

AGRICULTURAL PESTICIDE USE IN NEW JERSEY: 1985 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 downloaded 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 first survey completed in this series.

Methods

The NJPCP's registration records were used to identify all 3117 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. An initial mailing to all applicators and two subsequent mailings to non-respondents were sent during the first six months of 1986.

The survey requested information on each pesticide product used, including trade name, EPA registration number, active ingredient percentage, amount applied for the year, number of acres treated, and type of crop(s) 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 sub-program converted total product amounts to active ingredient amounts.

Results

Overall, 2957 of 3117 (95%) of the surveys were returned. Table I lists the chemicals and their amounts reported in the 1985 survey. Total agricultural pesticide use in New Jersey for 1985 was 1,557,179 pounds ai. Herbicides accounted for 30.1% of the total, insecticides 26.1%, fungicides 41.4%, growth regulators 0.1%, fumigants 1.2%, bactericides 0.1%, and miscellaneous 1.0%.

Table II lists the most frequently used compounds by pesticide category. The single most used compound in 1985 was sulfur, which made up more than half (56%) of New Jersey's agricultural fungicide use and close to one quarter (23%) of the state's total agricultural pesticide use.

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

Herbicides dominated field crop (soybeans, field corn, small grains) and sod production treatments. Fungicides dominated tree fruit (apples, peaches) and small fruit (blueberries, cranberries, strawberries) treatments. Insecticides were relatively uniform in distribution, however, very few were used in field crops and sod production.

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, show the highest pesticide use. Camden and Monmouth counties show a moderate amount of pesticide use. Warren county is the strongest agricultural county in the north. The heavily-industrialized northern counties such as Essex, Hudson and Union showed an expected small usage.

Discussion

Any review or discussion of the data collected in the 1985 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.

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.

[Curt Brown, RSII]

TABLE I. Pesticide amounts (lbs active ingredient) reported in the New Jersey 1985 Agricultural Pesticide Use Survey.

HERBICIDES:

2,4-D	9456
Acifluorfen	3123
Alachlor	84462
Allidochlor	23
Amitrol	10
Atrazine	58857
Benfluralin	651
Bensulide	5539
Bentazone	1945
Bromacil	9
Butylate	58906
Chloramben	4235
Chloridazon	7
Chlorimuron Ethyl	2
Chloroxuron	211
Chlorpropham	30
Chlorthal-dimethyl	15554
Chlorpropham	30
Cyanazine	24545
Cycloate	1915
Dalapon	17
Dicamba	2910
Dichlobenil	1135
Diethatyl Ethyl	1131
Dinoseb	11580
Diphenamide	2499
Diuron	5152
DSMA, MSMA	135
Endothal	1
EPTC	3256
Fluazifop-butyl	55
Glyphosate	6001
Hexazinone	676
Imazapyr	2
Imazaquin	100
Linuron	42615
Mecoprop	1085
Metolachlor	72691
Metribuzin	2167
Napropamide	5744

Naptalam	2001
Norflurazon	2387
Oryzalin	4337
Oxadiazon	286
Oxyfluorfen	106
Paraquat	9343
Pebulate	321
Pendimethalin	1982
Picloram	7
Prometon	267
Pronamide	1195
Propachlor	259
Sethoxydim	126
Siduron	72
Simazine	8866
Sodium chlorate	16
Sulfallate	33
Terbacil	3450
Trifluralin	4596
Vernolate	470
<u>TOTAL HERBICIDES:</u>	<u>468549</u>

INSECTICIDES:

Acephate	10203
Aldicarb	3589
Amitraz	15
Azinphos-methyl	32290
Bendiocarb	57
Boric Acid	236
Bt	13532
Carbaryl	21922
Carbofuran	33492
Carbophenothion	3
Chlorpyrifos	8153
Clofentezine	32
Crotoxyphos	1
Cyhexatin	2027
Diazinon	9035
Dichlorvos	440
Dicofol	4024

Dienochlor	230
Diflubenzuron	3
Dimethoate	4053
Disulfoton	333
Endosulfan	40032
Ethion	3696
Fenamiphos	725
Fenbutatin oxide	394
Fensulfothion	3099
Fenvalerate	4318
Fluvalinate	181
Fonophos	2528
Formetanate HCL	1494
Isofenphos	562
Kinoprene	22
Lead arsenate	32
Lindane	333
Malathion	9786
Methamidophos	3615
Methidathion	7
Methiocarb	97
Methomyl	42293
Methoxychlor	238
Mevinphos	2507
Mexacarbate	12
Naled	20
Nicotine	401
Oil	48096
Oxamyl	20179
Oxydemeton-methyl	596
Parathion	49575
Parathion-methyl	4681
Permethrin	4807
Phenothrin	14
Phorate	987
Phosalone	82
Phosmet	5741
Phosphamidon	1361
Pirimicarb	17
Propargite	91
Pyrethrin	28
Resmethrin	198
Rotenone	643
Soap	81
Terbufos	9042
Trichlorfon	294

TOTAL INSECTICIDES: 406573

FUNGICIDES:

Barium polysulfide	911
Benomyl	4455
Captafol	23376
Captan	60709
Chlorothalonil	24084
Copper salts	10492
Dichlone	1910
Dicloran	815
Dinocap	1522
Diphehylamine	130
Dodemorph acetate	13
Dodine	868
Etridiazole	265
Fenamiosulf	155
Fenarimol	1
Ferbam	23416
Folpet	1521
Fosetyl-al	32
Glyodin	1618
Iprodione	557
Mancozeb/Mnb/Znb	90542
Metalaxyl	7411
Metiram	17612
Oxythioquinox	76
Piperalin	2
Quintozene	5300
Sulfur	363145
Thiabendazole	53
Thiophanate	650
Thiophanate-methyl	315
Thiram	481
Triadimefon	381
Triforine	270
Vinclozolin	1547
<u>TOTAL FUNGICIDES: 644633</u>	

RODENTICIDES:

Zinc Phosphide	38
<u>TOTAL RODENTICIDES:</u>	<u>38</u>

GROWTH REGULATORS:

Ancymidol	1
Chlormequat chloride	110
Daminozide	1115
Ethephon	419
Gibberellic acid	1
Methyl octanoate	170
NAA, NAD	127
<u>TOTAL GR REGULATORS:</u>	<u>1943</u>

FUMIGANTS:

Dichlorpropene	2255
Metam-sodium	7848
Methyl bromide	3149
Methyl isothiocyanat	5239
Sulfotep	15
<u>TOTAL FUMIGANTS:</u>	<u>18506</u>

BACTERICIDES:

Oxatetracycline	1359
Streptomycin	745
<u>TOTAL BACTERICIDES:</u>	<u>2104</u>

MISCELLANEOUS:

Metaldehyde	10
Piperonyl butoxide	13924
Salt	900
<u>TOTAL MISCELLANEOUS:</u>	<u>14834</u>

TOTAL PESTICIDE USE: 1557179

Herbicides:	30.1%
Insecticides:	26.1%
Fungicides:	41.4%
Rodenticides:	0.0%
Growth Regulators:	0.1%
Fumigants:	1.2%
Bactericides:	0.1%
Miscellaneous:	1.0%

TABLE II. Highest use compounds in 1985 from the main pesticide categories. Shown are compounds $\geq 2\%$ of class.

<u>Compound</u>	<u>Lbs active Ingredient</u>	<u>% of class</u>	<u>% of total use</u>
HERBICIDES:			
Alachlor	84462	18.0%	5.4%
Metolachlor	72691	15.5%	4.7%
Butylate	58906	12.6%	3.8%
Atrazine	58857	12.6%	3.8%
Linuron	42615	9.1%	2.7%
Cyanazine	24545	5.2%	1.6%
Chlorthal-dimethyl	15554	3.3%	1.0%
Dinoseb	11580	2.5%	0.7%
2,4-D	9456	2.0%	0.6%
Paraquat	9343	2.0%	0.6%
INSECTICIDES:			
Parathion	49575	12.2%	3.2%
Oil	48096	11.8%	3.1%
Methomyl	42293	10.4%	2.7%
Endosulfan	40032	9.8%	2.6%
Carbofuran	33492	8.2%	2.2%
Azinphos-methyl	32290	7.9%	2.1%
Carbaryl	21922	5.4%	1.4%
Oxamyl	20179	5.0%	1.3%
Bt	13532	3.3%	0.9%
Acephate	10203	2.5%	0.7%
Malathion	9786	2.4%	0.6%
Terbufos	9042	2.2%	0.6%
Diazinon	9035	2.2%	0.6%
Chlorpyrifos	8153	2.0%	0.5%
FUNGICIDES:			
Sulfur	363145	56.3%	23.3%
Mancozeb	90542	14.0%	5.8%
Captan	60709	9.4%	3.9%
Chlorothalonil	24084	3.7%	1.5%
Ferbam	23416	3.6%	1.5%
Captafol	23376	3.6%	1.5%
Metiram	17612	2.7%	1.1%
FUMIGANTS:			
Metham-Sodium	7848	42.4%	0.5%
M Isothiocyanate	5239	28.3%	0.3%
Methyl Bromide	3149	17.0%	0.2%
Dichloropropene	2255	12.2%	0.1%

TABLE III. Total pesticide amounts (in pounds active ingredient) applied to crops in 1985.

<u>CROP</u>	<u>AMOUNT</u>	<u>% of Total Pesticide Use</u>
Tree Fruit	590544	37.9%
Small Fruit	149940	9.6%
Vegetable	359421	23.1%
Field Crop	372070	23.9%
Nursery	55997	3.6%
Greenhouse	9389	0.6%
Sod	10456	0.7%
Livestock	82	0%
Miscellaneous*	9280	0.6%
	1557179	100%

*crop code was not 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 and other commodities such as zucchini and pumpkins.

TABLE IV. Total pesticide amounts (lbs active ingredient) applied by county in 1985.

COUNTY	Amount	% of total use
Atlantic	140537	9.0%
Bergen	6743	0.4%
Burlington	226992	14.6%
Camden	72689	4.6%
Cape May	8608	0.6%
Cumberland	208645	13.4%
Essex	199	0.0%
Gloucester	367967	23.6%
Hudson	0	0.0%
Hunterdon	45037	2.9%
Mercer	20751	1.3%
Middlesex	42298	2.7%
Monmouth	107373	6.9%
Morris	7967	0.5%
Ocean	9257	0.6%
Passaic	3146	0.2%
Salem	191342	12.3%
Somerset	22669	1.5%
Sussex	12250	0.7%
Union	930	0.1%
Warren	61777	4.0%
TOTAL	1557179	100.0%