New Jersey Department of Environmental Protection (NJDEP)
Division of Water Resource Management
Bureau of Pesticide Control, Licensing & Registration
Pesticide Evaluation and Monitoring Section

LAWN CARE PESTICIDE USE IN NEW JERSEY: 2022 SURVEY

Introduction

The Pesticide Evaluation & Monitoring Section (PEMS) 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 lawn care survey is conducted every three years and targets pesticides used for lawn care purposes. The lawn care survey includes commercial applications of pesticides to control pests in the maintenance and production of turf, vegetation control on commercial and residential sites, flea and tick control in turf areas, and soil fumigation for turf. This report focuses on the eleventh survey completed in the lawn care series (2022).

All statewide pesticide use surveys are performed under the authority of the New Jersey Pesticide Control Code (NJPCP), N.J.A.C. 7:30-6.8(d) et.seq., requiring licensed applicators to maintain pesticide records for three years and to submit use records to the state when requested. This regulative authority provides a level of response that is difficult to duplicate in a voluntary, nationwide survey.

The information collected from the PEMS 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.

Survey Methods

The NJDEP Bureau of Pesticide Control, Licensing and Registration's records were used to identify 3,396 licensed commercial applicators holding a 3B (turf) category on their license. Survey forms were mailed along with instructional letters asking for only 2022 lawn care pesticide use. A total of three mailings (the first to lawn care businesses, the second to individuals and the third to non-respondents) were sent during the first four months of 2023.

The survey requested information on each pesticide product used, including trade name, EPA registration number, percent active ingredient, amounts applied, and number of acres treated. The data submitted by the applicators is used to compile the survey results. PEMS relies on the regulated community to provide data that accurately reflects their pesticide applications for the survey year; information contained within this report is based on the information provided at the time of the survey.

Survey information was entered into a database file. This information file was then merged with a second database that linked trade names with chemical names, and a subprogram converted reported amounts of formulated product to amounts of active ingredient (lbs. a.i.).

Results & Discussion

Once all three mailings were completed, 2,525 out of 3,396 (74%) applicators responded. Response rates have been steadily declining since the first survey in 1990, and there was a 2% decrease in response rate from the 2019 survey. Many surveys are being returned because applicators do not update their mailing addresses to stay current. PEMS forwarded a list of non-responders to the Bureau of Pesticide Control, Licensing and Registration for follow-up. Pesticides used by the lawn care industry in New Jersey for 2022 totaled 423,553 lbs. a.i. This is a 35% decrease from the total of 654,708 lbs. a.i. applied in 2019.

Table 1 lists all the compounds reported in the 2022 survey and the amounts (lbs. a.i.) applied. Herbicides comprise 85% of the total pesticide use in the New Jersey lawn care industry. Fungicides (6%), insecticides (9%), growth inhibitors (<1%) and miscellaneous compounds (<1%) account for the rest. Miscellaneous compounds include products such as bird repellents, pH neutralizing agents, antimicrobials and miticides.

Table 1. Pesticide amounts (lbs. a.i.) reported in the New Jersey 2022 Lawn Care Pesticide Use Survey. *Indicates a compound not reported in the 2019 survey.

HERBICIDES	lbs. a.i.	HERBICIDES	lbs. a.i.
2,4-D	123,712	Ethofumesate	2
2,4-DP	239	Fenoxaprop-ethyl	216
Amicarbazone	1	Florasulam	55
Ammonium nonanoate	56	Fluazifop-butyl	5
Atrazine*	3	Fluroxypyr-meptyl	8,181
Benefin	27	Glufosinate-ammonium	457
Benfluralin	17	Glyphosate	29,711
Bromacil	7	Halosulfuron-methyl	252
Capric acid	6	Imazapyr	241
Caprylic acid	7	Imazosulfuron	762
Carfentrazone-ethyl	124	Indaziflam	27
Clopyralid	120	Iron HEDTA	161
Dicamba	12,399	Isoxaben	430
Dichlobenil	8	MCPA	23,123
Dimethenamid	63	Mecoprop	17,913
Diquat	508	Mesotrione	245
Dithiopyr	25,807	Metsulfuron methyl*	7
Diuron	1,737	Oryzalin	38

Table 1 (cont.). Pesticide amounts (lbs. a.i.) reported in the New Jersey 2022 Lawn Care Pesticide Use Survey. *Indicates a compound not reported in the 2019 survey.

HERBICIDES	lbs. a.i.
Oxadiazon	26
Pelargonic acid	237
Pendimethalin	161
Penoxsulam	42
Prodiamine	87,906
Pyraflufen-ethyl	4
Pyrimisulfan*	2
Quinclorac	10,055
S-Metolachlor	9
Sethoxydim*	8
Siduron	1
Sulfentrazone	2,391
Sulfometuron	26
Topramezone	38
Treflan	477
Triclopyr	6,103
Trifluralin	5,920

GROWTH INHIBITORS	lbs.a.i.
Ethephon	66
Neem oil	841
Novaluron	3
Paclobutrazol	53
Pyriproxyfen	2
Trinexapac-ethyl	222

MISC	lbs. a.i.
Anthraquinone	75
Bacillus strains	14
Silver chloride*	6
Sulfuric acid	58

FUNGICIDES	lbs. a.i.
Acibenzolar	9
Azoxystrobin	1,669
Chlorothalonil	5,194
Cyazofamid	28
Fluazinam	200
Fludioxonil	2
Flumioxazin	200
Fluxapyroxad*	94
Iprodione	1,261
Isofetamid*	1
Mancozeb	161
Mandestrobin	1
Mefenoxam	15
Mefentrifluconazole	48
Myclobutanil	357
Penthiopyrad	11
Phosphorous acid salts*	3,046
Potassium phosphite*	3,765
Propamocarb HCL	85
Propiconazole	4,674
Prothioconazole*	1
Pyraclostrobin	114
Tebuconazole	891
Thiophanate-methyl	3,322
Thiram	1
Triadimefon	216
Trifloxystrobin	45
Triticonazole	6

Table 1 (cont.). Pesticide amounts (lbs. a.i.) reported in the New Jersey 2022 Lawn Care Pesticide Use Survey. *Indicates a compound not reported in the 2019 survey.

INSECTICIDES	lbs. a.i.
Acelepryn*	17
Acephate	37
Beta-cyfluthrin	42
Bifenthrin	10,092
Carbaryl	738
Chlorantraniliprole	119
Chlorpyrifos	99
Clothianidin	18
Cyantraniliprole	1
Cypermethrin	3
Deltamethrin	92
Dinotefuran	18
Flupyradifurone*	2
Halofenozide*	2
Imidacloprid	14,598
Indoxacarb	4
Lambda-cyhalothrin	2,677
Limonene	47
Mineral oil	6,334
Orthoboric acid*	3
PBO*	2
Permethrin	83
Soap	422
Spinosad	9
Tetraniliprole*	32
Trichlorfon	1,232

CATEGORY TOTALS:	lbs. a.i.
Herbicides	360,073
Insecticides	36,724
Fungicides	25,417
Growth Inhibitors	1,186
Miscellaneous	153

Table 2 lists the highest use compounds in the three main lawn care pesticide categories (lbs. a.i.) as listed in Table 1. The most highly reported pesticide products used in lawn care were 2,4-D formulations. These accounted for 29% of the herbicides used in New Jersey lawn care in 2022. 2,4-D is used to control broadleaf weeds in a variety of applications including agriculture, right of way and aquatic weed control. 2,4-D formulations can be liquid, dust or granular.

Table 2. Highest use compounds in the New Jersey 2022 Lawn Care Pesticide Use Survey from the main pesticide categories.

Compound	Total (lbs. a.i.)	% of Category	% of Total Usage
HERBICIDES			
2,4-D Formulations	123,712	34	29
Prodiamine	87,906	24	21
Dithiopyr	25,806	7	6
Glyphosate	29,711	8	7
INSECTICIDES			
Imidacloprid	14,598	40	3
Bifenthrin	10,092	25	2
Mineral Oil	6,334	16	1
Lambda-cyhalothrin	2,677	7	<1
FUNGICIDES			
Chlorothalonil	5,194	20	1
Propiconazole	4,675	18	1
Potassium phosphite	3,765	15	1
Thiophanate-methyl	3,322	13	1

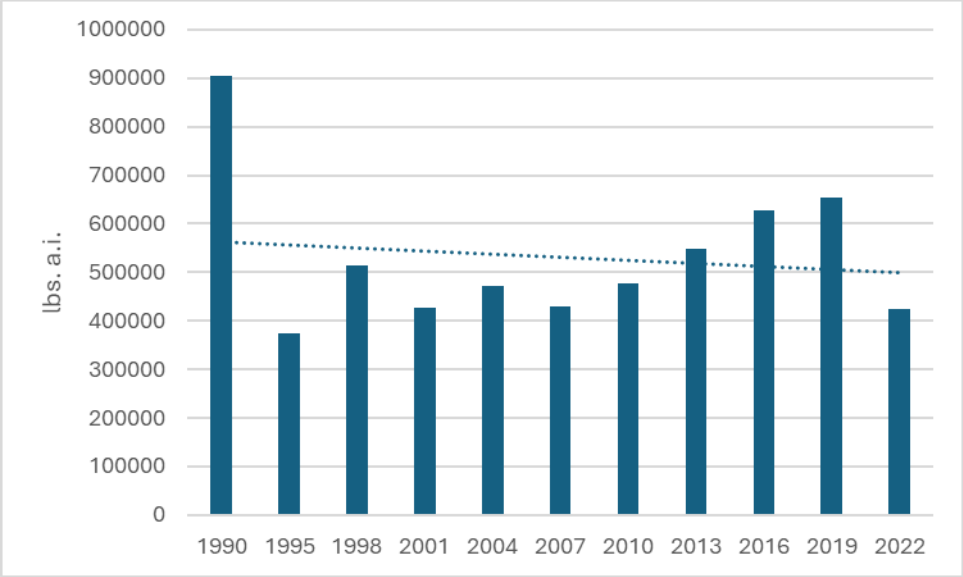
Table 3 shows lawn care pesticide use by county. Monmouth County had the highest use overall. Monmouth, Somerset, Bergen and Middlesex counties received nearly half of lawn care applications in New Jersey in 2022. It should be noted that county totals for lawn care pesticide use are difficult to quantify since many companies work in two or more counties and they do not report a total for each county, just total use over all their application sites. PEMS requests the respondents identify which county received most of their applications and that is the information entered into the database.

Table 3. Total pesticide amounts (lbs. a.i.) by county.

County	Total (lbs. a.i.)	% of Total Usage
Atlantic	4777	1
Bergen	44990	11
Burlington	34463	8
Camden	19684	5
Cape May	3893	1
Cumberland	4580	1
Essex	7022	2
Gloucester	26613	6
Hudson	380	0
Hunterdon	23136	5
Mercer	8804	2
Middlesex	41704	10
Monmouth	58582	14
Morris	30540	7
Ocean	16688	4
Passaic	15176	4
Salem	12415	3
Somerset	49889	12
Sussex	4179	1
Union	8261	2
Warren	7777	2

Figure 1 shows the total lbs. a.i. used in New Jersey for each lawn care survey conducted. The reported pesticide usage for lawn care has decreased by approximately 50% since the survey began in 1990. Since 1998, lawn care use averages around 500,000 lbs. a.i. per year.

Figure 1. Total lbs. a.i. used in New Jersey for each lawn care survey conducted (1990-2022).



Summary & Conclusions

Neonicotinoids, including imidacloprid, have become the most heavily used insecticides world-wide. Neonicotinoids have also been shown to have negative impacts on honeybees and other non-target pollinators. Imidacloprid continues to be the most heavily used insecticide in lawn and turf care in New Jersey, accounting for 40% of all the reported insecticides applied in 2022. In October of 2023, new legislation in New Jersey banned all outdoor uses of neonicotinoids (except agricultural uses). PEMS survey data will be an important tool in identifying what insecticides will be employed to replace imidacloprid in lawn and turf care.

Overall reported pesticide use in lawn and turf care in New Jersey decreased by over 215,000 lbs. a.i. between 2019 and 2022. A decrease in reported use of several herbicides accounts for the majority of the overall decrease, including 2,4-D, dithiopyr and glyphosate (approximately 143,000 fewer pounds of active ingredient reported for these three chemicals). The fungicide propiconazole also reported a 16,000 lbs. a.i. reduction in use between 2019 and 2022.

The most notable change in the use among the counties is the decrease in reported use in Warren County from 65,734 lbs. a.i. in 2019 to 7,777 lbs. a.i. in 2022. In 2022, Warren County accounted for 2% of the total reported lawn and turf care use in New Jersey. This is more consistent with the overall trend noted in previous surveys.

The purpose of this survey is to monitor overall use trends in New Jersey's lawn care industry. While it is important to note outliers in the survey data (as listed above), it is most important to

evaluate the data as a whole, while keeping in mind that the data is being provided by licensed pesticide applicators, not pesticide research scientists. While reporting errors may occur and go unnoticed during the data entry process, pesticide applicators are still the best source of use information that is specific to New Jersey. To that end, PEMS is currently under contract with Rutgers to create an online platform for the licensed pesticide applicators to self-submit their use data in an electronic format. The hope is that this format will reduce potential errors generated when the data is manually entered into an Access database by PEMS staff.