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

AGRICULTURAL PESTICIDE USE IN NEW JERSEY: 1994 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 fourth survey completed in this series (1994.)

Methods

The NJPCP's registration records were used to identify all 2748 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 seven months of 1995.

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 1994 survey. Total New Jersey agricultural pesticide use for 1994 according to the survey was 1,613,869 pounds ai. Herbicides accounted for 31.2% of the total, insecticides 23.6%, fungicides 35.5%, growth regulators 0.2%, fumigants 9.0%, bactericides 0.1%, and miscellaneous 0.4%.

Table II lists the most frequently used compounds by pesticide category. The single most used compound in 1994 was sulfur, which makes up 40% of New Jersey's agricultural fungicide use and 14% 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 and Chinese vegetable treatments. Insecticides were relatively uniform in distribution but tended to dominate potato treatments. "Other pesticide types" show minor use except for eggplant, other cole crops, and lettuce where fumigants made up a large percentage of the treatments.

Certain crops were dominated by a few chemicals. Peaches received the highest weight of pesticide application with 71% of the treatment being sulfur. On apples, scale oils made up 79% of all insecticide applications. Alachlor, metolachlor, atrazine, and cyanazine made up 89% of the herbicide treatments on sweet corn and 80% on field corn. Carbaryl made up 98% of insecticide applications on grapes and 92% on asparagus. On Chinese vegetables, chlorthal-dimethyl made up 98% of all herbicide applications and quintozene 82% of fungicide applications. Sodium aluminofluoride made up 89% 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 1994 agricultural pesticide use survey must

focus on the uniqueness of New Jersey's agriculture. A primary point to consider is the absence of a particular 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 high yield 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 second largest producer of blueberries, third largest producer of cranberries and fourth largest producer of peaches in 1994 (NJDOA, 1995). The main vegetable crop grown in New Jersey is sweet corn and the main field crops grown are soybeans and hay (NJDOA, 1995).

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, 1995 Annual Report/Statistics. NJ Department of Agriculture, Trenton; 1995.

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TABLE I. Pesticide amounts (lbs active ingredient) reported in the New Jersey 1994 Agricultural Pesticide Use Survey.

HERBICIDES:

2,4-D	14908
Acetochlor	2723
Acifluorfen	4080
Alachlor	48945
Atrazine	58790
Benfluralin	257
Bensulide	11093
Bentazone	2482
Bromoxynil	56
Butylate	2618
Chloramben	69
Chlorimuron Ethyl	2218
Chlorpropham	438
Chlorthal-dimethyl	24376
Clethodim	21
Clomazone	1842
Clopyralid	<1
Cyanazine	18233
Cycloate	2565
Dicamba	5723
Dichlobenil	703
Diethatyl Ethyl	2296
Diphenamide	7
Diquat	43
Diuron	4786
DSMA, MSMA	196
EPTC	1879
Ethalfluralin	<1
Fenoxaprop-ethyl	601
Fluazifop-butyl	377
Flumetsulam	24
Fomesafen	508
Glyphosate	24183
Hexazinone	487
Imazaquin	2642
Imazethapyr	612
Isoxaben	304
Lactofen	133
Linuron	24132
Mecoprop	1512
Metolachlor	137387
Metribuzin	9182
Metsulfuron-methyl	<1
Napropamide	9233
Naptalam	1553
Nicosulfuron	8193
Norflurazon	8364
Oryzalin	4669
Oxadiazon	322
Oxyfluorfen	579
Paraquat	19260
Pebulate	334
Pendimethalin	20027
Phenmedipham	508
Picloram	<1
Primisulfuron	62
Prometon	85
Pronamide	1864
Propachlor	765
Pyridate	4
Quizalofop-ethyl	88
Sethoxydim	683
Simazine	5846
Tebuthiuron	1
Terbacil	2318
Thifensulfuron methyl	266
Triclopyr	19
Trifluralin	5055
TOTAL HERBICIDES:	503525

INSECTICIDES:

Abamectin	10
Acephate	8866
Amitraz	27
Azinphos-methyl	22609
Bendiocarb	94
Bifenthrin	56
Boric Acid	59
Bromchlophos	7
Bt	1332

Carbaryl	16331
Carbofuran	10353
Chlorpyrifos	15230
Chlorpyrifos-methyl	15
Clofentezine	5
Cyfluthrin	17
Cyhexatin	3
Diazinon	12641
Dichlorvos	11
Dicofol	506
Dienochlor	76
Dimethoate	4903
Disulfoton	1112
Dymet	<1
Endosulfan	9172
Ethion	<1
Ethoprop	296
Fenamiphos	1224
Fenbutatin oxide	183
Fenpropathrin	127
Fenvalerate	1379
Fluvalinate	85
Fonophos	1400
Formetanate HCL	680
Imidacloprid	28
Isazofos	453
Isofenphos	12
Lindane	4095
Malathion	3923
Methidation	91
Methiocarb	8
Methomyl	28089
Methoxychlor	45
Mevinphos	1364
Mexacarbate	<1
Neem Extract	10
Nicotine	11
Oil	77516
Oxamyl	6954
Oxydemeton-methyl	324
Parathion	13
Parathion-methyl	6635
Permethrin	3211
Phenothrin	23
Phorate	901
Phosmet	9998
Phosphamidon	5
Pirimicarb	<1
Propargite	389
Propoxur	10
Pyrethrin	52
Resmethrin	7
Rotenone	831
Soap	1240
Sodium aluminoflrd	118710
Tefluthrin	143
Terbufos	4023
Tetrachlorvinphos	122
Thiodicarb	2517
Trichlorfon	605
TOTAL INSECTICIDES:	381162

FUNGICIDES:

Benomyl	5573
Captan	84209
Carboxin	17
Chlorothalonil	92404
Copper salts	38281
Dazomet	134
Dicloran	35
Dinocap	3
Dodemorph acetate	<1
Dodine	1143
Etridiazole	360
Fenarimol	125
Ferbam	8908
Fosetyl-al	3920
Glyodin	5
Iprodione	3989
Mancozeb/Mnb/Znb	53649
Metalaxyl	15160
Metiram	2866
Myclobutanil	634
Oxythioquinox	136
Prochloraz	208
Propiconazole	994
Quintozene	12666
Sulfur	229646
Thiabendazole	7
Thiophanate	3793

Thiophanate-methyl	595
Thiram	154
Triadimefon	558
Triforine	856
Vinclozolin	1040
Ziram	12069
TOTAL FUNGICIDES:	574137

Oxatetracycline	732
Streptomycin	139
TOTAL BACTERICIDES:	989

RODENTICIDES:

Chlorophacinone	<1
Zinc Phosphide	38
TOTAL RODENTICIDES:	38

GROWTH REGULATORS:

Ancymidol	9
Chlormequat chloride	180
Cyromazine	3
Cytokinin	<1
Daminozide	427
Ethephon	902
Fenoxycarb	1
Gibberellic acid	33
Kinoprene	126
Methyl octanoate	919
NAA, NAD	9
Paclobutrazol	1
Uniconazole	<1
TOTAL GR REGULATORS:	2611

FUMIGANTS:

Metam-sodium	140056
Methyl bromide	5336
Sulfotep	258
TOTAL FUMIGANTS:	145649

BACTERICIDES:

Ammonium chloride	118

MISCELLANEOUS:

Calcium chloride	314
Creosote	324
Metaldehyde	2
Piperonyl butoxide	5116
Stirrup (sex hormone)	1
TOTAL MISCELLANEOUS:	5757

TOTAL PESTICIDE USE: 1613869

Herbicides:	31.2%
Insecticides:	23.6%
Fungicides:	35.5%
Rodenticides:	0.0%
Growth Regulators:	0.2%
Fumigants:	9.0%
Bactericides:	0.1%
Miscellaneous:	0.4%

TABLE II. Highest use compounds in 1994 from the main pesticide categories. Shown are compounds >= 2% of class.

Compound	Lbs active ingredient	% of class	% of total use
HERBICIDES:			
Metolachlor	137387	27.3%	8.5%
Atrazine	58790	11.7%	3.6%
Alachlor	48945	9.7%	3.0%
Chlorthal-dimethyl	24376	4.8%	1.5%
Glyphosate	24183	4.8%	1.5%
Linuron	24132	4.8%	1.5%
Pendimethalin	20027	4.0%	1.2%
Paraquat	19260	3.8%	1.2%
Cyanazine	18233	3.6%	1.1%
2,4-D	14908	3.0%	0.9%
Bensulide	11093	2.2%	0.7%
INSECTICIDES:			
Sodium Aluminoflur	118710	31.1%	7.4%
Oil	77516	20.3%	4.8%
Methomyl	28089	7.4%	1.7%
Azinphos-methyl	22609	5.9%	1.4%
Carbaryl	16331	4.3%	1.0%
Chlorpyrifos	15230	4.0%	0.9%
Diazinon	12641	3.3%	0.8%
Carbofuran	10353	2.7%	0.6%
Phosmet	9998	2.6%	0.6%
Endosulfan	9172	2.4%	0.6%
Acephate	8866	2.3%	0.5%
FUNGICIDES:			
Sulfur	229646	40.0%	14.2%
Chlorothalonil	92404	16.1%	5.7%
Captan	84209	14.7%	5.2%
Mancozeb	53649	9.3%	3.3%
Copper Salts	38281	6.7%	2.4%
Metalaxyl	15160	2.6%	0.9%
Quintozene	12666	2.2%	0.8%
Ziram	12069	2.1%	0.7%
FUMIGANTS:			
Metam-Sodium	140056	96.2%	8.7%
Methyl Bromide	5336	3.7%	0.3%

TABLE III. Total pesticide amounts (in pounds active ingredient) applied to crops in 1994.

CROP	AMOUNT	% of Total Pesticide Use
Apples	167590	10.4%
Peaches	268601	16.6%
Other T Fruit	6216	0.4%
Blueberries	80525	5.0%
Cranberries	56992	3.5%
Strawberries	4936	0.3%
Grapes	1499	0.1%
Sweet Corn	43552	2.7%
Field Corn	192373	11.9%
Grains	2758	0.2%
Soybeans	168908	10.5%
Beans/Peas	17381	1.1%
Asparagus	3299	0.2%
Cucumbers	20131	1.2%
Tomatoes	60522	3.8%
Peppers	50694	3.1%
Eggplants	18255	1.1%
Potatoes	135752	8.4%
Chinese Veg	16132	1.0%
Cabbage	15903	1.0%
Cauliflower	1204	0.1%
Broccoli	4555	0.3%
Brussel Sprts	735	0%
Other Cole	15268	0.9%
Lettuce	20453	1.3%
Spinach	11605	0.7%
Leafy Green	7874	0.5%
Other Leafy	1176	0.1%
Hay/Alfalfa	3954	0.2%
Sod	13948	0.9%
Ornamentals	55157	3.4%
Livestock	1532	0.1%
no code*	144391	8.9%
	1613869	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 1994.

COUNTY	Amount	% of Total Use
Atlantic	179608	11.1%
Bergen	2414	0.1%
Burlington	197974	12.3%
Camden	22922	1.4%
Cape May	4663	0.3%
Cumberland	302032	18.7%
Essex	80	0.0%
Gloucester	350071	21.7%
Hudson	0	0.0%
Hunterdon	50260	3.1%
Mercer	26397	1.6%
Middlesex	43802	2.7%
Monmouth	67933	4.2%
Morris	15134	0.9%
Ocean	14727	0.9%
Passaic	397	0.0%
Salem	245137	15.2%
Somerset	16632	1.0%
Sussex	12067	0.7%
Union	2390	0.1%
Warren	59229	3.7%
TOTAL	1613869	100.0%