	.99 lb	6.69	2.51 lb	16.97	112	280 lb	1,893
	Total azinphos-methyl	-	-	-	-	-	118	-	1,985
carbaryl	Sevin 50W	2.90 lb	2.0 lb	5.80	6.0 lb	17.40	3	15 lb	44
clofente-zine	Apollo SC	56.47 pt	1.32 fl oz	4.66	1.32 fl oz	4.66	15	20 fl oz	71
chlorpyrifos	Lorsban 4E	47.32 gl	1.0 qt	11.83	1.0 qt	11.83	3	3 qt	35
	Lorsban 50W	6.00 lb	3.0 lb	18.00	6.0 lb	36.0	2	12 lb	72
	Total chlor-pyrifos	-	-	-	-	-	5	-	107
diazinon	Diazinon 50W	4.35 lb	1.0 lb	4.35	1.0 lb	4.35	3	3 lb	13
dicofol	Kelthane 35WP	7.95 lb	2.77 lb	22.02	3.07 lb	24.41	46	140 lb	1,113

Table 5.d. Insecticides and Miticides (continued)

Insecticide and Miticide	Trade Name and Formulation	Formulation Cost/Unit	Formulation Rate/A/ Application (Average)	Formulation Cost/A/ Application	Formulation Rate/A/ Year (Average)	Formulation Cost/A/ Year	Acres Treated[b]	Total Amount of Formulation Applied/Year	Total Formulation Cost/Year
endosulfan	Thiodan 3EC	$ 36.41 gl	3.08 qt	$ 28.04	3.08 qt	$28.04	31	24 gl	$ 874
	Thiodan 50WP	6.00 lb	3.25 lb	19.50	5.88 lb	35.28	84	494 lb	2,964
	Total endosulfan	-	-	-	-	-	99[e]	-	3,838
esfenvalerate	Asana XL(EC)	130.11 gl	1.5 pt	24.39	3.0 pt	48.79	5	15 pt	244
fenvalerate	Pydrin 2.4EC	65.00 gl	3.38 fl oz	1.72	3.38 fl oz	1.72	41	1 gl	65
formentanate hydrochloride	Carzol SP	32.78 lb	13.78 oz	28.23	18.89 oz	38.70	14	16 lb	525
methyl parathion	Penncap-M (F)	22.35 gl	3.1 qt	17.32	4.51 qt	25.20	11	50 qt	279
oil	Superior Oil, Spray Oil 6E	6.17 gl	4.03 gl	24.87	4.76 gl	29.37	159	759 gl	4,683
oxythioquinox	Morestan 25WP	13.23 lb	4.35 lb	57.55	4.35 lb	57.55	17	72 lb	953
permethrin	Ambush 25W	14.42 lb	8.25 oz	7.44	8.25 oz	7.44	4	2 lb	29
	Pounce 3.2EC	187.05 gl	8.04 fl oz	11.75	8.42 fl oz	12.30	96	25 qt	1,169
	Pounce 25WP	14.58 lb	3.25 lb	47.39	6.5 lb	94.77	6	39 lb	569
	Total permethrin	-[d]	-	-	-	-	106	-	1,767
phosalone	Zolone EC	28.50 gl	3.38 qt	24.08	3.38 qt	24.08	2	1 gl	57
phosmet	Imidan 50WP	3.57 lb	3.16 lb	11.28	6.41 lb	22.88	45	287 lb	1,025
potassium salts of fatty acids	Insecticidal Soap	15.00 gl	1.12 gl	16.80	2.35 gl	35.25	67	157 gl	2,355
Total insecticide/miticide		-	-	-	-	-	-	-	$ 30,815

Table 5.d. Insecticides and Miticides (continued)

[a] Prices listed are for 1991 unless otherwise indicated.

[b] Acres treated is the number of acres treated with one application of a given material. Example: If 10 A were sprayed three times with Captan 50W, the actual number of acres treated is 10.

[c] Price listed is for 1990.

[d] Price listed is for 1987.

[e] This figure is less than the total of the above acres; both formulations of the same active ingredient were used on the same acreage.

Table 5.e. Rodenticides: Formulations used on PEARS, amount used, and cost.[a]

Rodenticide	Trade Name and Formulation	Formulation Cost/Unit	Formulation Rate/A/ Application (Average)	Formulation Cost/A/ Application	Formulation Rate/A/ Year (Average)	Formulation Cost/A/ Year	Acres Treated[b]	Total Amount of Formulation Applied/Year	Total Formulation Cost/Year
chlorophacione	Rozol (P)	$ 1.41 lb	14.0 lb	$ 19.74	14.0 lb	$ 19.74	10	140 lb	$ 197
zinc phosphide	Zinc Phosphide (G)	.76 lb	10.25 lb	7.79	10.25 lb	7.79	28	287 lb	218
Total rodenticide		-	-	-	-	-	-	-	$ 415

[a] Prices listed are for 1991.

[b] Acres treated is the number of acres treated with one application of a given material. Example: If 10 A were sprayed three times with Captan 50W, the actual number of acres treated is 10.

Table 6.a. Fungicides and Bactericides: Active ingredient used on **PEARS**, acreage treated, timing, number and rate of application.

Fungicide and Bactericide	Trade Name and Formulation	Acres Treated[a]	Time of Application	No. of Applications (Range)	Rate (lb ai/A) Per Application (Range)	Rate (lb ai/A) Per Application (Average)	Rate (lb ai/A) Per Year (Average)	Total Pounds Active Ingredient/ Year
benomyl	Benlate DF, Benlate 50WP	135	green tip-8/7	1-9	.25-4.0	.25	.73	98
captan	Captan 50WP	12	green tip-8/16	1-9	.24-3.9	1.29	2.90	35
	Captan 80WP	3	bloom-7/21	2	.78-2.35	1.43	2.87	9
	Captec 4L	2	6/10-7/23	3	5.0	5.0	15.0	30
	Total captan	17	green tip-8/16	1-9	.24-5.0	1.88	4.32	74
copper hydroxide	Kocide 101(WP)	70	dormant	1-2	1.16-4.62	3.37	4.15	288
dodine	Cyprex 65W	3	green tip-3rd cover	6	.33	.33	1.95	6
fenarimol	Rubigan EC	3	5/20	1	.02	.02	.02	.1
ferbam	Carbamate WDG	112	green cluster-8/25	1-11	.38-4.56	1.84	5.76	643
mancozeb	Dithane M-45 (WP)	2	petal fall-5/25	3	2.14-4.27	3.55	10.64	24
	Manzate 200DF	21	green cluster-5/30	1-2	.75-2.34	1.99	2.18	46
	Total mancozeb	23	green cluster-5/30	1-3	.75-4.27	2.35	3.0	70

Table 6.a. Fungicides and Bactericides (continued)

Fungicide and Bactericide	Trade Name and Formulation	Acres Treated[a]	Time of Application	No. of Applications (Range)	Rate (lb ai/A) Per Application (Range)	Rate (lb ai/A) Per Application (Average)	Rate (lb ai/A) Per Year (Average)	Total Pounds Active Ingredient/ Year
strepto-mycin	Streptomycin C-17 (SP)	3	bloom	1	.32	.32	.32	1
sulfur	Sulfur (WP)	2	5/12-7/8	4	.8	.8	3.2	6
thiophanate-methyl	Topsin M 4.5F	2	4/16-5/30	3	.13-.42	.26	.77	2
	Topsin M 70W	18	green cluster-6/15	2-3	.31-.53	.70	2.61	48
	Total thiophanate-methyl	20	green cluster-6/15	2-3	.13-.53	.66	2.43	50
thiram	Thiram 65WP	26	green cluster-7/2	1-2	.33-2.11	.80	1.45	38
Total fungicide/bactericide		-	-	-	-	-	-	1,274

[a] Acres treated is the number of acres treated with one application of a given material. Example: If 10 A were sprayed three times with Captan 50W, the actual number of acres treated is 10.

Table 6.b. Growth regulators: Active ingredient used on **PEARS**, acreage treated, timing, number and rate of application.

Growth Regulator	Trade Name and Formulation	Acres Treated[a]	Time of Application	No. of Applications (Range)	Rate (lb ai/A) Per Application (Range)	Rate (lb ai/A) Per Application (Average)	Rate (lb ai/A) Per Year (Average)	Total Pounds Active Ingredient/ Year
naptha-leneacetamide	Amid-Thin W	2	5/5	1	.03	.03	.03	.1
naptha-leneacetic acid	Fruitone N (WP)	15	5/15, 9/10	1	.006-.01	.007	.007	.1
Total growth regulator		-	-	-	-	-	-	.2

[a] Acres treated is the same number of acres treated with one application of a given material. Example: If 10 A were sprayed three times with Captan 50W, the actual number of acres treated is 10.

Table 6.c. Herbicides: Active ingredient used on PEARS, acreage treated, timing, number and rate of application.

Herbicide	Trade Name and Formulation	Acres Treated[a]	Time of Application	No. of Applications (Range)	Rate (lb ai/A) Per Application (Range)	Rate (lb ai/A) Per Application (Average)	Rate (lb ai/A) Per Year (Average)	Total Pounds Active Ingredient/ Year
2,4-D	Dacamine 4D (OL)	3	7/16-11/7	2	1.2-2.4	1.8	3.6	9
dichlobenil	Casaron 4G	.04	12/10	1	10.0	10.0	10.0	.4
diuron	Karmex DF	8	5/22-10/16	1	1.92-3.2	2.14	2.14	17
glyphosate	Roundup (liquid)	3	5/2-12/4	1	.54-6.0	2.77	2.77	7
paraquat	Gramaxone Extra (liquid)	10	5/8-9/3	1-2	.47-.94	.69	.78	7
simazine	Princep 4L	1	5/22, 6/25	1	5.0	5.0	5.0	4
	Princep Caliber 90 (WDG)	9	5/22, 7/16	1	1.13-2.16	1.92	1.92	16
	Total simazine	10	5/22-7/16	1	1.13-5.0	2.17	2.17	20
Total herbicide		-	-	-	-	-	-	60

[a] Acres treated is the area spot and/or band treated with one application of a given material. Example: If 2 A were sprayed three times with Roundup, the actual number of acres is 2.

Table 6.d. Insecticides and Miticides: Active ingredient used on **PEARS**, acreage treated, timing, number and rate of application.

Insecticide and Miticide	Trade Name and Formulation	Acres Treated[a]	Time of Application	No. of Applications (Range)	Rate (lb ai/A) Per Application (Range)	Rate (lb ai/A) Per Application (Average)	Rate (lb ai/A) Per Year (Average)	Total Pounds Active Ingredient/ Year
amitraz	Mitac 1.5 EC	149	5/15-8/22	1-5	.28-.84	.86	1.32	196
	Mitac WP	32	white bud-8/25	1-3	.07-1.5	.82	1.22	38
	Total amitraz	160[b]	white bud-8/25	1-5	.07-1.5	.85	1.47	234
azinphos-methyl	Azinphos-methyl 35W, Guthion 35W	6	green tip-2nd cover	1-6	.16-1.09	.54	1.05	7
	Azinphos-methyl 50W, Guthion 35W	112	white bud-7/31	1-7	.13-1.25	.5	1.26	140
	Total azinphosmethyl	118	green tip-7/31	1-7	.13-1.25	.51	1.25	147
carbaryl	Sevin 50W	3	5/31-7/22	3	1.0	1.0	3.0	8
clofente-zine	Apollo SC	15	white bud	1	.04	.04	.04	1
chlorpyrifos	Lorsban 4E	3	4/13	1	1.0	1.0	1.0	3
	Lorsban 50W	2	5/28, 6/15	2	1.5	1.5	3.0	6
	Total chlorpyrifos	5	4/23-6/15	1-2	1.0-1.5	1.29	1.8	9

Table 6.d. Insecticides and Miticides (continued)

Insecticide and Miticide	Trade Name and Formulation	Acres Treated[a]	Time of Application	No. of Applications (Range)	Rate (lb ai/A) Per Application (Range)	Rate (lb ai/A) Per Application (Average)	Rate (lb ai/A) Per Year (Average)	Total Pounds Active Ingredient/ Year
diazinon	Diazinon 50W	3	6/20	1	.5	.5	.5	1
dicofol	Kelthane 35WP	46	6/29-8/25	1-3	.18-1.4	.97	1.08	49
endosulfan	Thiodan 3EC	31	dormant-6/15	1-2	.99-2.63	2.31	2.31	72
	Thiodan 50WP	84	5/16-8/6	1-4	.5-5.0	1.63	2.94	247
	Total endosulfan	99[b]	dormant-8/6	1-4	.5-5.0	1.74	3.22	319
enfenvalerate	Asana XL (EC)	5	5/9, 5/16	2	.12	.12	.25	1
fenvalerate	Pydrin 2.4EC	41	green cluster-4/29	1	.02-.3	.06	.06	3
formentanate hydrochloride	Carzol SP	14	petal fall-8/1	1-2	.12-1.38	.79	1.09	15
methyl parathion	Penncap M (F)	11	5/28-6/25	1-2	.8-2.0	1.55	2.26	25
oil	Superior Oil, Spray oil 6E	159	dormant-5/22	1-2	1.77-56.64	28.53	33.70	5,374
oxythioquinox	Morestan 25WP	17	green cluster	1	1.05-1.34	1.09	1.09	18
permethrin	Ambush 25W	4	dormant-1/2 inch	1	.07-.19	.13	.13	1
	Pounce 3.2EC	96	dormant-6/17	1-2	.03-.40	.20	.21	21
	Pounce 25WP	6	4/17-8/8	1-3	.25-1.0	.81	1.63	10
	Total permethrin	106	dormant-8/8	1-3	.03-1.0	.26	.29	31

Table 6.d. Insecticides and Miticides (continued)

Insecticide and Miticide	Trade Name and Formulation	Acres Treated[a]	Time of Application	No. of Applications (Range)	Rate (lb ai/A) Per Application (Range)	Rate (lb ai/A) Per Application (Average)	Rate (lb ai/A) Per Year (Average)	Total Pounds Active Ingredient/ Year
phosalone	Zolone EC	2	6/15	1	2.55	2.55	2.55	6
phosmet	Imidan 50WP	45	4/13-8/7	1-3	.3-3.0	1.58	3.21	143
potassium salts of fatty acids	Insecticidal Soap	67	white bud-7/15	1-4	2.39-27.06	4.26	8.93	595
Total insecticide		-	-	-	-	-	-	6,979

[a] Acres treated is the number of acres treated with one application of a given material. Example: If 10 A were sprayed three times with Captan 50W, the actual number of acres treated is 10.

[b] This figure is less than the total of the above acres; both formulations were used on the same acreage.

Table 6.e. Rodenticides: Active ingredient used on **PEARS**, acreage treated, timing, number, and rate of application.

Rodenticide	Trade Name and Formulation	Acres Treated[a]	Time of Application	No. of Applications (Range)	Rate (lb ai/A) Per Application (Range)	Rate (lb ai/A) Per Application (Average)	Rate (lb ai/A) Per Year (Average)	Total Pounds Active Ingredient/ Year
chlorophacione	Rozol (P)	10	11/13-12/21, 2/92	1	.0007	.0007	.0007	.01
zinc phosphide	Zinc Phosphide (G)	28	11/15-12/11	1	.18-.25	.21	.21	6
Total rodenticide		-	-	-	-	-	-	6

[a] Acres treated is the same number of acres treated with one application of a given material. Example: If 10 A were sprayed three times with Captan 50W, the actual number of acres treated is 10.

TABLE 7.a. Alternative fungicides, bactericides, and/or methods suggested by growers for disease control on PEARS, with expected affect on value of crop and cost of cotrol.

Pest Targeted	Name of Fungicide/Bactericide Used	Alternative Method and/or Pesticide	Expected Change in Value of Crop with Alternative: No Chg.	Inc. (+)	Dec. (-)	Don't Know	Expected Change in Cost with Alternative: No Chg.	Inc. (+)	Dec. (-)	Don't Know
Fabrea leaf spot (Fabrea maculate)	benomyl	Captan	x				x			
		Topsin M		x					x	
	ferbam	Captan	x						x	
		Captan	x				x			
		Dithane	x					x		
Fireblight (Erwinia amylovora)	benomyl	Topsin M		x					x	
Pear scab (Venturia pirina)	benomyl	Lime/Sulfur			x		x			
		Topsin M		x					x	
	ferbam	Captan	x				x			
		Benlate		x						x
	mancozeb	Captan	x						x	
	thiophanate-methyl	Captan	x						x	
	benomyl/captan	Lime/Sulfur			x		x			
	benomyl/ferbam	EBDC				x				x
Sooty blotch/ fly speck (Gloeodus pomigena/Microthyriella rubi)	benomyl	Topsin M		x					x	
	sulfur	Benlate				x				x

Table 7.b. Alternative herbicides and/or methods suggested by growers for weed control on PEARS, with expected affect on value of crop and cost of control.

Pest Targeted	Name of Herbicide Used	Alternative Method and/or Pesticide	Expected Change In Value of Crop with Alternative: No Chg.	Inc. (+)	Dec. (-)	Don't Know	Expected Change In Cost with Alternative: No Chg.	Inc. (+)	Dec. (-)	Don't Know
Weeds	dichlobenil	Simazine				x				x
	glyphosate/diuron	Paraquat/Princep				x				x
	glyphosate/simazine	Gramaxone/Mowing	x					x		

Table 7.c. Alternative insecticides, miticides, and/or methods of insect/mite control suggested by growers on PEARS, with expected affect on value of crop and cost of control.

Pest Targeted	Name of Insecticide/Miticide Used	Alternative Method and/or Pesticide	Expected Change In Value of Crop With Alternative: No Chg.	Inc. (+)	Dec. (-)	Don't Know	Expected Change In Cost With Alternative: No Chg.	Inc. (+)	Dec. (-)	Don't Know
Codling moth (Cydia pomonella)	azinphosmethyl	Imidan				x		x		
		Pounce				x				x
	methyl parathion	Imidan				x		x		
	phosalone	Guthion	x							x
	phosmet	Guthion	x					x		
		Sevin	x							x
Leafrollers	phosmet	Pydrin				x				x
Mites	clofentezine	Carzol			x			x		
	oil	Apolo/Safer Soap	x					x		
		Carzol			x			x		
		Carzol			x			x		
	oil/sulfur	Apolo				x				x
		Carzol				x				x
	oil/thiram	Oil/Thiodan	x							x
Pear midge (Contarinia pyrivora)	azinphosmethyl	Imidan	x					x		
	permethrin	Guthion	x					x		
Pear rust mite (Epitrimerus pyri)	clofentezine	Carzol				x		x		
	oil/sulfur	Carzol				x				x
Plant bugs	azinphosmethyl	Ambush	x							x
		Imidan				x		x		
		Imidan			x		x			
		Ambush		x				x		
		Pounce	x				x			
		Imidan	x					x		
		Ambush				x				x

Table 7.c. Alternative insecticides, miticides, and/or methods (continued)

Pest Targeted	Name of Insecticide/Miticide Used	Alternative Method and/or Pesticide	Expected Change In Value of Crop with Alternative				Expected Change In Cost with Alternative			
			No Chg.	Inc. (+)	Dec. (-)	Don't Know	No Chg.	Inc. (+)	Dec. (-)	Don't Know
	fenvalerate	Pounce	x				x			
	methyl parathion	Imidan				x		x		
	permethrin	Imidan			x		x			
	phosmet	Guthion	x							x
Plum curculio (*Conotrachelus nenuphar*)	azinphosmethyl	Imidan				x		x		
		Imidan			x		x			
		Imidan				x				x
		Imidan			x		x			
		Imidan	x					x		
		Imidan				x				x
Pear psylla (*Psylla pyricola*)	amitraz	Safer Soap	x					x		
		Insecticidal Soap			x		x			
		Vendex			x			x		
		Omite	x							x
		EBDC	x						x	
	oil	EBDC	x						x	
	oxythioquinox	Ambush	x						x	
	permethrin	Insecticidal Soap			x		x			
		Vendex			x					x
		Dormant Oil			x			x		
		Another pyrethoid	x							x
	amitraz/endosulfan	EBDC		x					x	
		EBDC	x						x	

Table 7.c. Alternative insecticides, miticides, and/or methods (continued)

Pest Targeted	Name of Insecticide/Miticide Used	Alternative Method and/or Pesticide	Expected Change In Value of Crop with Alternative: No Chg.	Inc. (+)	Dec. (-)	Don't Know	Expected Change In Cost with Alternative: No Chg.	Inc. (+)	Dec. (-)	Don't Know
	endosulfan/ insecticidal soap	EBDC	x						x	
	permethrin/ insecticidal soap	EBDC	x						x	
	methyl parathion	Imidan				x		x		
	phosmet	Pyrethoids	x					x		
		Guthion	x					x		
Scales	oil	Chlorpyrifos	x							x
		Chlorpyrifos	x					x		
		Methyl parathion				x		x		
		Methyl parathion				x				x

Comments: "No alternatives for early oils when targeting pear psylla. If you use pyrethoids in early covers, other problems would be created."

"Thankfully, the EBDCs are back because the choices of fungicides were limited."

"We need an alternative to using Mitac for pear pyslla. Thiodan no longer works in most orchards; certain oils are still in experimental stage, and Safer Insecticidal Soap does cause spotting of fruit when used at a rate that is effective."

"We need as many chemical choices as possible to reduce our chances of resistance and to keep chemical costs competitive so we can stay in business."

"We chose to use the one's [pesticides] we did because they are effective against multiple pests and are cost effective. The only change we would make is the use of EBDCs in 1992 since they are again available and are effective and economical."

Table 8.a. Fungicides and Bactericides used to control diseases on PEARS.

Disease	Fungicide/ Bactericide	Trade Name and Formulation	Acres Treated[a]
Fabrea leaf spot (Fabraea maculata)	benomyl	Benlate DF, Benlate 50W	73
	ferbam	Carbamate WDG	60
	thiophanate-methyl	Topsin M 70W	18
	thiram	Thiram 65WP	18
	Actual acres treated for fabrea leaf spot		95[b]
Fireblight (Erwinia amylovora)	benomyl	Benlate DF	1
	copper hydroxide	Kocide 101 (WP)	34
	streptomycin	Streptomycin C-17 (SP)	3
	Actual acres treated for fireblight		38
Pear scab (Venturia pirina)	benomyl	Benlate DF, Benlate 50W	73
	captan	Captan 50W	7
		Captan 80W	2
		Total captan	9
	dodine	Cyprex 65W	3
	ferbam	Carbamate WDG	59
	mancozeb	Dithane M-45 (WP)	2
		Manzate 200DF	16
		Total mancozeb	18

Table 8.a. Diseases (continued)

Disease	Fungicide/ Bactericide	Trade Name and Formulation	Acres Treated[a]
	thiophanate-methyl	Topsin M 70W	18
	thiram	Thiram 65WP	21
	Actual acres treated for pear scab		110[b]
Rots	benomyl	Benlate DF	2
	captan	Captan 80W	2
	Actual acres treated for rots		2[b]
Sooty blotch/fly speck (*Gloeodus pomigena*/ *Microthyriella rubi*)	benomyl	Benlate DF, Benlate 50W	58
	ferbam	Carbamate WDG	44
	sulfur	Sulfur (WP)	2
	thiram	Thiram 65WP	18
	Actual acres treated for sooty blotch/fly speck		75[b]

[a] Acres treated is the number of acres treated with one application of a given material. Example: If 10 A were sprayed three times with Captan 50W, the actual number of acres treated is 10.

[b] Acres treated for this pest is less than the total of the above acres. Some acres were treated with more than one pesticide.

Table 8.b. Herbicides used to control weeds on PEARS.

Weeds	Herbicide	Trade Name and Formulation	Acres Treated[a]
Weeds	dichlobenil	Casoron 4G	.04
	diuron	Karmex DF	8
	glyphosate	Roundup (liquid)	2
	paraquat	Gramaxone (liquid)	7
	simazine	Princep Caliber 90 (WDG)	6
		Princep 4L	1
		Total simazine	7
Actual acres treated for weeds			9[b]

[a] Acres treated is the area spot and/or band treated with one application of a given material. Example: If 2 A were sprayed three times with Roundup, the actual number of acres is 2.

[b] Acres treated for this pest is less than the total of the above acres. Some acres were treated with more than one herbicide.

Table 8.c. Insecticides and Miticides used to control insects and mites on PEARS.

Insect	Insecticide/ Miticide	Trade Name and Formulation	Acres Treated[a]
Aphids	azinphosmethyl	Guthion 50W	1
	endosulfan	Thiodan 50WP	21
	Actual acres treated for aphids		22
Codling moth (Cydia pomonella)	azinphosmethyl	Azinphosmethyl 50W, Guthion 50W	31
	methyl parathion	Penncap M (F)	6
	phosalone	Zolone EC	2
	phosmet	Imidan 50WP	20
	Actual acres treated for codling moth		53[c]
Green fruitworms	azinphosmethyl	Azinphosmethyl 50W, Guthion 50W	20
Leafhoppers	endosulfan	Thiodan 50WP	1
Leafrollers	azinphosmethyl	Guthion 35W	1
		Guthion 50W	20
		Total azinphosmethyl	21
	phosmet	Imidan 50WP	3
	Actual acres treated for leafrollers		23[c]
Mealybugs	azinphosmethyl	Azinphosmethyl 50W, Guthion 50W	20
Mites	clofentezine	Apollo SC	15
	dicofol	Kelthane 35WP	18
	endosulfan	Thiodan 50WP	1

Table 8.c. Insects and Mites (continued)

Insect	Insecticide/ Miticide	Trade Name and Formulation	Acres Treated[a]
	formentanate hydrochloride	Carzol SP	11
	oil	Superior Oil, Sunspray Oil 6E	65
	potassium salts of fatty acids	Insecticidal Soap	18
	sulfur	Sulfur (WP)	2
	Actual acres treated for mites		74[c]
Oriental fruit moth (Grapholita molesta)	azinphosmethyl	Azinphosmethyl 50W	6
	methyl parathion	Penncap M (F)	6
	Actual acres treated for oriental fruit moth		6[c]
Pear midge (Contarinia pyrivora)	azinphosmethyl	Azinphosmethyl 50W, Guthion 50W	6
	permethrin	Pounce 3.2EC	18
	Actual acres treated for pear midge		24
Pear psylla (Psylla pyricola)	amitraz	Mitac 1.5EC	111
		Mitac WP	25
		Total amitraz	117[b]
	azinphosmethyl	Azinphosmethyl 50W	16

Table 8.c. Insects and Mites (continued)

Insect	Insecticide/ Miticide	Trade Name and Formulation	Acres Treated[a]
	chlorpyrifos	Lorsban 4E	3
		Lorsban 50W	2
		Total chlorpyrifos	5
	endosulfan	Thiodan 3EC	31
		Thiodan 50WP	77
		Total endosulfan	92[b]
	esfenvalerate	Asana XL (EC)	5
	fenvalerate	Pydrin 2.4EC	36
	mancozeb	Dithane M-45 (WP)	2
	oil	Superior Oil, Sunspray Oil 6E	112
	oxythioquinox	Morestan 25WP	2
	permethrin	Ambush 25W	4
		Pounce 3.2EC	72
		Pounce 25WP	3
		Total permethrin	79
	phosalone	Zolone EC	2
	phosmet	Imidan 50WP	10
	potassium salts of fatty acids	Insecticidal Soap	47
	Actual acres treated for pear psylla		126[c]

Table 8.c. Insects and Mites (continued)

Insect	Insecticide/ Miticide	Trade Name and Formulation	Acres Treated[a]
Plant bugs	azinphosmethyl	Guthion 35WP	2
		Azinphosmethyl 50WP, Guthion 50WP	77
		Total azinphosmethyl	79
	chlorpyrifos	Lorsban 50W	2
	endosulfan	Thiodan 50WP	17
	esfenvalerate	Asana XL (EC)	5
	fenvalerate	Pydrin 2.4EC	33
	methyl parathion	Penncap M (F)	6
	permethrin	Pounce 3.2EC	28
	phosmet	Imidan 50WP	24
	potassium salts of fatty acids	Insecticidal Soap	16
	Actual acres treated for plant bugs		108[c]
Plum curculio (Conotrachelus nenuphar)	azinphosmethyl	Guthion 35W	1
		Azinphosmethyl 50W, Guthion 50W	61
		Total azinphosmethyl	64
	chlorpyrifos	Lorsban 50W	2
	methyl parathion	Penncap M (F)	6
	phosalone	Zolone EC	2
	phosmet	Imidan 50WP	38
	Actual acres treated for plum curculio		99[c]

Table 8.c. Insects and Mites (continued)

Insect	Insecticide/ Miticide	Trade Name and Formulation	Acres Treated[a]
Scales	azinphosmethyl	Guthion 35W	1
	chlorpyrifos	Lorsban 50W	2
	methyl parathion	Penncap M (F)	11
	oil	Superior Oil, Sunspray Oil 6E	48
	Actual acres treated for scales		62

a
Acres treated is the number of acres treated with one application of a given material. Example: If 10 A were sprayed three times with Captan 50W, the actual number of acres treated is 10.

b
This figure is less than the total of the above acres; two formulations of the same active ingredient were used on the same acreage.

c
Acres treated for this pest is less than the total of the above acres. Some acres were treated with more than one insecticide.

PEACH SURVEY

SECTION A: General Instructions

1. Report every application of every pesticide used in 1991 on your peach bearing trees. This includes rodenticides, oils, thinners, herbicides, insecticides, fungicides, miticides, etc.
2. Record all units in ounces, pounds, pints or gallons
3. Pests Targeted: Next to each pesticide, write the specific name of all pests or problems that were targeted that application.
4. Actual Rate: How much material did you actually put in the tank per 100 gallons concentrate mix (or per 100 gallons dilute mix if applied dilute)? Record all units as lbs/100 gal, oz/100 gal, gal/100 gal, or pt/100 gal.
5. Acres treated: If you sprayed herbicides in strips or bands, only report the actual area sprayed.
6. If you come across a question which you cannot answer, please continue filling out the form as completely as you possibly can or call 241-4940 and ask for Jim Turner.

SECTION B: 1991 Regular Spray Program Information

Total area of peach bearing trees sprayed: _____acres

Total production harvested: _____ 16 quart baskets (1/2 bushels)

Total production not harvested: _____ 16 quart baskets (1/2 bushels)

Average gross income per 16 quart basket: _____ dollars

Date and Growth Stage	Trade Name and Formulation (Ex. Captan 50W)	Pests Targeted by Each Chemical (see Instruction #3)	Your Actual Rate per 100 Gal (see instruction #4)	Gallons of Mix per Acre	Acres Treated (see instruction #5)	Type of Application (check column)		
						Air Blast	Hand Gun	Other (specify)

SECTION C: Alternative Program Information

If [illegible] was not available, what other method or pesticide would you use for each of the following pests?

Name of Pest	Alternate Method and/or Pesticide (be specific)	Expected Change in the Value of the Crop with Alternate (check one)		Expected Change in Cost with Alternate (check one)	
		No change____	Decrease____	No change____	Decrease____
Mite		Increase____	Don't Know____	Increase____	Don't Know____
Peach Tree Borer		No change____	Decrease____	No change____	Decrease____
		Increase____	Don't Know____	Increase____	Don't Know____
Aphid		No change____	Decrease____	No change____	Decrease____
		Increase____	Don't Know____	Increase____	Don't Know____
Leaf Curl		No change____	Decrease____	No change____	Decrease____
		Increase____	Don't Know____	Increase____	Don't Know____
Plant Bug		No change____	Decrease____	No change____	Decrease____
		Increase____	Don't Know____	Increase____	Don't Know____
Brown Rot		No change____	Decrease____	No change____	Decrease____
		Increase____	Don't Know____	Increase____	Don't Know____
Oriental Fruit Moth		No change____	Decrease____	No change____	Decrease____
		Increase____	Don't Know____	Increase____	Don't Know____
Plum Curculio		No change____	Decrease____	No change____	Decrease____
		Increase____	Don't Know____	Increase____	Don't Know____
Bacterial Leaf Spot		No change____	Decrease____	No change____	Decrease____
		Increase____	Don't Know____	Increase____	Don't Know____
Lesser Peach Tree Borer		No change____	Decrease____	No change____	Decrease____
		Increase____	Don't Know____	Increase____	Don't Know____
X-Disease		No change____	Decrease____	No change____	Decrease____
		Increase____	Don't Know____	Increase____	Don't Know____
Rhizopus Rot		No change____	Decrease____	No change____	Decrease____
		Increase____	Don't Know____	Increase____	Don't Know____
Weeds		No change____	Decrease____	No change____	Decrease____
		Increase____	Don't Know____	Increase____	Don't Know____

SECTION D: General Comments

Thank you for your participation. Any additional comments that you might want to make about chemical use, alternate methods or this survey would be appreciated.

PEAR SURVEY

SECTION A: General Instructions

1. Report every application of every pesticide used in 1991 on your pear bearing trees. This includes rodenticides, oils, thinners, herbicides, insecticides, fungicides, miticides, etc.
2. Record all units in ounces, pounds, pints or gallons.
3. Pests Targeted: Next to each pesticide, write the specific name of all pests or problems that were targeted that application.
4. Actual Rate: How much material did you actually put in the tank per 100 gallons concentrate mix (or per 100 gallons dilute mix if applied dilute)? Record all units as lbs/100 gal, oz/100 gal, gal/100 gal, or pt/100 gal.
5. Acres treated: If you sprayed herbicides in strips or bands, only report the actual area sprayed.
6. If you come across a question which you cannot answer, please continue filling out the form as completely as you possibly can or call 241-4940 and ask for Jim Turner.

SECTION B: 1991 Regular Spray Program Information

Total area of pear bearing trees sprayed: _____acres

Total production harvested: _____ bushels (40 lb. bushel)

Total production not harvested: _____ bushels (40 lb. bushel)

Average gross income per 40 pound bushel: _____ dollars

Date and Growth Stage	Trade Name and Formulation (Ex. Captan 50W)	Pests Targeted by Each Chemical (see instruction #3)	Your Actual Rate per 100 Gal (see instruction #4)	Gallons of Mix per Acre	Acres Treated (see instruction #5)	Type of Application (check column)		
						Air Blast	Hand Gun	Other (specify)

SECTION C: 1991 Alternative Program Information

If the materials you used in section B were not available, what other method or pesticide would you use for each of the following pests?

Name of Pest	Alternate Method and/or Pesticide (be specific)	Expected Change in the Value of the Crop with Alternate (check one)		Expected Change in Cost with Alternate (check one)	
Mites (European Red & 2-Spotted)		No change____ Increase____	Decrease____ Don't Know____	No change____ Increase____	Decrease____ Don't Know____
Pear Psylla		No change____ Increase____	Decrease____ Don't Know____	No change____ Increase____	Decrease____ Don't Know____
Scale		No change____ Increase____	Decrease____ Don't Know____	No change____ Increase____	Decrease____ Don't Know____
Fireblight		No change____ Increase____	Decrease____ Don't Know____	No change____ Increase____	Decrease____ Don't Know____
Pear Scab		No change____ Increase____	Decrease____ Don't Know____	No change____ Increase____	Decrease____ Don't Know____
Fabrea Leaf Spot		No change____ Increase____	Decrease____ Don't Know____	No change____ Increase____	Decrease____ Don't Know____
Pear Midge		No change____ Increase____	Decrease____ Don't Know____	No change____ Increase____	Decrease____ Don't Know____
Plant Bug		No change____ Increase____	Decrease____ Don't Know____	No change____ Increase____	Decrease____ Don't Know____
Sooty Blotch/ Fly Speck		No change____ Increase____	Decrease____ Don't Know____	No change____ Increase____	Decrease____ Don't Know____
Plum Curculio		No change____ Increase____	Decrease____ Don't Know____	No change____ Increase____	Decrease____ Don't Know____
Pear Rust Mite		No change____ Increase____	Decrease____ Don't Know____	No change____ Increase____	Decrease____ Don't Know____
Codling Moth		No change____ Increase____	Decrease____ Don't Know____	No change____ Increase____	Decrease____ Don't Know____
Leafroller		No change____ Increase____	Decrease____ Don't Know____	No change____ Increase____	Decrease____ Don't Know____
Weeds		No change____ Increase____	Decrease____ Don't Know____	No change____ Increase____	Decrease____ Don't Know____

SECTION D: General Comments

Thank you for your participation. Any additional comments that you might want to make about chemical use, alternate methods or this survey would be