NJ Pesticide Control Program
Pesticide Control Program
Pesticide Evaluation & Monitoring

AGRICULTURAL PESTICIDE USE IN NEW JERSEY: 2009 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 ninth survey completed in this series (2009).

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 1767 private applicators licensed as of December 2009. "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 2010.

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, 88% (1553 of 1767) of the applicators responded to the survey. The list of non-respondents was turned over to the Bureau of Pesticide Compliance section for follow-up. Table I lists the chemicals and their amounts reported in the 2009 survey. Total New Jersey agricultural pesticide use for 2009 according to the survey was 1086014 pounds active ingredient.

Table II lists the most frequently used compounds by pesticide category and overall. The single most used compound in 2009 was the fumigant metam-sodium which made up 13% of the state's total agricultural pesticide use. Glyphosate was second with 9% of the state's total use.

Table III lists the amounts and percentages of agricultural pesticide use on each crop type. Peaches and blueberries received the highest percentage (almost 12%) 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 2009 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 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 are hay and soybeans. Despite its relatively small size, New Jersey was the nation's second largest producer of blueberries and third largest producer of cranberries, peaches and bell peppers in 2009 (NJDOA, 2009).

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, 2009 Annual Report/Statistics. NJ Department of Agriculture, Trenton; 2009.

TABLE I. Pesticide amounts (lbs active ingredient) reported in the New Jersey 2009 Agricultural Pesticide Use Survey.

HERBICIDES:	
2,4-D	16220
2,4-DP	22
2,4-DT	13
Acetochlor	8015
Alachlor	4134
Aminopyralid	9
Ammonium sulfate	91
Atrazine	46855
Benfluralin	21
Bensulide	12859
Bentazon	409
Bromacil	<1
Bromoxynil	5
Carfentrazone-ethyl	6
Chlorimuron-ethyl	141
Chlorpropham	120
Chlorsulfuron	<1
Chlorthal-dimethyl	7719
Clethodim	488
Clomazone	1420
Clopyralid	640
Cloransulam-methyl	125
Cycloate	893
Dicamba	2094
Dichlobenil	296
Diflufenzopyr	4
Dimethenamid	4059
Diquat	186
Dithiopyr	201
Diuron	7355
DSMA, MSMA	32
EPTC	171
Ethalfluralin	1448
Fenoxaprop-ethyl	1
Fluazifop-butyl	20
Flumiclorac-pentyl	171
Flumioxazin	965
Fluthiacet-methyl	2
Fomesafen	5
Foramsulfuron	3
Glufosinate-ammonium	306
Glyphosate	102176
Halosulfuron-methyl	67
Hexazinone	91
Imazamox	<1
Imazapic	22
Imazaquin	4
Imazethapyr	95
Isoxaben	607
Isoxaflutole	1
Lactofen	4
Linuron	2476
MCPA	67
Mecoprop	1592
Mesosulfuron-methyl	4
Mesotrione	2016
Metolachlor	16254
Metolachlor-S	29385
Metribuzin	2094
Metsulfuron-methyl	2
Napropamide	5004
Naptalam	12
Nicosulfuron	10
Norflurazon	11408
Oryzalin	4603
Oxadiazon	239
Oxyfluorfen	681
Paraquat	17308
Pebulate	6
Pelargonic acid	89
Pendimethalin	18102
Phenmedipham	1356
Primisulfuron	16
Prodiamine	1306
Prometon	36
Pronamide	1696
Quinclorac	21
Quizalofop-ethyl	2
Rimsulfuron	83
Sethoxydim	383
Simazine	4272
Sodium percarbonate	113
Sulfentrazone	324

Sulfosulfuron	1
Tebuthiuron	1
Terbacil	2114
Thifensulfuron	261
Tribenuron	111
Triclopyr	74
Trifluralin	1100
TOTAL HERBICIDES:	345100

INSECTICIDES:

Acephate	3951
Acetamiprid	544
Avermectin	13
Azadirachtin (Neem)	43
Azinphos-methyl	1770
Bendiocarb	<1
Bifenazate	85
Bifenthrin	822
Borate	3
Bacillus sp.	2900
Carbaryl	7054
Carbofuran	160
Chlorantraniliprole	344
Chlorfenapyr	20
Chlorpyrifos	8837
Clofentezine	14
Clothianidin	3
Cyfluthrin	647
Cyhalothrin	980
Cypermethrin	364
Deltamethrin	1
Diazinon	6479
Dichlorvos	2
Dicofol	5
Dienochlor	1
Dimethoate	2806
Dinotefuran	405
Emamectin	3
Endosulfan	4248
Etoxazole	8
Fenbutatin oxide	10
Fenpropathrin	168
Fenpyroximate	3
Fenvalerate	1002
Fipronil	43
Flonicamid	48
Flubendiamide	408
Fluvalinate	37
Formetanate HCL	55
Hexakis	<1
Hexythiazox	40
Imidacloprid	1157
Indoxacarb	1070
Lindane	<1
Malathion	876
Methidation	4
Methiocarb	161
Methomyl	7719
Methoxyfenozide	669
Mexacarbate	<1
Nicotine	2
Novaluron	30
Oil	80369
Oxamyl	2499
Oxydemeton-methyl	4
Permethrin	878
Phorate	168
Phosmet	15449
Pymetrozine	112
Pyrethrins	4
Pyridaben	60
Pyridalyl	15
Rotenone	<1
Soap	171
Spinetoram	390
Spinosad	517
Spirodiclofen	18
Spiromesifen	162
Spirotetramat	7
Tefluthrin	78
Terbufos	849
Thiacloprid	9
Thiamethoxam	402
Thiodicarb	127
Trichlorfon	119
TOTAL INSECTICIDES:	158421

FUNGICIDES:

Acibenzolar-methyl	14
Azoxystrobin	5472
Benomyl	2
Boscalid	1690
Buprofezin	19
Calcium polysulfide	836
Captan	50918
Carboxin	5
Chlorothalonil	83263
Coniothyrium mintans	108
Copper salts	31308
Cyazofamid	153
Cymoxanil	1474
Cyprodinil	1398
Dimethomorph	353
Dinocap	<1
Dodine	108
Etridiazole	445
Famoxadone	1117
Fenamidone	7
Fenarimol	143
Fenbuconazole	3351
Fenhexamid	506
Ferbam	1672
Fludioxonil	343
Fluopicolide	280
Flutolanil	105
Flutriafol	3
Fosetyl-al	1495
Gliocladium virens	4
Iprodione	1632
Kresoxim-methyl	246
Mancozeb/Mnb/Znb	46482
Mandipropamide	320
Mefenoxam	1806
Metalaxyl	688
Metiram	487
Myclobutanil	1164
Oxythioquinox	3
Phosphoric acid	565
Piperalin	2
Polyoxin D Zinc	9
Potassium Bicarbonate	564
Potassium Phosphite	18321
Propamocarb HCL	13110
Propiconazole	544
Prothioconazole	8
Pyraclostrobin	2018
Pyrimethanil	34
Quinoxyfen	138
Quintozene	10584
Reynoutria sachalinensis	7
Sulfur	84938
Tebuconazole	357
Tetraconazole	9
Thiabendazole	2
Trichoderma harzianum	2
Thiophanate-methyl	6465
Thiram	172
Triadimefon	45
Trifloxystrobin	325
Triflumizole	146
Triforine	<1
Vinclozolin	19
Ziram	43886
Zoxamide	1
TOTAL FUNGICIDES:	421692

RODENTICIDES:

Chlorophacinone	<1
Diphacinone	<1
Zinc Phosphide	12
TOTAL RODENTICIDES:	12

GROWTH REGULATORS:

Aminoethoxyvinylglycine	7
Ancymidol	<1
Benzyladenine	1
Chlormequat chloride	164
Cyromazine	143
Cytokinin	<1
Daminozide	635
Diflubenzuron	12
Ethephon	247
Fenoxycarb	<1
Flurprimidol	<1

Gibberellin	49
Indole-3-butyric acid	2
Kinoprene	24
Maleic hydrazide	70
Methyl octanoate	229
NAA, NAD	8
Paclobutrazol	24
Prohexidione calcium	4
Pyriproxyfen	55
Trinexapac-ethyl	10
Uniconazole	1
TOTAL GRs:	1685

TOTAL PESTICIDE USE: 1086014

Herbicides:	32 %
Insecticides:	15 %
Fungicides:	39 %
Fumigants:	13 %
Other:	1 %

FUMIGANTS:

Aluminum Phosphide	30
Dazomet	4277
Metam-sodium	139072
TOTAL FUMIGANTS:	143379

BACTERICIDES:

Ammonium chloride	748
Hydrogen Peroxide	7097
Oxytetracycline	618
Peroxyacetic acid	204
Streptomycin	396
TOTAL BACTERICIDES:	9063

MISCELLANEOUS:

Copper ethanolamine complex	1
Herbal Oil	225
Kaolin	1473
Menthol	3
Metaldehyde	37
Methyl anthranilate	11
Piperonyl butoxide	235
Potassium salts	4509
Sodium hypochlorite	59
Sodium percarbonate	113
TOTAL MISCELLANEOUS:	6663

TABLE II. Highest use compounds in 2009 from the main pesticide categories. Shown are compounds >= 5% of class.

Compound	Lbs active ingredient	% of class	% of total use
HERBICIDES:			
Glyphosate	102176	30%	9%
Atrazine	46855	14%	4%
Metolachlor-S	29385	9%	3%
Pendimethalin	18102	5%	2%
Paraquat	17308	5%	2%
INSECTICIDES:			
Oil	80369	51%	7%
Phosmet	15449	10%	1%
Chlorpyrifos	8837	6%	<1%
Methomyl	7719	5%	<1%
FUNGICIDES:			
Sulfur	84938	20%	8%
Chlorothalonil	83263	20%	8%
Captan	50918	12%	5%
Mancozeb/Mnb/Znb	46482	11%	4%
Ziram	43886	10%	4%
Copper salts	31308	7%	3%
FUMIGANTS:			
Metam-Sodium	139072	97%	13%

TABLE III. Total pesticide amounts (in pounds active ingredient) applied to crops in 2009.

CROP	AMOUNT	% of Total Pesticide Use
Apples	68352	6.3
Peaches	126854	11.7
Other Tree Fruit	13617	1.3
Blueberries	126947	11.7
Cranberries	39204	3.6
Strawberries	8097	0.7
Grapes	17670	1.6
Sweet Corn	14177	1.3
Field Corn	124732	11.5
Grains	6168	0.6
Soybeans	83098	7.7
Beans/Peas	3588	0.3
Asparagus	4255	0.4
Cucumbers	23633	2.2
Tomatoes	55941	5.1
Peppers	33233	3.0
Eggplants	27583	2.5
Potatoes	26103	2.4
Chinese Vegetables	41217	3.8
Cabbage	9537	0.9
Cauliflower	498	0.0
Broccoli	3130	0.3
Brussel Sprouts	225	0.0
Other Cole	1833	0.2
Lettuce	16204	1.5
Spinach	5683	0.5
Leafy Greens	12621	1.2
Other Leafy	12149	1.1
Hay/Alfalfa	6546	0.6
Sod	14319	1.3
Ornamentals	49089	4.5
Livestock	3	0.0
no code*	109708	10.1
ALL CROPS	1086014	100

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

TABLE IV. Total pesticide amounts (lbs active ingredient) applied by county in 2009.

COUNTY	Amount	% Total Use
Atlantic	166689	15%
Bergen	663	<1%
Burlington	115497	11%
Camden	6777	1%
Cape May	3375	<1%
Cumberland	183920	17%
Essex	10	<1%
Gloucester	231761	21%
Hudson	0	0%
Hunterdon	45252	4%
Mercer	32919	3%
Middlesex	9658	1%
Monmouth	69949	6%
Morris	15923	2%
Ocean	15997	2%
Passaic	150	<1%
Salem	113313	10%
Somerset	7745	1%
Sussex	7164	1%
Union	42	<1%
Warren	59220	5%
TOTAL	1086014	100%