NJ Department of Environmental Protection
Pesticide Control Program
Pesticide Evaluation and Monitoring

AGRICULTURAL PESTICIDE USE IN NEW JERSEY: 1991 SURVEY

Introduction

The New Jersey Pesticide Control Program (NJPCP) began a series of pesticide use surveys in 1985. These surveys address use for agriculture, golf courses, termite control, right-of-way, mosquito control, and lawn care.

All statewide pesticide use surveys are performed under the authority of the New Jersey Pesticide Control Code, N.J.A.C. 7:30-1 et. seq., requiring applicators to maintain pesticide records for two years and to submit use records to the state when requested. This regulative authority provides an accuracy and level of response that is difficult to duplicate in a voluntary, nationwide survey. In fact, these New Jersey surveys almost represent a pesticide usage census rather than a probabilistic survey.

The information collected from the NJPCP surveys is used by agencies within the NJ Department of Environmental Protection to help research and monitoring efforts in areas such as ground water protection, farm worker protection and education, and residual pesticide sampling. The survey data are also entered into state and federal geographical information systems for mapping purposes. All general pesticide use information is available to the public.

The agricultural use survey is conducted every three years and targets agricultural, nursery, and greenhouse use of general and restricted pesticides. This report focuses on the third survey completed in this series (1991.)

Methods

The NJPCP's registration records were used to identify all 2889 licensed private applicators. "Private applicators" (persons using pesticides on agricultural commodities) include farmers, ranchers, sod farmers, Christmas tree growers, and nursery and greenhouse operators. A survey form was sent to each applicator, but since two or three applicators can work on the same agricultural establishment, the accompanying cover letter requested that only one form be returned for each agricultural establishment to avoid duplication of response. A total of three mailings were sent during the first six months of 1992.

The survey requested information on each pesticide formulation used. This included trade name, EPA registration number, percent active ingredient, amount applied, number of acres treated, and type of crop treated.

Survey information was entered into a database file. This information file was then merged with a second database that linked chemical names with trade names, and a subprogram converted total amounts of formulated product to total amounts of active ingredient (lbs ai).

Results

Overall, 92% of the applicators responded to the survey. Table I lists the chemicals and their amounts reported in the 1991 survey. Total agricultural pesticide use in New Jersey for 1991 was 1,649,126 pounds ai. Herbicides accounted for 28.8% of the total, insecticides 25.0%, fungicides 41.3%, growth regulators 0.1%, fumigants 3.9%, bactericides 0.1%, and miscellaneous 0.7%.

Table II lists the most frequently used compounds by pesticide category. The single most used compound in 1991 was sulfur, which makes up about half (47%) of New Jersey's agricultural fungicide use and nearly one fifth (19%) of the state's total agricultural pesticide use.

Table III lists the percentage of the total pesticide use on each crop type.

Herbicides dominate field corn, grain, soybean, and sod production treatments. Fungicides dominate peach, cranberry, grape and to a certain extent blueberry treatments. Insecticides were relatively uniform in distribution but tended to dominate potato production. Other pesticide types show minor use except for strawberries where fumigants made up 48% of the treatments.

Certain crops were dominated by a few chemicals. Peaches received the highest weight of pesticide application with 72% of the treatment being sulfur. Scale oils made up 73% of all insecticide applications and captan made up 76% of all fungicide applications to apples. Chlorothalonil and ferbam made up 75% of the fungicide treatments on cranberries. Alachlor, metolachlor, atrazine, and cyanazine made up 91% of the herbicide treatments on field corn. Alachlor, metolachlor, and linuron made up 77% of the herbicide treatments on soybeans. Sodium aluminofluoride made up 80% of all insecticide treatments to potatoes.

Table IV lists by county the amounts and percentages of the state's total pesticide use. The southern half of New Jersey makes up most of the state's agricultural production. Atlantic, Burlington, Cumberland, Gloucester and Salem counties, all located in the south, showed the highest pesticide use. Monmouth county, located in central New Jersey, showed a moderate amount of pesticide use. Warren county, the strongest agricultural county in the north, also displayed a moderate use. The heavily-industrialized northern counties such as Bergen, Essex, Hudson and Union showed an expected small usage.

Discussion

Any review or discussion of the data collected in the 1991 agricultural pesticide use survey must focus on the uniqueness of New Jersey's agriculture. A primary point to consider is the absence of a major crop. Due to New Jersey's geographical location, climatic conditions allow the production of

a tremendous selection of vegetables and fruits, and the state incorporates a vast collection of what are termed "truck farms", where a variety of small crops are grown on the same farm. Therefore, although individual pesticides may dominate use on a particular crop, there is no group of pesticides that dominate use in the state. This is in contrast to many midwestern states, where corn herbicides represent the predominant use.

There are a few major crops within New Jersey. The four main fruit and berry crops produced in the state are apples, peaches, blueberries and cranberries, and despite its relatively small size, New Jersey was the nation's third largest producer of cranberries and fourth largest producer of peaches in 1991 (NJDOA, 1992). The two main vegetable crops grown in New Jersey are corn and soybeans (NJDOA, 1992).

In reporting and evaluating pesticide use, it is important to consider the many, diverse influences on pesticide use. No single factor, or even set of factors, can completely account for fluctuations in the amounts of pesticide active ingredients used from survey to survey. Weather conditions such as temperature and rainfall, in terms of duration, timing and amounts or degrees, influence pest pressure and the associated response. In agricultural settings, issues such as cropping patterns and the associated pest impacts vary from year to year. Economic factors play a significant role, ranging from crop demand to golf course playability to product and/or service cost. The changing face of land use also plays a part. While agricultural acreage has been declining, new home building starts and the associated lawns around those new homes have been increasing. Another factor is the adoption of IPM (Integrated Pest Management). Short term, some pest control situations may require increased pesticide applications beyond the alternative means contained in an IPM program. Long term, however, IPM should result in overall pesticide use reduction. This may be confounded by the increased use of reduced-risk alternatives that may have higher application rates than the materials they replace.

References

New Jersey Department of Agricultural, 1992 Annual Report/Statistics. NJ Department of Agriculture, Trenton; 1992.

[Curt Brown, RSII]

TABLE I. Pesticide amounts (lbs active ingredient) reported in the New Jersey 1991 Agricultural Pesticide Use Survey.

HERBICIDES:

2,4-D	13976
2,4-DP	243
Acifluorfen	3681
Alachlor	35323
Allidochlor	10
Amitrol	<1
Ammonium Sulfamate	14
Atrazine	57128
Benfluralin	188
Bensulide	11000
Bentazone	2977
Bromacil	21
Bromoxynil	49
Butylate	4189
Calcium Arsenate	<1
Chloramben	1063
Chloridazon	9
Chlorimuron Ethyl	1290
Chloroxuron	23
Chlorpropham	108
Chlorthal-dimethyl	24968
Clomazone	2118
Cyanazine	21374
Cycloate	2448
Dicamba	3990
Dichlobenil	932
Diethatyl Ethyl	5366
Diphenamide	148
Diquat	22
Diuron	5936
DSMA, MSMA	105
EPTC	4561
Ethalfluralin	15
Fenoxaprop-ethyl	16
Fluazifop-butyl	340
Glyphosate	16400
Hexazinone	498
Imazaquin	1600
Imazethapyr	419
Isoxaben	412
Lactofen	106
Linuron	31155
MCPA	10
Mecoprop	1792
Metolachlor	144418
Metribuzin	3020
Napropamide	9538
Naptalam	2062
Nicosulfuron	21
Norflurazon	5141
Oryzalin	5277
Oxadiazon	562
Oxyfluorfen	508
Paraquat	18038
Pebulate	1741
Pendimethalin	9957
Phenmedipham	170
Picloram	<1
Primisulfuron	48
Prometon	24
Pronamide	2627
Propachlor	1016
Quizalofop-ethyl	36
Sethoxydim	728
Simazine	4691
Tebuthiuron	13
Terbacil	4585
Thifensulfuron methyl	89
Triclopyr	45
Trifluralin	4317
TOTAL HERBICIDES:	474695

INSECTICIDES:

Abamectin	13
Acephate	14023
Aldicarb	6
Allethrin	46
Amitraz	46
Asulam	8

Azinphos-methyl	24534
Bendiocarb	98
Bifenthrin	107
Boric Acid	194
Bromchlophos	11
Bt	907
Carbaryl	16768
Carbofuran	19956
Chlorpyrifos	14318
Chlorpyrifos-methyl	4
Clofentezine	5
Coumaphos	4
Cyfluthrin	25
Cyhexatin	<1
DDT	5
Diazinon	8310
Dichlorvos	7
Dicofol	1440
Dienochlor	117
Diflubenzuron	6
Dimethoate	5337
Disulfoton	2047
Dymet	5
Endosulfan	14434
Ethoprop	105
Fenamiphos	91
Fenbutatin oxide	559
Fenpropathrin	138
Fenvalerate	1184
Fluvalinate	360
Fonophos	1160
Formetanate HCL	1586
Isazofos	1477
Isofenphos	73
Lindane	248
Malathion	6252
Methamidophos	1796
Methidation	5
Methiocarb	16
Methomyl	29331
Methoxychlor	1191
Mevinphos	3085
Neem Extract	1
Nicotine	45
Oil	100683
Oxamyl	14157
Oxydemeton-methyl	264
Parathion	15633
Parathion-methyl	4849
Permethrin	3843
Phenothrin	6
Phorate	1600
Phosmet	8431
Phosphamidon	244
Pirimicarb	<1
Propargite	1271
Propoxur	1
Pyrethrin	3
Resmethrin	27
Rotenone	576
Soap	2135
Sodium aluminoflrd	80341
Terbufos	4424
Tetrachlorvinphos	12
Thiodicarb	2258
Trichlorfon	343
TOTAL INSECTICIDES:	412586

FUNGICIDES:

Anilazine	58
Barium polysulfide	356
Benomyl	4326
Captafol	231
Captan	113392
Carboxin	24
Chlorothalonil	90829
Copper salts	41513
Dazomet	8
Dichlone	17
Dicloran	689
Dinocap	93
Dodemorph acetate	214
Dodine	2651
Etridiazole	1794
Fenarimol	161
Ferbam	26302
Folpet	8
Fosetyl-al	1802
Iprodione	4381

Mancozeb/Mnb/Znb	27620
Metalaxyl	21312
Metiram	1007
Myclobutanil	192
Oxycarboxin	1
Oxythioquinox	337
Piperalin	10
Propamocarb HCL	8
Propiconazole	47
Quintozene	1395
Sulfur	319936
Thiabendazole	94
Thiophanate	9107
Thiophanate-methyl	2793
Thiram	812
Triadimefon	922
Triforine	1441
Vinclozolin	1385
Ziram	3802
TOTAL FUNGICIDES:	681070

RODENTICIDES:

Zinc Phosphide	273
TOTAL RODENTICIDES:	273

GROWTH REGULATORS:

Ancymidol	<1
Chlormequat chloride	196
Cyromazine	26
Daminozide	384
Ethephon	1352
Fenoxycarb	1
Gibberellic acid	10
Kinoprene	380
Methyl octanoate	354
NAA, NAD	26
Paclobutrazol	2
TOTAL GR REGULATORS:	2731

FUMIGANTS:

Aluminum phosphide	14
Dichloropropene	25106
Metam-sodium	27829
Methyl bromide	5374
Methyl isothiocyanate	5812
Sulfotep	100
TOTAL FUMIGANTS:	64235

BACTERICIDES:

Ammonium chloride	97
Oxatetracycline	1597
Streptomycin	162
Zinc sulfate	180
TOTAL BACTERICIDES:	2036

MISCELLANEOUS:

Bromine	2
Calcium chloride	3749
Metaldehyde	1
Piperonyl butoxide	7547
Salt	200
Stirrup (sex hormone)	1
TOTAL MISCELLANEOUS:	11500

TOTAL PESTICIDE USE: 1649126

Herbicides:	28.8%
Insecticides:	25.0%
Fungicides:	41.3%
Rodenticides:	0.0%
Growth Regulators:	0.1%
Fumigants:	3.9%
Bactericides:	0.1%
Miscellaneous:	0.7%

TABLE II. Highest use compounds in 1991 from the main pesticide categories. Shown are compounds >= 2% of class.

Compound	Lbs active ingredient	% of class	% of total use
HERBICIDES:			
Metolachlor	144418	30.4%	8.8%
Atrazine	57128	12.0%	3.5%
Alachlor	35323	7.4%	2.1%
Linuron	31155	6.6%	1.9%
Chlorthal-dimethyl	24968	5.2%	1.5%
Cyanazine	21374	4.5%	1.3%
Paraquat	18038	3.8%	1.1%
Glyphosate	16400	3.4%	1.0%
2,4-D	13976	2.9%	0.8%
Bensulide	11000	2.3%	0.7%
Pendimethalin	9957	2.1%	0.6%
Napropamide	9538	2.0%	0.6%
INSECTICIDES:			
Oil	100683	24.3%	6.1%
Sodium Aluminoflur	80341	19.5%	4.9%
Methomyl	29331	7.1%	1.8%
Azinphos-methyl	24534	5.9%	1.5%
Carbofuran	19956	4.8%	1.2%
Carbaryl	16768	4.0%	1.0%
Parathion	15633	3.8%	0.9%
Endosulfan	14434	3.5%	0.9%
Chlorpyrifos	14318	3.4%	0.9%
Oxamyl	14157	3.4%	0.9%
Acephate	14023	3.4%	0.9%
Phosmet	8431	2.0%	0.5%
Diazinon	8310	2.0%	0.5%
FUNGICIDES:			
Sulfur	319936	46.9%	19.4%
Captan	113392	16.6%	6.9%
Chlorothalonil	90829	13.3%	5.5%
Copper salts	41513	6.1%	2.5%
Mancozeb	27620	4.0%	1.7%
Ferbam	26302	3.8%	1.6%
Metalaxyl	21312	3.1%	1.3%
FUMIGANTS:			
Metam-Sodium	27829	43.3%	1.7%
Dichloropropene	25106	39.0%	1.5%
M Isothiocyanate	5812	9.0%	0.4%
Methyl Bromide	5374	8.3%	0.3%

TABLE III. Total pesticide amounts (in pounds active ingredient) applied to crops in 1991.

CROP	AMOUNT	% of Total Pesticide Use
Apples	151840	9.2%
Peaches	430607	26.1%
Other T Fruit	3156	0.2%
Blueberries	61999	3.8%
Cranberries	63931	3.9%
Strawberries	7412	0.4%
Grapes	1881	0.1%
Sweet Corn	43581	2.6%
Field Corn	164766	10.0%
Grains	3973	0.2%
Soybeans	150552	9.1%
Beans/Peas	22112	1.3%
Asparagus	2565	0.2%
Cucumbers	22711	1.4%
Tomatoes	80404	4.9%
Other Solan	60307	3.7%
Potatoes	114968	7.0%
Chinese Veg	9416	0.6%
Cole Crops	22968	1.4%
Leafy Veg	38280	2.3%
Hay/Alfalfa	6289	0.4%
Sod	19496	1.2%
Ornamentals	90965	5.5%
Livestock	415	0.0%
no code*	74532	4.5%
ALL CROPS	1649126	100%

*no crop codes were indicated or commodity treated was not originally listed on survey. Frequently reported commodities not appearing on the list were root vegetables such as onions, carrots and radishes.

TABLE IV. Total pesticide amounts (lbs active ingredient) applied by county in 1991.

COUNTY	Amount	% of Total Use
Atlantic	166571	10.1%
Bergen	8842	0.5%
Burlington	205459	12.5%
Camden	40726	2.5%
Cape May	5591	0.3%
Cumberland	261858	15.9%
Essex	368	0.0%
Gloucester	419336	25.4%
Hudson	0	0.0%
Hunterdon	46946	2.8%
Mercer	38222	2.3%
Middlesex	37294	2.3%
Monmouth	79882	4.8%
Morris	18522	1.1%
Ocean	10860	0.7%
Passaic	18871	1.1%
Salem	194053	11.8%
Somerset	14550	0.9%
Sussex	19912	1.2%
Union	916	0.1%
Warren	56221	3.4%
not listed*	4127	0.3%
TOTAL	1649126	100.0%

*actual location of agricultural establishment is uncertain.