

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 pesticide use in the state of New Jersey for agriculture, golf courses, termite control, right-of-way, mosquito control, and lawn care. 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).

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 pesticide use surveys is used by agencies within the NJ Department of Environmental Protection along with other state agencies to aid in research, exposure management 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 geographical distribution.

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 product 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 active ingredient.

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. A few chemicals dominated certain crops. Peaches received the highest weight of total pesticide use (17%) with 71% of that treatment being sulfur.

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.

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
Ethalfuralin	<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	Phosphamidon	5
Carbofuran	10353	Pirimicarb	<1
Chlorpyrifos	15230	Propargite	389
Chlorpyrifos-methyl	15	Propoxur	10
Clofentezine	5	Pyrethrin	52
Cyfluthrin	17	Resmethrin	7
Cyhexatin	3	Rotenone	831
Diazinon	12641	Soap	1240
Dichlorvos	11	Sodium aluminoflrd	118710
Dicofol	506	Tefluthrin	143
Dienochlor	76	Terbufos	4023
Dimethoate	4903	Tetrachlorvinphos	122
Disulfoton	1112	Thiodicarb	2517
Dymet	<1	Trichlorfon	605
Endosulfan	9172	TOTAL INSECTICIDES:	381162
Ethion	<1		
Ethoprop	296		
Fenamiphos	1224	FUNGICIDES:	
Fenbutatin oxide	183		
Fenpropathrin	127	Benomyl	5573
Fenvalerate	1379	Captan	84209
Fluvalinate	85	Carboxin	17
Fonophos	1400	Chlorothalonil	92404
Formetanate HCL	680	Copper salts	38281
Imidacloprid	28	Dazomet	134
Isazofos	453	Dicloran	35
Isofenphos	12	Dinocap	3
Lindane	4095	Dodemorph acetate	<1
Malathion	3923	Dodine	1143
Methidation	91	Etridiazole	360
Methiocarb	8	Fenarimol	125
Methomyl	28089	Ferbam	8908
Methoxychlor	45	Fosetyl-al	3920
Mevinphos	1364	Glyodin	5
Mexacarbate	<1	Iprodione	3989
Neem Extract	10	Mancozeb/Mnb/Znb	53649
Nicotine	11	Metalaxyl	15160
Oil	77516	Metiram	2866
Oxamyl	6954	Myclobutanil	634
Oxydemeton-methyl	324	Oxythioquinox	136
Parathion	13	Prochloraz	208
Parathion-methyl	6635	Propiconazole	994
Permethrin	3211	Quintozene	12666
Phenothrin	23	Sulfur	229646
Phorate	901	Thiabendazole	7
Phosmet	9998	Thiophanate	3793

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

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 HORMONES:	2611

FUMIGANTS:

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

BACTERICIDES:

Ammonium chloride	118
Oxatetracycline	732
Streptomycin	139
TOTAL BACTERICIDES:	989

MISCELLANEOUS:

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

TOTAL PESTICIDE USE: 1613869

Herbicides:	31%
Insecticides:	24%
Fungicides:	36%
Rodenticides:	<1%
Growth Regulators:	<1%
Fumigants:	9%
Bactericides:	<1%
Miscellaneous:	<1%

TABLE II. Highest use compounds in 1994 from the main pesticide categories. Shown are Compounds \geq 5% of class.

<u>Compound</u>	<u>Lbs active ingredient</u>	<u>% of class</u>	<u>% of total use</u>
HERBICIDES:			
Metolachlor	137387	27%	8.5%
Atrazine	58790	12%	3.6%
Alachlor	48945	10%	3.0%
Chlorthal-dimethyl	24376	5%	1.5%
Glyphosate	24183	5%	1.5%
Linuron	24132	5%	1.5%
INSECTICIDES:			
Sodium Aluminoflur	118710	31%	7.4%
Oil	77516	20%	4.8%
Methomyl	28089	7%	1.7%
Azinphos-methyl	22609	6%	1.4%
FUNGICIDES:			
Sulfur	229646	40%	14.2%
Chlorothalonil	92404	16%	5.7%
Captan	84209	15%	5.2%
Mancozeb	53649	9%	3.3%
Copper Salts	38281	7%	2.4%
FUMIGANTS:			
Metam-Sodium	140056	96%	8.7%

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

<u>CROP</u>	<u>AMOUNT</u>	<u>% of Total Pesticide Use</u>
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%
<u>no code*</u>	<u>144391</u>	<u>8.9%</u>
	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	% Total Use
Atlantic	179608	11%
Bergen	2414	<1%
Burlington	197974	12%
Camden	22922	1%
Cape May	4663	<1%
Cumberland	302032	19%
Essex	80	<1%
Gloucester	350071	22%
Hudson	0	0%
Hunterdon	50260	3%
Mercer	26397	2%
Middlesex	43802	3%
Monmouth	67933	4%
Morris	15134	1%
Ocean	14727	1%
Passaic	397	<1%
Salem	245137	15%
Somerset	16632	1%
Sussex	12067	1%
Union	2390	<1%
Warren	59229	4%
TOTAL	1613869	100.0%

1994 Agricultural Pesticide Use by County

