

AGRICULTURAL PESTICIDE USE IN NEW JERSEY: 1988 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 second survey completed in this series (1988).

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 3137 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 1989.

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, 3007 of 3137 (96%) of the surveys were returned. Table I lists the chemicals and their amounts reported in the 1988 survey. Total agricultural pesticide use in New Jersey for 1988 was 1,783,181 pounds active ingredient.

Table II lists the most frequently used compounds by pesticide category. The single most used compound in 1988 was sulfur, which makes up more than half (60%) of New Jersey's agricultural fungicide use and one quarter (25%) of the state's total agricultural pesticide use.

Table III lists the percentage of the total pesticide use on each crop type. Herbicides dominate soybean, grain, field corn, and sod production treatments. Fungicides dominate peach, grape, cranberry, and to a certain extent blueberry treatments. Insecticides were relatively uniform in distribution but dominate potato production. Certain crops were dominated by a few chemicals. Peaches received the highest weight of pesticide application with 75% of the treatment being sulfur. Scale oils made up 63% of all insecticide applications to apples. Sodium aluminofluoride made up 87% 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, show the highest pesticide use. Camden and Monmouth counties show a moderate amount of pesticide use. Warren county, the strongest agricultural county in the north, shows only half the use of the smaller Camden county to the south. 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 1988 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.

TABLE I. Pesticide amounts (lbs active ingredient) reported in the New Jersey 1988 Agricultural Pesticide Use Survey.

HERBICIDES:

2,4-D, 2,4-DP	16117
Acifluorfen	2961
Alachlor	49050
Allidochlor	55
Amitrol	8
Ammonium Sulfamate	8
Atrazine	45812
Benfluralin	150
Bensulide	9338
Bentazone	1900
Bromacil	2
Bromoxynil	586
Butylate	5660
Chloramben	5926
Chlorimuron Ethyl	637
Chloroxuron	170
Chlorpropham	993
Chlorthal-dimethyl	20656
Clomazone	402
Cyanazine	17143
Cycloate	1419
Dalapon	8
Dicamba	4331
Dichlobenil	522
Diethatyl Ethyl	47677
Dinoseb	540
Diphenamide	3457
Diquat	274
Diuron	7336
DSMA, MSMA	82
EPTC	3725
Fenoxaprop-ethyl	23
Fluazifop-butyl	285
Glyphosate	10009
Hexazinone	755
Imazaquin	1476
Imazethapyr	61
Lactofen	402
Linuron	28191
Mecoprop	991

Metolachlor	98379
Metribuzin	3549
Napropamide	6384
Naptalam	1473
Norflurazon	4055
Oryzalin	2930
Oxadiazon	296
Oxyfluorfen	453
Paraquat	9711
Pebulate	397
Pendimethalin	4970
Phenmedipham	22
Prometon	92
Pronamide	3645
Propachlor	565
Quizalofop-ethyl	8
Sethoxydim	278
Siduron	250
Simazine	3311
Sodium chlorate	745
Tebuthiuron	5
Terbacil	13193
Thifensulfuron methyl	2
Triclopyr	3
Trifluralin	3729
TOTAL HERBICIDES:	447577

INSECTICIDES:

Abamectin	7
Acephate	15739
Aldicarb	3403
Amitraz	42
Azinphos-methyl	26034
Bendiocarb	90
Bifenthrin	32
Bt	508
Carbaryl	18694
Carbofuran	29954
Chlorpyrifos	13340

Crotoxyphos	<1
Cyfluthrin	3
Cyhexatin	8
Cypermethrin	<1
Diazinon	9258
Dichlorvos	28
Dicofol	1277
Dienochlor	200
Diflubenzuron	1
Dimethoate	16300
Disulfoton	274
Dymet	5
Endosulfan	18227
Ethion	114
Ethoprop	808
Fenamiphos	501
Fenbutatin oxide	308
Fensulfothion	4437
Fenvalerate	2855
Flucythrinate	1
Fluvalinate	234
Fonophos	1551
Formetanate HCL	1239
Isofenphos	1084
Lindane	336
Malathion	6106
Methamidophos	5862
Methiocarb	40
Methomyl	24683
Methoxychlor	112
Mevinphos	5151
Mexacarbate	3
Naled	11
Nicotine	26
Oil	74398
Oxamyl	13084
Oxydemeton-methyl	492
Parathion	30784
Parathion-methyl	4945
Permethrin	16935
Phenothrin	51
Phorate	6889
Phosalone	22
Phosmet	4219
Phosphamidon	243
Pirimicarb	2

Pirimiphos-methyl	16
Propargite	943
Propoxur	3
Pyrethrin	1
Resmethrin	43
Rotenone	1243
Soap	463
Sodium aluminoflrd	158947
Terbufos	4906
Thiodicarb	1704
Trichlorfon	2576
TOTAL INSECTICIDES:	531793

FUNGICIDES:

Anilazine	22
Barium polysulfide	1362
Benomyl	9032
Captafol	8709
Captan	63943
Chlorothalonil	40723
Copper salts	11288
Dichlone	302
Dicloran	2204
Dinocap	1639
Dodemorph acetate	130
Dodine	262
Etridiazole	471
Fenaminosulf	1541
Fenarimol	102
Ferbam	29161
Folpet	221
Fosetyl-al	529
Glyodin	86
Iprodione	2715
Mancozeb/Mnb/Znb	79473
Metalaxyl	10385
Metiram	21460
Oxythioquinox	496
Propiconazole	12
Quintozene	10394
Sulfur	459142
Thiabendazole	178
Thiophanate	1720

Thiophanate-methyl	629
Thiram	462
Triadimefon	271
Triforine	1393
Vinclozolin	2214
Ziram	1187
TOTAL FUNGICIDES:	763859

RODENTICIDES:

Zinc Phosphide	30
TOTAL RODENTICIDES:	30

GROWTH REGULATORS:

Ancymidol	<1
Chlormequat chloride	171
Daminozide	1783
Ethephon	1272
Gibberellic acid	18
Methyl octanoate	207
NAA, NAD	4
Paclbutrazol	<1
TOTAL HORMONES:	3455

FUMIGANTS:

Aluminum phosphide	6
Metam-sodium	10892
Methyl bromide	1490
Methyl isothiocyanat	13778
Sulfotep	196
TOTAL FUMIGANTS:	26361

BACTERICIDES:

Oxatetracycline	1688
Streptomycin	31
TOTAL BACTERICIDES:	1718

MISCELLANEOUS:

Calcium chloride	1898
Piperonyl butoxide	5308
Salt	1182
TOTAL MISCELLANEOUS:	8388

TOTAL PESTICIDE USE: 1783181

Herbicides:	25%
Insecticides:	30%
Fungicides:	43%
Rodenticides:	<1%
Growth Regulators:	<1%
Fumigants:	2%
Bactericides:	<1%
Miscellaneous:	<1%

TABLE II. Highest use compounds in 1988 from the main pesticide categories. Shown are compounds $\geq 5\%$ of class.

Compound	Lbs active ingredient	% of class	% of total use
HERBICIDES:			
Metolachlor	98379	22%	5.5%
Alachlor	49050	11%	2.8%
Diethatyl ethyl	47677	11%	2.7%
Atrazine	45813	10%	2.6%
Linuron	28190	6%	1.6%
Chlorthal-dimethyl	20656	5%	1.2%
INSECTICIDES:			
Sodium Aluminoflur	158947	30%	8.9%
Oil	76182	14%	4.3%
Parathion	30784	6%	1.7%
Carbofuran	29954	6%	1.7%
Azinphos-methyl	26034	5%	1.5%
Methomyl	24683	5%	1.4%
FUNGICIDES:			
Sulfur	459142	60%	25.7%
Mancozeb	79473	10%	4.5%
Captan	63942	8%	3.6%
Chlorothalonil	40724	5%	2.3%
FUMIGANTS:			
M Isothiocyanate	13778	52%	0.8%
Metam-Sodium	10892	41%	0.6%
Methyl Bromide	1490	6%	0.1%

TABLE III. Total pesticide amounts (in pounds active ingredient) applied to crops in 1988.

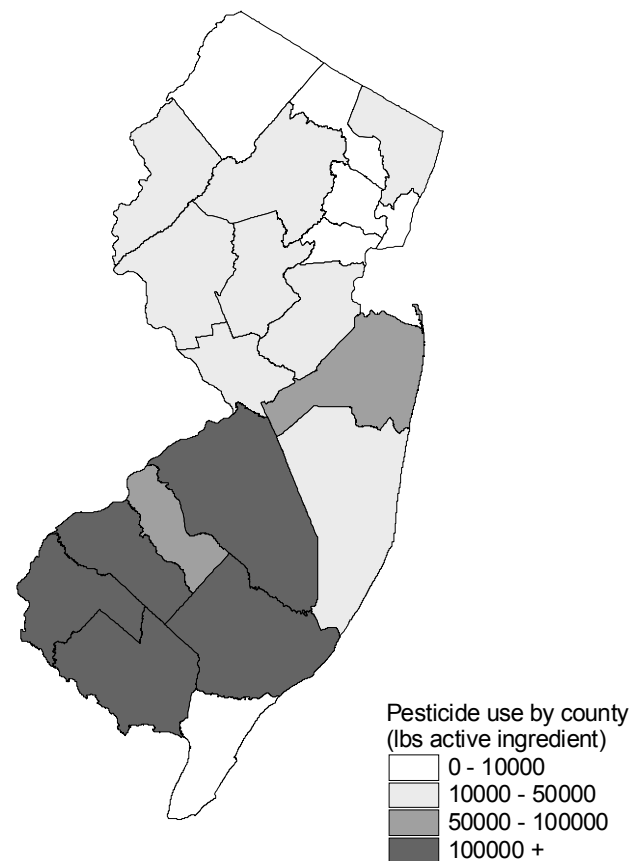
<u>CROP</u>	<u>AMOUNT</u>	<u>% of Pesticide Use</u>
Apples	212485	12%
Peaches	533315	30%
Other T Fruit	9576	1%
Blueberries	44858	3%
Cranberries	27150	2%
Strawberries	5865	0%
Grapes	3678	0%
Sweet Corn	32835	2%
Field Corn	143522	8%
Grains	3973	0%
Soybeans	119317	7%
Beans/Peas	28181	2%
Solanaceous	80787	4%
Vine Crops	39060	2%
Cole Crops	42897	2%
Leafy Veggies	93982	5%
Potatoes	211865	12%
Ornamentals	81599	7%
Sod	20888	1%
Livestock	29	0%
Miscellaneous*	6289	0%
ALL CROPS	1783181	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.

TABLE IV. Total pesticide amounts (lbs active ingredient) applied by county in 1988.

COUNTY	Amount	% of Total Use
Atlantic	166592	9%
Bergen	10809	1%
Burlington	196716	11%
Camden	93620	5%
Cape May	9526	1%
Cumberland	323130	18%
Essex	773	<1%
Gloucester	435680	24%
Hudson	0	0%
Hunterdon	38634	2%
Mercer	23709	1%
Middlesex	35723	2%
Monmouth	92908	5%
Morris	10345	1%
Ocean	13254	1%
Passaic	720	<1%
Salem	256716	14%
Somerset	15829	1%
Sussex	8684	1%
Union	2512	<1%
Warren	46981	3%
not listed*	321	0.0%
TOTAL	1783181	100.0%

1988 Agricultural Pesticide Use by County



*actual location of agricultural establishment is uncertain.