

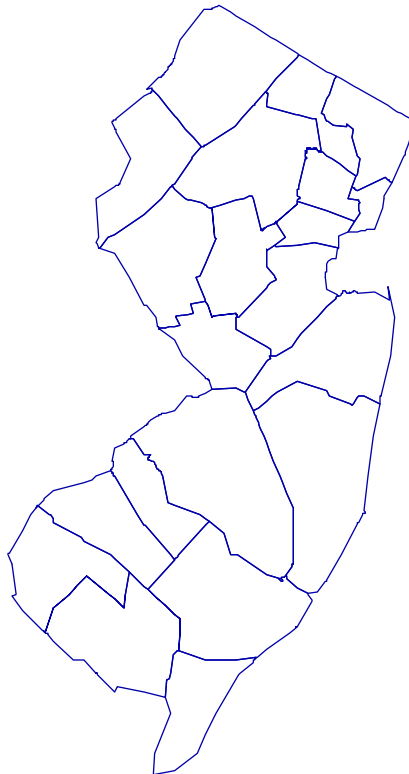


N.J. Department of Environmental Protection and Energy  
Environmental Safety, Health and Analytical Programs  
Pesticide Control Program

**RUTGERS COOPERATIVE EXTENSION**

NEW JERSEY AGRICULTURAL STATION

# **PESTICIDE USE IN NEW JERSEY**



**A Survey of Golf Courses and Lawn Care Applicators**

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## **BACKGROUND**

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In 1991, two pesticide use surveys were conducted to estimate the load of pesticides applied to turf areas by commercial applicators in New Jersey. These surveys, which covered the use of turf pesticides during 1990 included the public and private golf courses in New Jersey (the Golf Course Survey), and the lawn care industry (the Lawn Care Survey). Both are described in separate sections below. Right-of-way treatments were also included in the lawn care survey. Not covered in these surveys were sod farms and homeowner (unlicensed) pesticide use.

The purpose of these surveys was to supplement the information gathered from previous agricultural pesticide use surveys, and to further address the impact of the types and amounts of pesticides currently in use in the state.

Both the Golf Course survey and the Lawn Care survey were developed by the Pesticide Control Program (PCP) of the New Jersey Department of Environmental Protection and Energy (NJDEPE) with the assistance of Rutgers Cooperative Extension (RCE). Funds for these two surveys were provided by the NJDEPE PCP and a grant from USDA Cooperative States Research Service (CSRS).

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## **SURVEY PROCEDURES**

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### **The Golf Course Survey**

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A survey form was mailed to all public and most private New Jersey golf course superintendents requesting the following information:

1. Golf course name
2. County
3. Municipality
4. Pesticide name (trade/common)
5. Formulation
6. EPA registration number
7. Amount used (pounds/gallons)
8. Site

The site codes included:

1. Fairways
2. Greens/Tees
3. Rough/Out of bounds
4. Water areas

Survey forms, along with an instructional letter and return envelope, were sent to public and private golf courses in December of 1990 asking for their use records for the 1990 season. A second mailing, including another survey form and cover letter, was sent to non-respondents indicating that the initial survey had not been received.

To analyze the information received a database which included all the information requested was designed using DBase III+ (Ashton-Tate). Upon receipt of the survey form by PCP, each response was logged in and entered into the database. In addition to the usage information requested, the responsible applicator's name and license number were also entered. When all responses were received, the database entries were reviewed for any duplication of entries in a final quality assurance check. Sub-routines in the database identified the active ingredient(s) from the tradenames, and calculated the pounds of active ingredients from the formulations.

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### **The Lawn Care Survey**

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A survey form was mailed out to all commercial applicators carrying a "3B" (turf) or "6" (right-of-way) category code on their applicator license requesting the following information:

1. Most commonly treated municipality
2. Pesticide name (trade/common)
3. Formulation
4. EPA registration number
5. Amount used (pounds/gallons)
6. Approximate acreage treated

Survey forms, along with an instructional letter and return envelope, were mailed out in December of 1990 asking the applicators for their 1990 pesticide use. A second mailing, including another survey form and cover letter, was sent to non-respondents indicating that the initial survey had not been received.

A separate database was designed for the lawn care data following the same procedures as the golf course survey.

### **Crossover Between the Surveys**

Some Category 3B licensed applicators received both the lawn care and golf course surveys. This duplication occurred because golf course superintendents are required to obtain the same license as professional landscapers in order to apply or supervise the application of turf pesticides. License numbers between the two databases were com-

pared and when duplicate records were found, the records in question were removed from the lawn care database. This was done because of the specificity of golf course locations. Due to this uniqueness, inclusion of the duplicate information into the golf course database was deemed a higher priority.

## RESULTS

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For both the golf course and lawn care surveys, all pesticide formulations were converted to their appropriate amount of active ingredient (a.i.).

### The Golf Course Survey

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Based on both the initial and followup mailings, 204 out of 219 or 93% of private and public golf courses canvassed responded.

Pesticide usage by type of pesticide applied (herbicide, insecticide, fungicide, growth hormone) on golf courses in 1990 is presented in Figure 1. Fungicide usage was substantially higher than all the others, totalling 126,919 lbs a.i. or 63.6% of the total pesticide usage. Herbicide usage was second (40,179 lbs a.i. or 20.1% of total usage) followed by insecticides (31,195 lbs a.i. or 15.6% of total usage). Growth hormone usage was by far the smallest group, totalling 1,159 lbs a.i. or 0.6% of the total use pattern.

The ten most applied pesticides on golf courses in 1990 are presented in Figure 2. The top three were fungicides: chlorothalonil (44,670 lbs a.i.), thiram (15,714 lbs a.i.), and the EBDCs (13,732 lbs a.i.). The highest use herbicide was chlorthal-dimethyl, or DCPA. Trichlorfon had the highest use for insecticides (8,061 lbs a.i.).

Figure 3 illustrates the highest use herbicides on golf courses in 1990. The most commonly used herbicide was by far chlorthal-dimethyl (12,793 lbs a.i.). Its use pattern was almost double the use of bensulide (6,715 lbs a.i.) which occupied the number two spot.

Figure 4 illustrates the highest use insecticides on golf courses in 1990. The insecticides with the largest use patterns were trichlorfon (8,088 lbs a.i.), isofenphos (6,408 lbs a.i.), bendiocarb (6,156 lbs a.i.), chlorpyrifos (5,003 lbs a.i.), and carbaryl (4,115 lbs a.i.).

The highest use fungicides on golf courses in 1990 are presented in Figure 5. Chlorothalonil (45,059 lbs a.i.) usage was by far the most commonly applied fungicide. Its use almost tripled the use of thiram (15,714 lbs a.i.) or the EBDCs (13,783 lbs a.i.) which occupied the number two and three spots, respectively.

Figure 6 illustrates the distribution of pesticide treatments on the three major sites of a golf course. The fairways receive approximately 57% of the applied pesticides, the greens/tees 34%, and the rough areas 9%. The green/tee sites exhibit the heaviest loading of pesticides per square foot, since they occupy only 5-10% of the golf course's total area and receive close to one third of the pesticides applied.

The pesticide use totals by county are presented in Figures 7. Bergen, Union, Monmouth, Essex, and Somerset counties showed the heaviest pesticide use on golf courses in 1990. While Bergen and Monmouth counties represented the greatest number of courses and amount of use, it is interesting to note some wide differences between counties with the same number of courses. For example, Union's total pesticide use was more than four times Atlantic's use, despite their equal count of 11 courses each.

### The Lawn Care Survey

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Of the 3,472 lawn care applicators surveyed, 2,664 or 77% involved responded. This level of response, while lower than for the golf course survey, represents the bulk of the material applied. The lower response rate is due partly to duplicate returns by golf course superintendants and to lawn care companies employing more than one licensed applicator.

Pesticide usage by type of pesticide applied (herbicide, insecticide, fungicide, growth hormone) for lawn care in 1990 is presented in Figure 8. Herbicide use was substantially higher than all the others, totalling 768,210 lbs a.i. or 84.8% of the total pesticide usage. Insecticide usage was second (115,395 lbs a.i. or 12.7% of total usage) followed by fungicides (21,689 lbs a.i. or 2.4% of total usage). Growth hormones were by far the smallest group, totalling 835 lbs a.i. or 0.1% of the total use.

The ten most applied pesticides for lawn care in 1990 are presented in Figure 9. The top three were herbicides: 2,4-D, (215,928 lbs a.i.), mecoprop (190,598 lbs a.i.), and pendimethalin (152,646 lbs a.i.). Their usage patterns dwarf by comparison the use of any of the other pesticides categorized as high use. The highest use insecticide is trichlorfon (34,794 lbs a.i.).

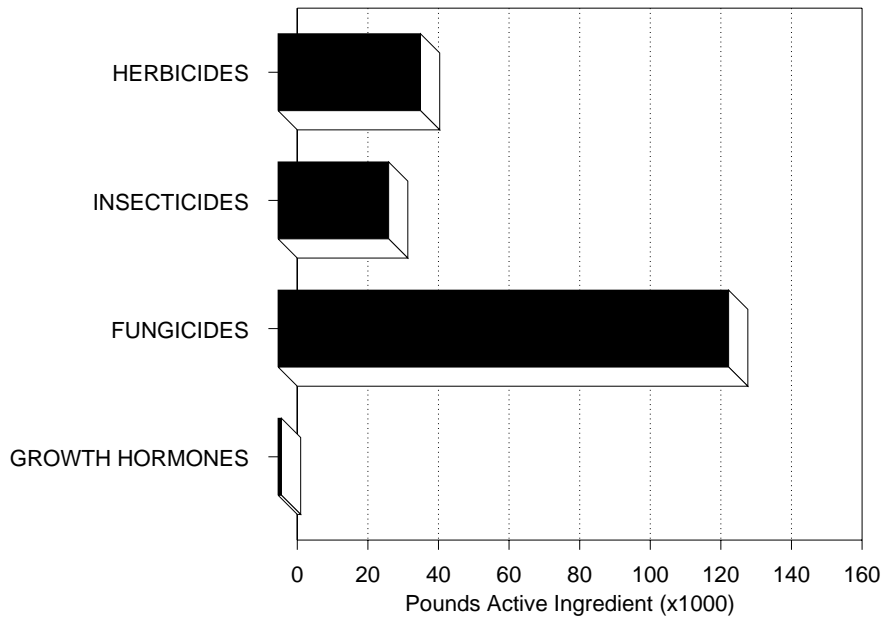


Figure1. Pesticide Usage by Type of Pesticide Applied, 1990 Golf Course Survey.

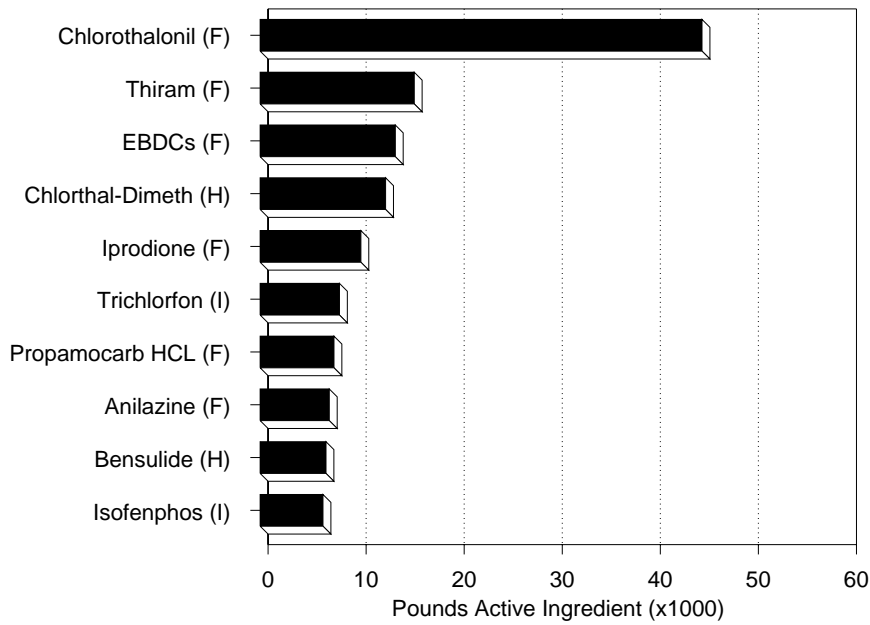


Figure2. Top Ten Most Commonly Applied Pesticides, 1990 Golf Course Survey.

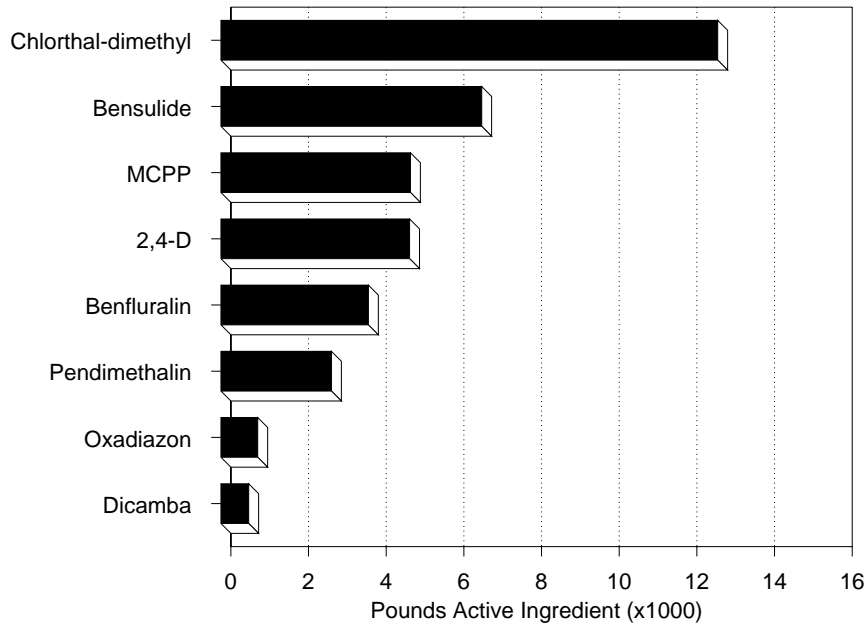


Figure3. High Use Herbicides, 1990 Golf Course Survey.

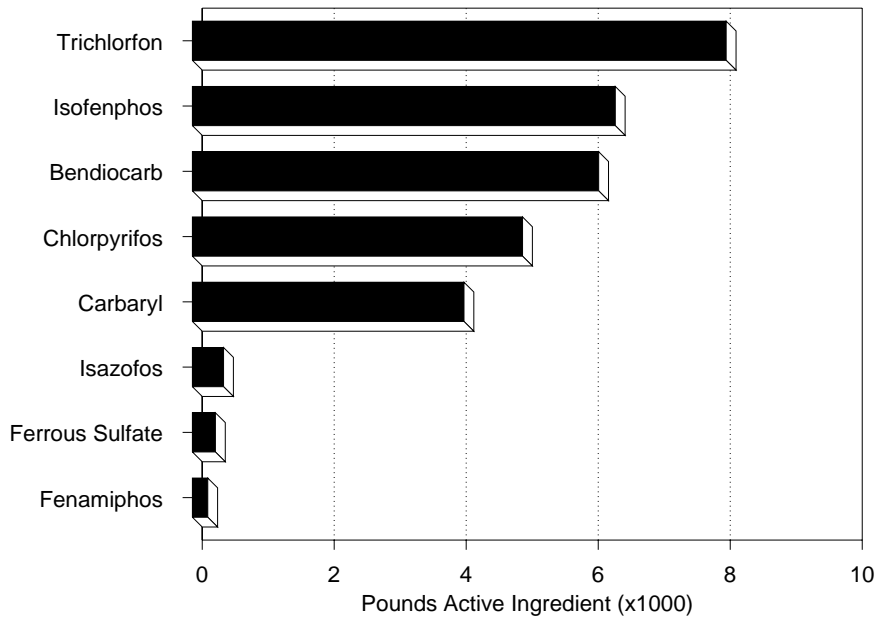


Figure4. High Use Insecticides, 1990 Golf Course Survey.

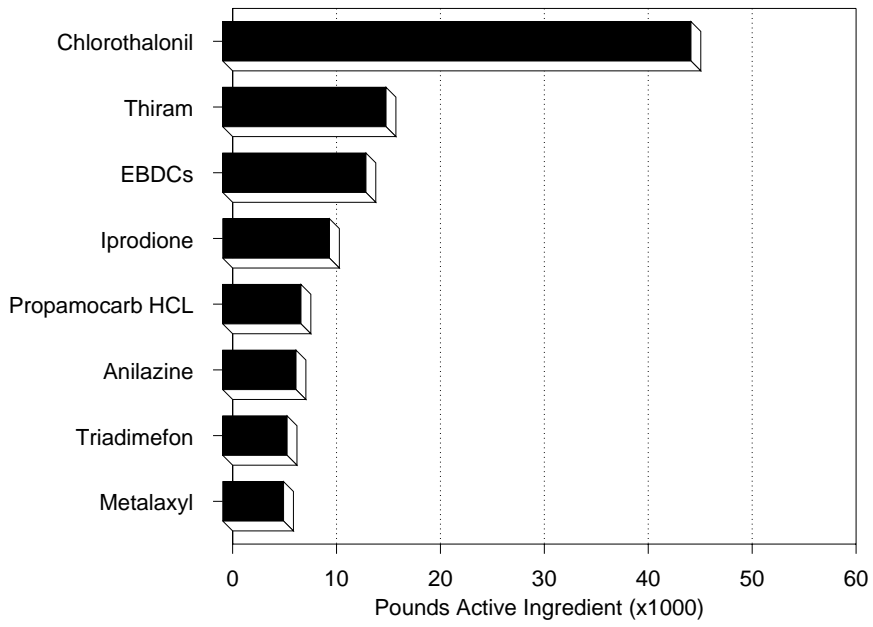


Figure5. High Use Fungicides, 1990 Golf Course Survey.

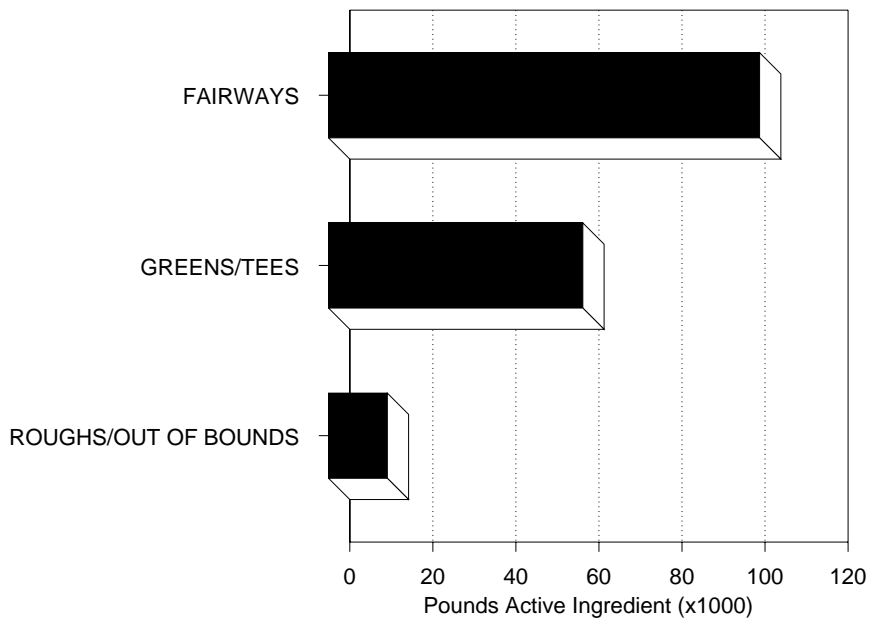
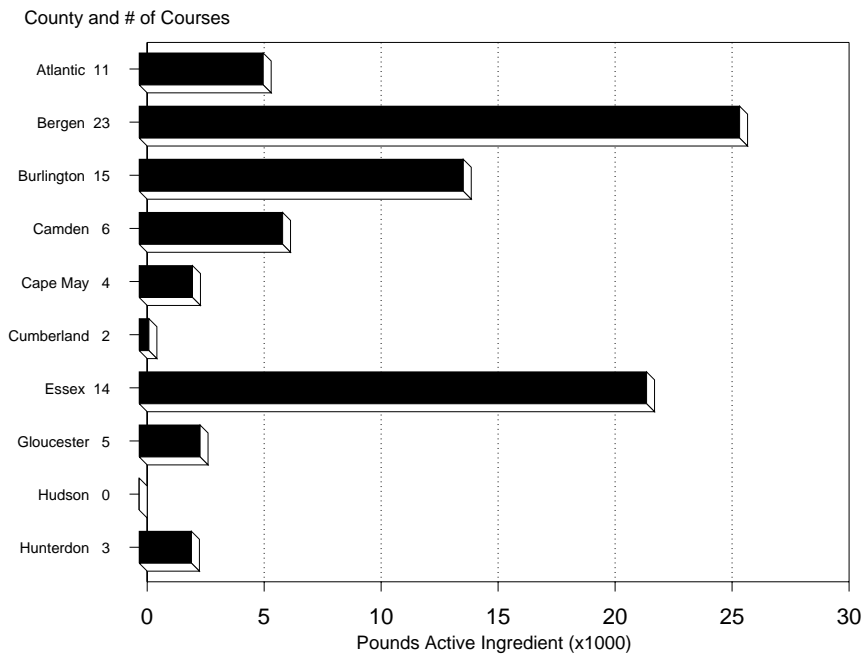


Figure6. Pesticide Use by Site, 1990 Golf Course Survey.

A



B

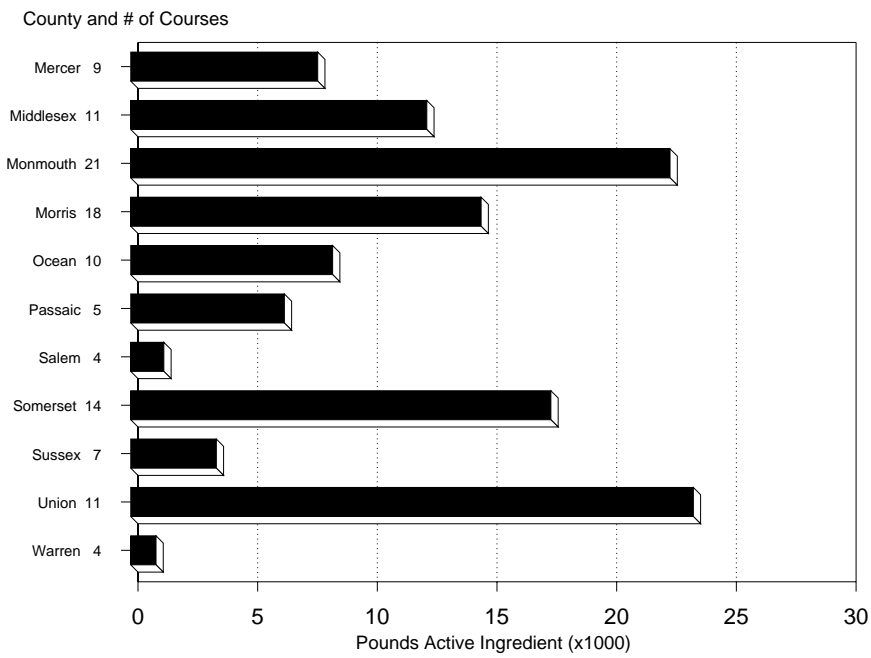


Figure 7. Pesticide Use by County, 1990 Golf Course Survey (A - Atlantic - Hunterdon; B - Mercer - Warren).

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Figure 10 illustrates the highest use herbicides for lawn care in 1990. 2,4-D (215,928 lbs a.i.), mecoprop (190,598 lbs a.i.), and pendimethalin (152,646 lbs a.i.) were by far the most commonly used herbicides. Their usage tripled or quadrupled the use of all the other herbicides reported. Other high use herbicides included triclopyr, dicamba and benfluralin.

Figure 11 illustrates the highest use insecticides for lawn care in 1990. Trichlorfon (34,794 lbs a.i.) showed the highest use. The fall off of use here is nearly linear.

Figure 12 illustrates the highest use fungicides for lawn care in 1990. The most commonly used fungicides were iprodione (6,300 lbs a.i.) and chlorothalonil (5,986 lbs a.i.). The usage of both were individually more than double the use of the EBDCs (2,655 lbs a.i.) which occupied the number three spot.

### **Comparison of the Surveys**

Figure 13 and Table 1 presents side-by-side comparisons of the pesticide usage reported in the golf course and lawn care surveys. It is interesting to note that although both surveys involve treatments to turf, they are radically different in pesticide use. The golf course treatments involved much heavier fungicide use (64% of the total pesticide use compared to the lawn survey's 2% of the total). The lawn care treatments, on the other hand, involved heavier herbicide use (85% of the total pesticide use compared to the golf course survey's 20% of the total).

Insecticide use, in terms of percentage, stayed relatively the same (16% of the total pesticide use in the golf course survey, 13% in the lawn care survey.)

There was also little difference in terms of percentage between the use of growth hormones (0.6% of the total pesticide use in the golf course survey, 0.1% in the lawn care survey.)

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### **ACKNOWLEDGEMENTS**

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Coordinators of the project were Drs. Roy Meyer (PCP) and George C. Hamilton (RCE), and Curtis Brown (PCP). Vital to the successful completion of this project was the cooperation of the golf course superintendants and lawn care applicators who provided the information in this report.

For additional information contact the NJDEPE Pesticide Control Program at (609) 530-4124 or Rutgers Cooperative Extension at (908) 932-9801.

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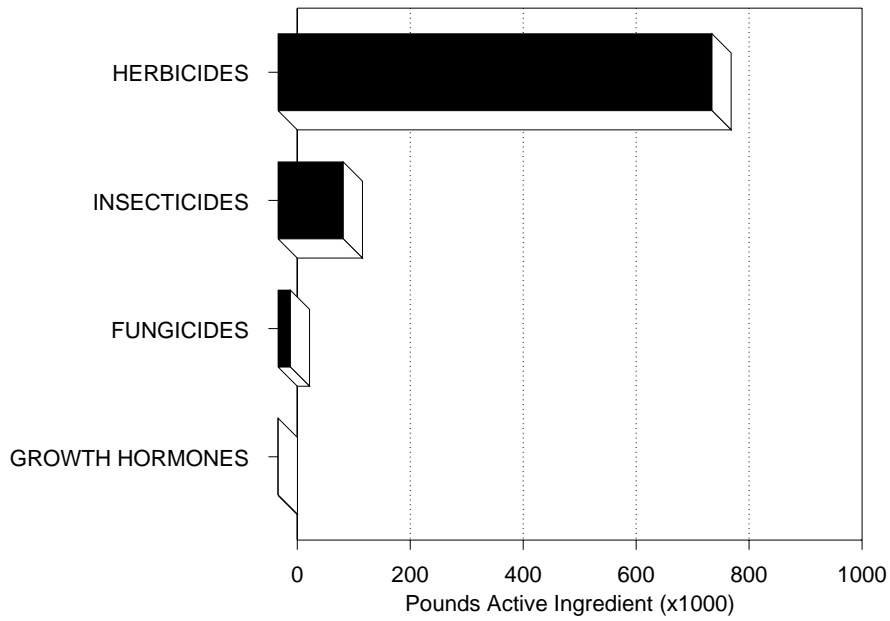


Figure8. Pesticide Usage by Type of Pesticide Applied, 1990 Lawn Care Survey.

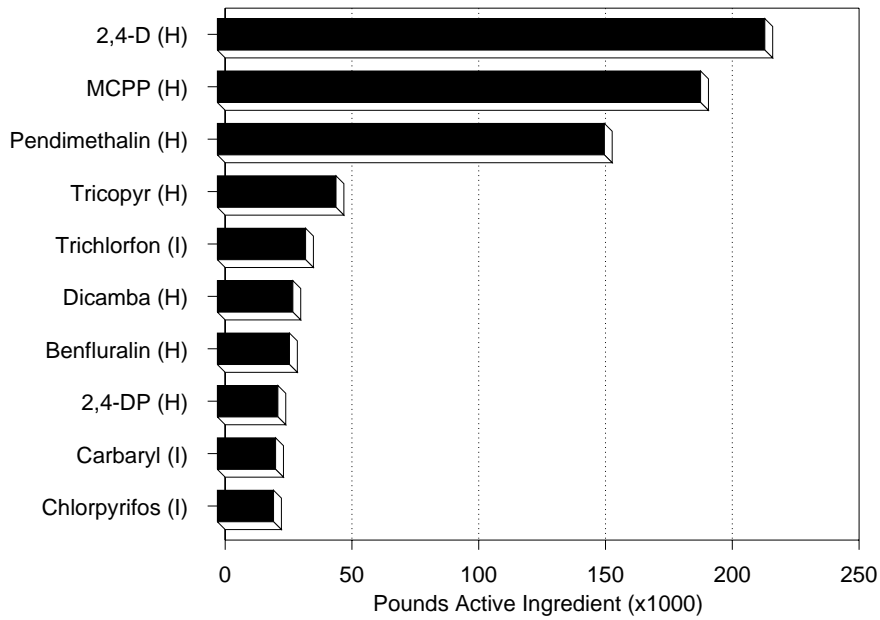


Figure9. Top Ten Most Commonly Applied Pesticides, 1990 Lawn Care Survey.

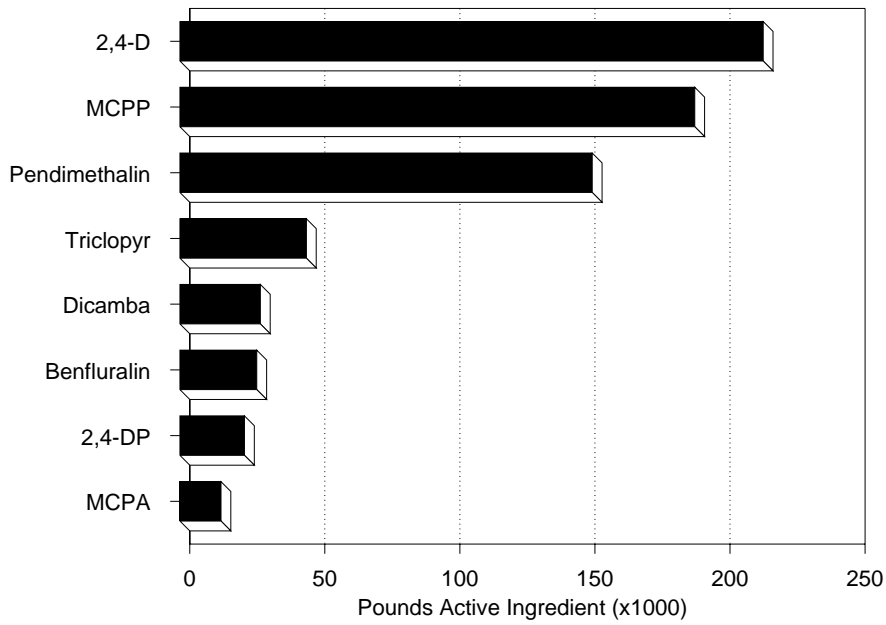


Figure 10. High Use Herbicides, 1990 Lawn Care Survey.

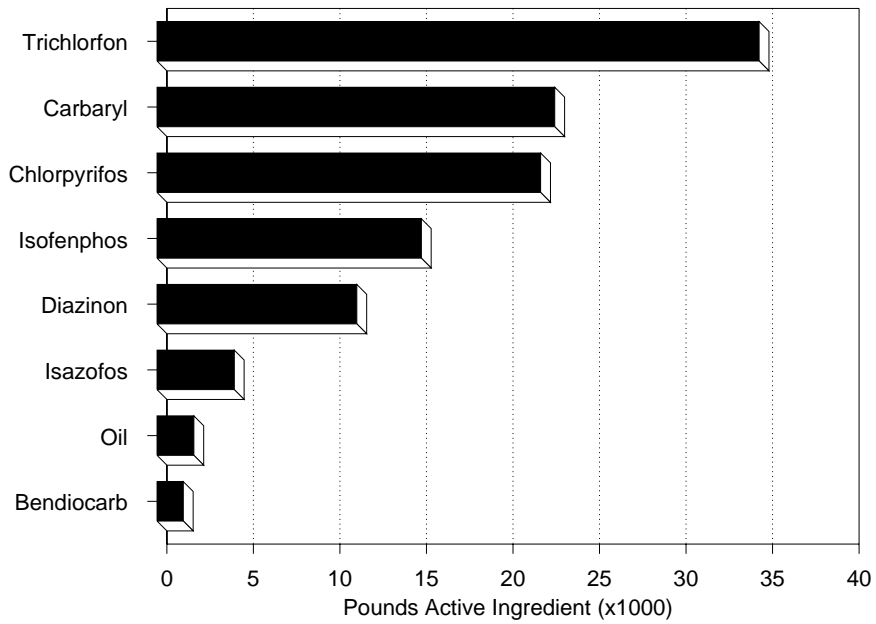


Figure 11. High Use Insecticides, 1990 Lawn Care Survey.

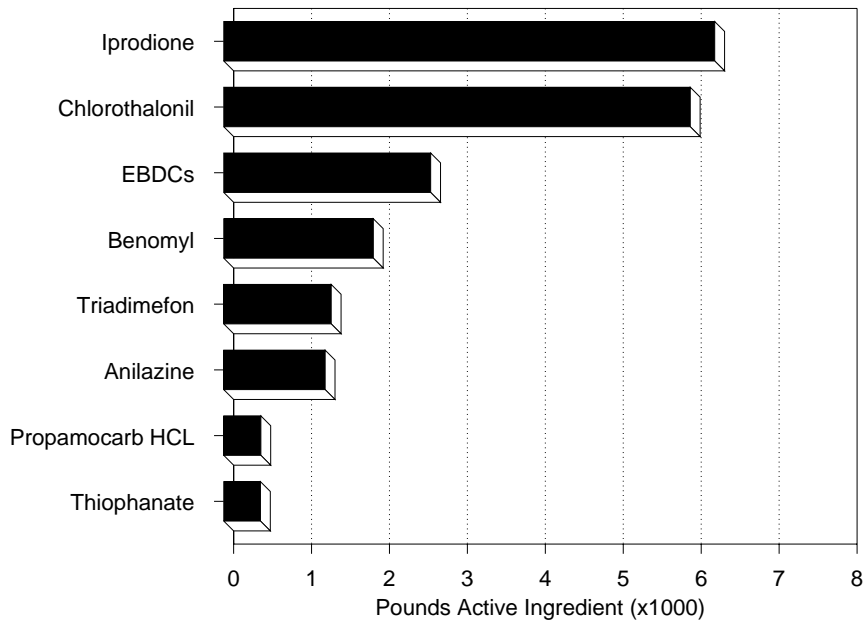


Figure 12. High Use Fungicides, 1990 Lawn Care Survey.

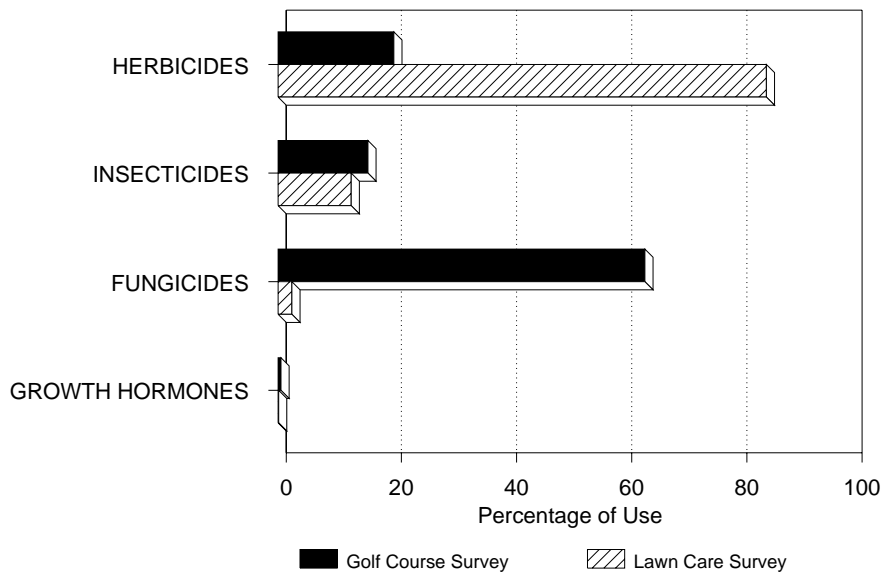


Figure 13. Comparison of Pesticide Use Between Golf Courses and Lawn Care Companies in 1990.

Table 1. Total Pounds of Active Ingredient By Type of Pesticide.

<b>Type of Pesticide</b>	<b>Golf Course Survey</b>	<b>Lawn Care Survey</b>
Herbicides:	40,349	768,210
Insecticides:	31,316	115,395
Fungicides:	127,640	21,689
Growth Hormones:	1,187	835
<b>TOTAL</b>	<b>200,492</b>	<b>906,130</b>