NJ Department of Environmental Protection
Pesticide Control Program
Pesticide Evaluation & Monitoring

GOLF COURSE PESTICIDE USE IN NEW JERSEY – 2008 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 2008 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 almost represent a pesticide usage census rather than a probabilistic survey.

For 2008, surveys were mailed to all New Jersey golf courses. Survey forms, along with instructional letters and a return envelope, were mailed to the superintendent or responsible applicator asking for their 2008 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, 276 out of 298 (93%) 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 2008 on golf courses.

Table 3 shows pesticide use by site. Applications are relatively equal between Green/Tee and Fairway areas.

Table 4 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 2008 Golf Course Pesticide Use Survey.

HERBICIDES:

2,4-D	2610
2,4-DP	31
2,4-DT	698
Alachlor	9
Benfluralin	263
Bensulide	1867
Bentazon	<1
Bispyribac-sodium	6
Carfentrazone	22
Chlorsulfuron	2
Chlorthal-dimethyl	89
Clopyralid	412
Dicamba	853
Diquat	<1
Dithiopyr	5656
DSMA,MSMA	387
Ethofumesate	57
Fenoxaprop-ethyl	102
Flumiclorac-pentyl	16
Fluroxypyr	54
Glufosinate-ammonium	23
Glyphosate	380
Halosulfuron	14
Isoxaben	41
Lactofen	57
MCPA	218
Mecoprop	989
Mefenoxam	323
Mesotrione	25
Metalochlor	53
Oryzalin	37
Oxadiazon	312
Pelargonic acid	153
Pendimethalin	1501
Prodiamine	3370
Quinclorac	382
Sethoxydim	33
Siduron	266
Sulfentrazone	61
Triclopyr	567
Trifluralin	58
TOTAL HERBICIDES:	21997

INSECTICIDES:

Abamectin	<1
Bacillus (biological)	<1
Bifenthrin	501
Carbaryl	3591
Chlorantraniliprole	11
Chlorpyrifos	2294
Clothianidin	2
Cyfluthrin	135
Cyhalothrin	130
Deltamethrin	9
Dimethoate	620
Fenamiphos	54
Fluvalinate	1
Halofenozide	338
Imidacloprid	3581
Indoxacarb	131
Lindane	<1
Metaldehyde	114
Permethrin	26
Pyrethrins	1
Thiamethoxam	186
Trichlorfon	3066
TOTAL INSECTICIDES:	14791

FUNGICIDES:

Azoxystrobin	751
Boscalid	807
Captan	<1
Chloroneb	293
Chlorothalonil	136152
Copper	118
Cyazofamid	18
Etridiazole	476
Fenarimol	71

Fludioxonil	391
Fluoxastrobin	9
Flutolanil	1478
Fosetyl-al	30066
Iprodione	19015
Mancozeb	8323
Metalaxyl	1012
Metconazole	3
Myclobutanil	518
Polyoxin D	239
Potassium phosphite	4761
Propamocarb HCl	8369
Propiconazole	6173
Pyraclostrobin	560
Quintozene	5100
Thiophanate	4410
Thiophanate-methyl	7718
Thiram	4977
Triadimefon	11357
Trifloxystrobin	1799
Triticonazole	1314
Vinclozolin	10038
TOTAL FUNGICIDES:	266316

GROWTH REGULATORS:

Dikegulac sodium	2
Ethephon	3530
Flurprimidol	316
Mefluidide	86
Paclobutrazol	758
Trinexapac-ethyl	2337
TOTAL GROWTH REG:	7029

BIRD REPELLENTS

Anthraquinone	33
TOTAL REPELLENTS:	33

MISCELLANEOUS

Ammonium chloride	167
Hydrogen peroxide	246
PBO	5
Phosphoric acid	430
TOTAL MISC:	848

TOTAL PESTICIDE USE: 311014 lbs ai

Herbicides:	7 %
Insecticides:	5 %
Fungicides:	85 %
Growth Reg:	2 %
Bird Repellents:	<1%
Miscellaneous	<1%

Table 2. Highest use compounds from the main pesticide categories; 2008 golf course survey. Shown are compounds >= 5% of class.

Compound	Lbs active ingredient	% of class	% of total use
HERBICIDES:			
Dithiopyr	5656	26 %	1.8 %
Prodiamine	3370	15 %	1.1 %
2,4-D	2610	12 %	0.8 %
Bensulide	1867	8 %	0.6 %
Pendimethalin	1501	7 %	0.5 %
Mecoprop	989	5 %	0.3 %
INSECTICIDES:			
Carbaryl	3591	24 %	1.1 %
Imidacloprid	3581	24 %	1.1 %
Trichlorfon	3066	21 %	1.0 %
Chlorpyrifos	2294	16 %	0.7 %
FUNGICIDES:			
Chlorothalonil	136152	51 %	43.7 %
Fosetyl-al	30066	11 %	9.6 %
Iprodione	19015	7 %	6.1 %
GROWTH REGULATORS:			
Ethephon	3530	50 %	1.1 %
Trinexapac-ethyl	2337	33 %	0.7 %
Paclobutrazol	758	11 %	0.2 %

Table 3. Total pesticide amounts (in pounds active ingredient) applied to the various sites, 2008 golf course survey.

SITE	AMOUNT	% Total
Greens/Tees	147769	48 %
Fairways	134432	43 %
Rough	28813	9 %

Table 4. Total pesticide amounts (in pounds active ingredient) by county; 2008 golf course survey.

COUNTY	# of Courses	Amount lbs ai	% of Total
Atlantic	20	26401	8 %
Bergen	18	27286	9 %
Burlington	17	25905	8 %
Camden	10	10930	3 %
Cape May	8	11441	4 %
Cumberland	2	785	<1 %
Essex	15	27494	9 %
Gloucester	6	4356	1 %
Hudson	2	4087	1 %
Hunterdon	5	6442	2 %
Mercer	11	8402	3 %
Middlesex	14	17514	6 %
Monmouth	27	40259	13 %
Morris	14	18016	6 %
Ocean	16	15346	5 %
Passaic	6	8128	3 %
Salem	2	922	<1 %
Somerset	17	31021	10 %
Sussex	12	7109	2 %
Union	9	13967	4 %
Warren	7	5203	2 %