

GOLF COURSE PESTICIDE USE IN NEW JERSEY – 2014 SURVEY

The New Jersey Pesticide Control Program (NJPCP) began a series of golf course pesticide use surveys in 1990. The specific purpose of this project is to identify what chemicals and how much of each are being used in on golf courses for trends analysis. A more general purpose of the survey is to supplement data gathered from previous pesticide use surveys for addressing the impact of pesticide use statewide. The survey is conducted every three years. This report focuses on the 2014 survey.

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 represent a pesticide usage census rather than a probabilistic survey.

For 2014 data, surveys were mailed to all New Jersey golf courses at the end of 2013. Survey forms, along with instructional letters and a return envelope, were mailed to the superintendent or responsible applicator asking for their 2014 pesticide use. A list of these golf courses was kept in the office and marked off as surveys were returned. Second and third mailings, the third being certified, were made to non-respondents indicating that the previously mailed survey had not been received.

Each survey form received by the PCP was entered into a database. When the data entry was completed the database was reviewed for any duplication of entries. Subroutines in the database identified active ingredients and calculated pounds of active ingredients from the information supplied by the applicators.

Once all three mailings were completed, 256 out of 293 (87%) surveys were received.

Table 1 lists the chemicals and their respective amounts appearing in the survey. Fungicides dominate golf course pesticide use.

Table 2 selects out the highest use compounds. Chlorothalonil was by far the most commonly used pesticide in 2014 on golf courses.

Table 3 lists pesticide use on golf courses by county and the number of golf courses surveyed in each county.

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. 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 1. Pesticide amounts (lbs active ingredient) reported in the New Jersey 2014 Golf Course Pesticide Use Survey.

HERBICIDES:

2,4-D	6359
2,4-DP	166
2,4-DT	123
Benfluralin	<1
Bensulide	1590
Bentazon	18
Bispyribac-sodium	<1
Carfentrazone	38
Clopyralid	371
Dicamba	1241
Dimethenamid	83
Dithiopyr	3409
DSMA,MSMA	165
Ethofumesate	80
Fenoxaprop-ethyl	68
Fluazifop-butyl	18
Flumiclorac-pentyl	58
Flumioxazin	1
Fluroxypyr-meptyl	18
Glufosinate-ammonium	8
Glyphosate	3081
Halosulfuron	22
Isoxaben	40
Lactofen	206
MCPA	873
Mecoprop	1493
Mefenoxam	432
Mesotrione	56
Metalochlor	368
Metsulfuron	27
Oryzalin	30
Oxadiazon	537
Pelargonic acid	12
Pendimethalin	1540
Prodiamine	1364
Quinclorac	453
Sethoxydim	219
Siduron	192
Sulfentrazone	220
Sulfosulfuron	<1

Triclopyr	766
Trifluralin	<1
TOTAL HERBICIDES:	25745

INSECTICIDES:

Bacillus (biological)	<1
Bendiocarb	46
Bifenazate	<1
Bifenthrin	731
Carbaryl	3460
Chlorantraniliprole	374
Chlorpyrifos	8596
Clothianidin	545
Cyfluthrin	11
Cyhalothrin	114
Deltamethrin	<1
Halofenozide	17
Imidacloprid	3384
Indoxacarb	792
Isofenphos	4
Oil	3513
Permethrin	<1
Spinosad	1769
Thiamethoxam	54
Trichlorfon	4423
TOTAL INSECTICIDES:	27829

FUNGICIDES:

Azoxystrobin	1155
Boscalid	2589
Chlorothalonil	143337
Copper	33
Cyazofamid	887
Etridiazole	1092
Fenarimol	30
Fludioxonil	459
Fluoxastrobin	245

Flutolanil	531
Fosetyl-al	23996
Iprodione	22712
Mancozeb	5328
Metalaxyl	661
Metconazole	467
Myclobutanil	379
Polyoxin D	180
Potassium phosphite	785
Propamocarb HCl	5171
Propiconazole	10907
Pyraclostrobin	1486
Quintozene	3986
Tebuconazole	3993
Thiophanate-methyl	11957
Thiram	3260
Triadimefon	4846
Trifloxystrobin	963
Triticonazole	1184
Vinclozolin	8740
TOTAL FUNGICIDES:	261359

TOTAL MISC: 173

TOTAL PESTICIDE USE: 324703

Herbicides:	8 %
Insecticides:	6 %
Fungicides:	81 %
Growth Reg:	3 %
Bird Repellents:	<1 %
Miscellaneous	<1%

GROWTH REGULATORS:

Ethephon	3269
Flurprimidol	657
Mefluidide	68
Paclobutrazol	1172
Trinexapac-ethyl	4414
TOTAL GROWTH REG:	9580

BIRD REPELLENTS

Anthraquinone	17
TOTAL REPELLENTS:	17

MISCELLANEOUS

Hydrogen peroxide	81
Phosphoric acid	92

Table 2. Highest use compounds from the main pesticide categories; 2014 golf course survey. Shown are compounds $\geq 5\%$ of class.

Compound	Lbs active ingredient	% of class	% of total use
HERBICIDES:			
2,4-D	6359	25 %	2 %
Glyphosate	3081	12 %	1 %
Dithiopyr	3409	13 %	1 %
Bensulide	1590	6 %	<1 %
Pendimethalin	1540	6 %	<1 %
Mecoprop	1493	6 %	<1 %
INSECTICIDES:			
Chlorpyrifos	8596	31 %	3 %
Trichlorfon	4423	16 %	1 %
Oil	3513	13 %	1 %
Carbaryl	3460	12 %	1 %
Imidacloprid	3384	12 %	1 %
FUNGICIDES:			
Chlorothalonil	143337	55 %	44 %
Fosetyl-al	23996	9 %	7 %
Iprodione	22712	7 %	7 %
Thiophanate-methyl	11957	5 %	4 %
GROWTH REGULATORS:			
Trinexapac-ethyl	4414	46 %	1 %
Ethephon	3269	34 %	1 %
Paclobutrazol	1172	12 %	<1 %

Table 3. Total pesticide amounts (in pounds active ingredient) by county; 2014 golf course survey.

<u>COUNTY</u>	<u># of Courses</u>	<u>Amount lbs ai</u>	<u>% of Total</u>
Atlantic	21	24201	7 %
Bergen	19	30563	9 %
Burlington	14	19209	6 %
Camden	8	8950	3 %
Cape May	7	10481	3 %
Cumberland	2	386	<1 %
Essex	15	19907	6 %
Gloucester	9	7174	2 %
Hudson	2	4920	2 %
Hunterdon	7	10493	3 %
Mercer	10	8905	3 %
Middlesex	13	16017	5 %
Monmouth	29	39137	12 %
Morris	18	20933	6 %
Ocean	23	19386	6 %
Passaic	6	18610	6 %
Salem	5	3906	1 %
Somerset	21	37478	12 %
Sussex	14	7610	2 %
Union	10	17732	5 %
Warren	7	4488	1 %