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

# GOLF COURSE PESTICIDE USE IN NEW JERSEY – 1996 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 1996 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 1996, 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 1996 pesticide use. A list of these golf courses was kept in the office and marked off as surveys were returned. Second and third mailings 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, 205 out of 223 (92%) surveys were received. Two courses indicated no use or out of business.

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 1996 on golf courses, followed by mancozeb and fosetyl-al (all fungicides.)

Table 3 shows pesticide use by site. Fairways received the highest overall pesticide use.

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. 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 1**. Pesticide amounts (lbs active ingredient) reported in the New Jersey 1996 Golf Course Pesticide Use Survey.

**HERBICIDES**:

| | |
|---|---|
| 2,4-D | 2806 |
| 2,4-DP | 114 |
| Benfluralin | 1289 |
| Bensulide | 3477 |
| Bentazon | 24 |
| Bromoxynil | 7 |
| Chlorsulfuron | 11 |
| Chlorthal-dimethyl | 571 |
| Clopyralid | 36 |
| Dicamba | 488 |
| Dithiopyr | 1336 |
| DSMA,MSMA | 108 |
| Ethofumesate | 314 |
| Fenoxaprop-ethyl | 215 |
| Glufosinate-ammonium | 44 |
| Glyphosate | 222 |
| Isoxaben | 22 |
| Mecoprop | 2078 |
| Metalochlor | 62 |
| Oryzalin | 49 |
| Oxadiazon | 253 |
| Paraquat | 1 |
| Pelargonic acid | 1 |
| Pendimethalin | 3089 |
| Prodiamine | 293 |
| Sethoxydim | <1 |
| Siduron | 365 |
| Triclopyr | 98 |
| Trifluralin | 102 |
| TOTAL HERBICIDES: | 17475 |

**INSECTICIDES**:

| | |
|---|---|
| Acephate | 5 |
| Bendiocarb | 2934 |
| Bt | <1 |
| Carbaryl | 2788 |
| Chlorpyrifos | 5475 |
| Cyfluthrin | 116 |
| Cyhalothrin | 52 |
| DDVP | 7 |
| Diazinon | 6 |
| Dimethoate | 1178 |
| Fenamiphos | 88 |
| Fluvalinate | 9 |
| Fonofos | 20 |
| Imidacloprid | 1877 |
| Isazofos | 163 |
| Isofenphos | 307 |
| Metaldehyde | 176 |
| Soap | 134 |
| Trichlorfon | 4197 |
| TOTAL INSECTICIDES: | 19532 |

**FUNGICIDES**:

| | |
|---|---|
| Ammonium chloride | 12 |
| Anilazine | 1142 |
| Benomyl | 39 |
| Chloroneb | 852 |
| Chlorothalonil | 85689 |
| Copper | 14 |
| Cyproconazole | 362 |
| Etridiazole | 968 |
| Fenarimol | 210 |
| Flutolanil | 1598 |
| Fosetyl-al | 17510 |
| Iprodione | 10297 |
| Mancozeb | 26526 |
| Mercurous Chloride | 222 |
| Metalaxyl | 3558 |
| Myclobutanil | 146 |
| PMA | 37 |
| Propamocarb HCl | 14552 |
| Propiconazole | 1837 |
| Quintozene | 5406 |
| Thiophanate | 8678 |
| Thiophanate-methyl | 360 |
| Thiram | 8722 |
| Triadimefon | 4885 |

| | |
|---|---|
| Vinclozolin | 5704 |
| TOTAL FUNGICIDES: | 199326 |

**GROWTH HORMONES**:

| | |
|---|---|
| Amidochlor | 3 |
| Azadirachtin | <1 |
| Ethephon | <1 |
| Flurprimidol | 249 |
| Mefluidide | 217 |
| Paclobutrazol | 206 |
| Trinexapac-ethyl | 190 |
| TOTAL GR HORMONES: | 865 |

**TOTAL PESTICIDE USE: 237198**

| | |
|---|---|
| Herbicides: | 7.4% |
| Insecticides: | 8.2% |
| Fungicides: | 84.0% |
| Growth Hormones: | 0.4% |

**Table 2**. Highest use compounds from the main pesticide categories, 1996 golf course survey. Shown are compounds >= 2% of class.

| Compound | Lbs active ingredient | % of class | % of total use |
|---|---|---|---|
| HERBICIDES: | | | |
| Bensulide | 3477 | 19.9% | 1.5% |
| Pendimethalin | 3089 | 17.7% | 1.3% |
| 2,4-D | 2806 | 16.1% | 1.2% |
| Mecoprop | 2078 | 11.9% | 0.9% |
| Dithiopyr | 1336 | 7.6% | 0.6% |
| Benfluralin | 1289 | 7.4% | 0.5% |
| Chlorthal-dimethyl | 571 | 3.3% | 0.2% |
| Dicamba | 488 | 2.8% | 0.2% |
| Siduron | 365 | 2.1% | 0.2% |
| INSECTICIDES: | | | |
| Chlorpyrifos | 5475 | 28.0% | 2.3% |
| Trichlorfon | 4197 | 21.5% | 1.8% |
| Bendiocarb | 2934 | 15.0% | 1.2% |
| Carbaryl | 2788 | 14.3% | 1.2% |
| Imidacloprid | 1877 | 9.6% | 0.8% |
| Dimethoate | 1178 | 6.0% | 0.5% |
| FUNGICIDES: | | | |
| Chlorothalonil | 85689 | 43.0% | 36.1% |
| Mancozeb | 26526 | 13.3% | 11.2% |
| Fosetyl-al | 17510 | 8.8% | 7.4% |
| Propamocarb HCl | 14552 | 7.3% | 6.1% |
| Iprodione | 10297 | 5.2% | 4.3% |
| Thiophanate/T-methyl | 9038 | 4.6% | 3.9% |
| Thiram | 8722 | 4.4% | 3.7% |
| Vinclozolin | 5704 | 2.9% | 2.4% |
| Quintozene | 5406 | 2.7% | 2.3% |
| Triadimefon | 4885 | 2.5% | 2.1% |
| GROWTH HORMONES: | | | |
| Flurprimidol | 249 | 28.8% | 0.1% |
| Mefluidide | 217 | 25.1% | 0.1% |
| Paclobutrazol | 206 | 23.8% | 0.1% |
| Trinexapac-ethyl | 190 | 22.0% | 0.1% |

**Table 3**. Total pesticide amounts (in pounds active ingredient) applied to the various sites, 1996 golf course survey.

| SITE | AMOUNT | % Total |
|---|---|---|
| Greens/Tees | 98789 | 42% |
| Fairways | 127020 | 53% |
| Rough | 11318 | 5% |
| No site code | 71 | 0% |

**Table 4**. Total pesticide amounts (in pounds active ingredient) by county, 1996 golf course survey.

| COUNTY | # of Courses | Amount | % of Total |
|---|---|---|---|
| Atlantic | 11 | 7683 | 3.2% |
| Bergen | 19 | 22647 | 9.5% |
| Burlington | 17 | 24769 | 10.5% |
| Camden | 8 | 8533 | 3.6% |
| Cape May | 6 | 5845 | 2.5% |
| Cumberland | 2 | 571 | 0.2% |
| Essex | 17 | 22161 | 9.3% |
| Gloucester | 5 | 3108 | 1.3% |
| Hudson | 0 | 0 | 0.0% |
| Hunterdon | 4 | 7861 | 3.3% |
| Mercer | 10 | 9201 | 3.9% |
| Middlesex | 11 | 13226 | 5.6% |
| Monmouth | 22 | 33997 | 14.3% |
| Morris | 17 | 15186 | 6.4% |
| Ocean | 10 | 7796 | 3.3% |
| Passaic | 5 | 7200 | 3.0% |
| Salem | 4 | 1327 | 0.6% |
| Somerset | 12 | 17811 | 7.5% |
| Sussex | 8 | 7717 | 3.3% |
| Union | 11 | 16446 | 6.9% |
| Warren | 4 | 4116 | 1.7% |
| | 203 | 237198 | 100.0% |