

AGRICULTURAL PESTICIDE USE IN NEW JERSEY: 2000 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 sixth survey completed in this series (2000).

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 1696 licensed private applicators licensed as of December 2000. "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 2001.

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 2000 survey. Total New Jersey agricultural pesticide use for 2000 according to the survey was 1,090,300 pounds active ingredient.

Table II lists the most frequently used compounds by pesticide category and overall. The single most used compound in 2000 was metam-sodium which made up 15.2% of the state's total agricultural pesticide use. Sulfur was second with 14.7% of the state's total use.

Table III lists the amounts and percentages of agricultural pesticide use on each crop type. A few chemicals dominated certain crops. Peaches received the highest percentage (almost 20%) of the total reported pesticide use.

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, located in central New Jersey, showed a moderate amount of pesticide use. Warren, 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 2000 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 mid-western 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. The main vegetable crop grown in New Jersey is sweet corn and the main field crops grown are soybeans and hay. Despite its relatively small size, New Jersey was the nation's second largest producer of blueberries, third largest producer of cranberries and bell peppers, and fifth largest producer of peaches in 1999 (NJDOA, 2000).

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, 2000 Annual Report/Statistics. NJ Department of Agriculture, Trenton; 2000.

TABLE I. Pesticide amounts (lbs active ingredient) reported in the New Jersey 2000 Agricultural Pesticide Use Survey.

HERBICIDES:

		Glyphosate	59966
		Glyphosate-trimesium	10193
2,4-D	12386	Halosulfuron-methyl	9
2,4-DP	70	Hexazinone	252
Acetochlor	29137	Imazamox	25
Acifluorfen	605	Imazaquin	128
Alachlor	12585	Imazethapyr	145
Atrazine	37355	Isoxaben	1180
Benfluralin	48	Lactofen	27
Bensulide	18420	Linuron	3531
Bentazone	2030	Mecoprop	1271
Bifenox	12	Metolachlor	54411
Bromacil	1	Metolachlor(S)	1995
Bromoxynil	4	Metribuzin	2293
Butylate	275	Metsulfuron-methyl	3
Carfentrazone-ethyl	<1	Napropamide	5589
Chlorimuron-ethyl	316	Naptalam	931
Chlorpropham	463	Nicosulfuron	76
Chlorthal-dimethyl	676	Norflurazon	4588
Clethodim	66	Oryzalin	11043
Clomazone	1427	Oxadiazon	293
Clopyralid	34	Oxyfluorfen	690
Cloransulam-methyl	20	Paraquat	12175
Cyanazine	5750	Pebulate	58
Cycloate	1189	Pelargonic acid	984
Dicamba	3567	Pendimethalin	10884
Dichlobenil	574	Phenmedipham	539
Diflufenzopyr	41	Primisulfuron	48
Dimethenamid	315	Prodiamine	382
Diquat	124	Prometon	83
Dithiopyr	32	Pronamide	1684
Diuron	3689	Propachlor	1156
DSMA, MSMA	255	Prosulfuron	5
Endothall	22	Quinclorac	1
EPTC	774	Quizalofop-ethyl	83
Ethalfluralin	147	Rimsulfuron	83
Fenoxaprop-ethyl	177	Sethoxydim	504
Fluazifop-butyl	120	Siduron	258
Flufenacet	27	Simazine	8341
Flumetsulam	15	Sulfentrazone	1275
Fluridone	1	Terbacil	1790
Fomesafen	455	Thifensulfuron	979
Glufosinate-ammonium	155	Triclopyr	25

Trifluralin	1537
Trinexapac	2
TOTAL HERBICIDES:	334874

INSECTICIDES:

Abamectin	6
Acephate	5115
Amitraz	7
Avermectin	8
Azadirachtin (Neem)	3
Azinphos-methyl	11143
Bendiocarb	213
Bifenazate	21
Bifenthrin	326
Bt, Microbials	208
Carbaryl	9530
Carbofuran	3439
Chlorethoxyfos	30
Chlorpyrifos	17439
Chlorpyrifos-methyl	13
Clofentezine	1567
Cyfluthrin	204
Cyhalothrin	1546
Demeton	4
Diazinon	6341
Dicofol	461
Dienochlor	6
Dimethoate	3200
Disulfoton	307
Emamectin	<1
Endosulfan	5259
Ethion	<1
Ethoprop	770
Fenamiphos	307
Fenbutatin oxide	56
Fenpropathrin	60
Fenvalerate	361
Fipronil	50
Fluvalinate	46
Fonofos	34
Formetanate HCL	238
Halofenozide	305
Hexythiazox	29
Imidacloprid	1563

Lindane	83
Malathion	2116
Methamidophos	929
Methidation	46
Methiocarb	545
Methomyl	12357
Methoxychlor	2
Nicotine	49
Oil	35451
Oxamyl	2095
Oxydemeton-methyl	139
Parathion-methyl	101
Permethrin	2242
Phosmet	10664
Phosphamidon	7
Pirimicarb	<1
Pymetrozine	37
Pyrethrins	6
Pyridaben	157
Resmethrin	<1
Rotenone	6
Soap	320
Spinosad	335
Tebufenozide	177
Tefluthrin	1459
Terbufos	6076
Tetradifon	1
Thiodicarb	156
Trichlorfon	44
TOTAL INSECTICIDES:	145815

FUNGICIDES:

Azoxystrobin	1366
Benomyl	5228
Captan	61256
Carboxin	26
Chlorothalonil	51419
Copper salts	31729
Cyprodinil	91
Dicloran	43
Dodine	347
Etridiazole	341
Fenarimol	104
Fenbuconazole	250

Fenhexamid	104
Ferbam	17703
Fludioxonil	14
Fosetyl-al	1645
Iprodione	2374
Kresoxim-methyl	43
Mancozeb/Mnb/Znb	38821
Mefenoxam	38
Metalaxyl	5630
Metalaxyl-M	272
Metiram	1539
Myclobutanil	1243
Oxythioquinox	6
Piperalin	<1
Potassium Bicarbonate	196
Propamocarb HCL	178
Propiconazole	1618
Quintozene	6594
Sodium Hypochlorate	111
Sulfur	161059
Tebuconazole	44
Thiophanate	2128
Thiophanate-methyl	1238
Thiram	181
Triadimefon	485
Trifloxystrobin	52
Triflumizole	12
Triforine	1
Vinclozolin	434
Ziram	17080
TOTAL FUNGICIDES:	413043

RODENTICIDES:

Bromadiolone	<1
Diphacinone	<1
Zinc Phosphide	24
TOTAL RODENTICIDES:	24

Aminoethoxyvinylglycine	2
Ancymidol	<1
Chlormequat chloride	98
Cyromazine	53
Cytokinin	<1
Daminozide	612
Diflubenzuron	65
Dikegulac sodium	<1
Ethephon	209
Fenoxycarb	39
GABA	11
Gibberellic acid	14
Glutamic acid	11
Kinoprene	179
Methyl octanoate	138
NAA, NAD	12
Paclobutrazol	3
Pyriproxyfen	1
Uniconazole	<1
TOTAL GR REGULATORS:	1447

FUMIGANTS:

Aluminum Phosphide	4
Dichloropropene	12159
Metam-sodium	165293
Methyl bromide	1017
Sulfotep	21
TOTAL FUMIGANTS:	178494

BACTERICIDES:

Ammonium chloride	377
Oxatetracycline	902
Streptomycin	142
TOTAL BACTERICIDES:	1421

GROWTH REGULATORS:

MISCELLANEOUS:

Capsaicin	<1
Cinnamaldehyde	<1
Garlic Oil	25
Hydrogen Peroxide	60
Metaldehyde	20
Pentachlorophenol	2
Pheromone	10
Piperonyl butoxide	63
Potassium salts	14993
Trisodium phosphate	9
TOTAL MISCELLANEOUS:	15182

TOTAL PESTICIDE USE: 1090300

Herbicides:	31%
Insecticides:	13%
Fungicides:	38%
Fumigants:	16%
Other:	2%

TABLE II. Highest use compounds in 2000 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:			
Glyphosate	59966	18%	5.5%
Metolachlor	54411	16%	5.0%
Atrazine	37355	11%	3.4%
Acetochlor	29137	9%	2.7%
Bensulide	18420	6%	1.7%
INSECTICIDES:			
Oil	35451	24%	3.3%
Chlorpyrifos	17439	12%	1.6%
Methomyl	12357	8%	1.1%
Azinphos-methyl	11143	8%	1.0%
Phosmet	10664	7%	1.0%
Carbaryl	9530	7%	<1%
FUNGICIDES:			
Sulfur	161059	39%	14.7%
Captan	61256	15%	5.6%
Chlorothalonil	51419	12%	4.7%
Mancozeb	38821	9%	3.6%
Copper Salts	31729	8%	2.9%
FUMIGANTS:			
Metam-Sodium	165293	93%	15.2%
Dichloropropene	12159	7%	1.1%

TABLE III. Total pesticide amounts (in pounds active ingredient) applied to crops in 2000.

<u>CROP</u>	<u>AMOUNT</u>	<u>% of Total Pesticide Use</u>
Apples	73444	6.7
Peaches	215771	19.8
Other Tree Fruit	9213	0.8
Blueberries	65397	6.0
Cranberries	39095	3.6
Strawberries	5599	0.5
Grapes	1538	0.1
Sweet Corn	22351	2.0
Field Corn	129883	11.9
Grains	5324	0.5
Soybeans	84469	7.8
Beans/Peas	8413	0.8
Asparagus	3784	0.3
Cucumbers	22134	2.0
Tomatoes	32276	3.0
Peppers	49066	4.5
Eggplants	18600	1.7
Potatoes	32790	3.0
Chinese Vegetables	9564	0.9
Cabbage	4746	0.4
Cauliflower	79	0.0
Broccoli	2220	0.2
Brussel Sprouts	8	0.0
Other Cole	1662	0.2
Lettuce	19884	1.8
Spinach	8879	0.8
Leafy Greens	5254	0.5
Other Leafy	17613	1.6
Hay/Alfalfa	4304	0.4
Sod	47436	4.4
Ornamentals	64649	5.9
Livestock	2	0.0
no code*	84852	7.8
ALL CROPS	1090300	100.0

*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 2000.

<u>COUNTY</u>	<u>Amount</u>	<u>% Total Use</u>
Atlantic	121573	11%
Bergen	1211	<1%
Burlington	97435	9%
Camden	37334	3%
Cape May	4649	<1%
Cumberland	245307	23%
Essex	22	<1%
Gloucester	253421	23%
Hudson	0	<1%
Hunterdon	26811	2%
Mercer	16138	1%
Middlesex	18598	2%
Monmouth	45474	4%
Morris	10367	1%
Ocean	5743	1%
Passaic	323	<1%
Salem	126508	12%
Somerset	5374	<1%
Sussex	5421	1%
Union	533	<1%
Warren	68058	6%
TOTAL	1090300	100%

2000 Agricultural Pesticide Use by County

