
# 2003 Pesticide Usage on Four Major Minnesota Crops

Minnesota Department of Agriculture
Minnesota Agricultural Statistics Service

**January 2005**

For information regarding this report contact:
Denton Bruening or Joe Zachmann
Minnesota Department of Agriculture
Agronomy & Plant Protection Division
651-296-6121

## Table of Contents Page No.

## List of Tables Page No.

## List of Figures **Page No.**

# Introduction

## Acknowledgements

This survey was a cooperative effort of the Minnesota Department of Agriculture (MDA), the Minnesota Agricultural Statistics Service (MASS), the National Agricultural Statistics Service (NASS), and the North Dakota Agricultural Statistics Service (NDASS). The detailed pesticide use information could not have been collected without the cooperation of the hundreds of farmers who voluntarily responded to the survey in the midst of their normally busy lives, and for this we are extremely grateful. Similarly, the assistance of agricultural chemical dealers and co-operatives is much appreciated. Special thanks go to Doug Hartwig and Eddie Oaks, Director and Deputy Directory, respectively, of the MASS/NASS, Bill Meyer, Deputy Director of the NDASS, and their respective staff, for assistance with survey design, data collection and processing. The MDA is ultimately responsible for the representations of data provided in this report, and for the design of the survey mechanism used to collect that data.

## 2003 Pesticide Use Summary and Highlights

This report summarizes herbicide, insecticide and fungicide use information reported by approximately 2,500 farmers for the 2003 crop year. Excellent participation and good record keeping by Minnesota farmers and agricultural chemical dealerships played a vital part in providing complete and detailed pesticide information. The survey targeted the four major crops grown in Minnesota which are corn, soybeans, wheat, and hay. Collectively these crops account for over 90% of Minnesota's farmland. This survey collected pesticide information from over one million acres of cropland in seventy-six of the state's most intensively agricultural counties. The survey covered 5-6% of the state's corn, soybean, and hay acres and 8% of the wheat acres.

The report represents one of the largest surveys ever conducted on pesticide use in Minnesota. Farmers were interviewed over the phone in the early part of 2004. Future surveys can use this information to determine changes in rates and pesticide selections over time.

*Corn Highlights:* Herbicides, insecticides, and fungicides were applied to 96%, 20%, and <1%, respectively, of the surveyed corn acres. On the 1,500+ farms which reported corn information on approximately 376,000 acres, the top five herbicide products (based on percent acres covered) were atrazine, acetochlor, glyphosate, nicosulfuron, and mesotrione.

*Soybean Highlights:* Herbicides, insecticides, and fungicides were applied to 96%, 31%, and <1%, respectively, on the 430,000 surveyed acres of soybeans. Slightly less than 1,500 farms provided pesticide information on this crop. Glyphosate products[1] were applied to 84% of the acres. Other important herbicides, although with considerably less coverage, were imazamox, imazethapyr, pendimethalin, and triflulalin.

[1] Including the diammonium salt

Lambda-cyhalothrin, Chlorpyrifos, and Esfenvalerate were the major soybean insecticides.

*Wheat Highlights:* Herbicides, insecticides, and fungicides were applied to 94%, 11%, and 43%, respectively, of the 142,000 wheat acres. Approximately 400 farms provided information for this crop. The top five herbicide products (based on percent acres covered) were MCPA, bromoxynil products, fenoxaprop, 2,4-D, and thifensulfuron. methyl parathion was the only reportable insecticide and was used on 10% of the surveyed wheat acres. The major fungicide products were tebuconazole, propiconazole, and trifloxystrobin.

*Hay Highlights:* Herbicides, insecticides, and fungicides were applied to 1%, 11%, and <1%, respectively, of the 107,000 acres of hay. Approximately 1,400 farms provided information on this crop. Lambda-cyhalothrin and four other minor use products were used for insect control on 6% of the surveyed acres.

**Survey Design and Implementation**

Figure 1 shows ten preliminary Pesticide Management Areas and Monitoring Regions proposed by the MDA. Counties are clustered based on similarities in geology, soils, and crops. The areas also define the general boundaries of the monitoring regions used by the MDA water resource monitoring program. Regional pesticide use information will eventually be used to help design and implement specific water quality monitoring and pesticide educational programs.

Due to the low intensity of row crop agriculture in portions of northern Minnesota and the Minneapolis/St. Paul Metro Area, Region 2 (Clearwater, Beltrami, Lake of the Woods, Koochiching, and Itasca) and Region 3 (St. Louis, Lake, Carlton, and Cook) and portions of Region 10 (Hennepin and Ramsey) were not included in the survey.

**Figure 1.** MDA Preliminary Pesticide Management Areas/Regions

Some of the challenges of collecting pesticide use data are:

- Unlike fertilizer formulations which remain very constant, new pesticide products and formulations are released every year;
- Currently there are over 700 different pesticide products available for use on Minnesota corn, soybeans, wheat and hay;
- There are multiple product names that use very similar chemicals but frequently have different label rates and use restrictions. For example, Monsanto marketed glyphosate for many years under numerous tradenames. Currently popular glyphosate products are Roundup, Roundup Ultra, Roundup Ultradry, and Roundup WeatherMax. It is critical that the exact product be correctly identified in any type of use survey;
- Occasionally pesticide clones are legally sold once a patent expires. For example, GlyStar, GlyStar Plus, Glyphos and Glyphos Xtra are various glyphosate based products. Minor complications may arise from these similar formulations; and
- Similar chemistry can be marketed under both multiple liquid and granular (dry) formulations and can easily lead to reporting errors in units applied per acre during the survey process. For example, Harness, Harness Xtra and Harness Xtra 5.6L are sold as a liquid. The maximum legal application rate of Harness is 2.75 pints/acre while Harness Xtra and Harness Xtra 5.6L is 2.3 and 3.0 quarts/acre, respectively. Confusing data collection even more, Harness 20G is a granular with a maximum application rate of 14 pounds/acre.

MASS developed the sample population of 4,000 farms. This was done by selecting fifty-three farms from each of seventy-six agricultural counties. All farmers from each county who grew any one or more of the target crops (corn, soybeans, wheat and hay) were eligible to be drawn. The selection of fifty-three farms per county was based upon MASS's extensive expertise with telephone surveys. This number provided a large enough pool to reach the desired goal of obtaining at least 25 farms with complete records. Table 1 summarizes the crop acres surveyed for each crop and corresponding acreage receiving herbicide, insecticide or fungicide. Table 2 summarizes the number of participating farms in each county along with the total acres of each crop. Benton County (24) was the only county that did not reach that goal. The average number of participating farms per county was 32.

The general guideline used was to make six contact attempts to an individual farm before taking it off the list. For a variety of reasons (infrequently home, no longer farming, disconnected telephone number, etc), a significant percentage of potential farmers were never directly contacted. Although records were not kept, the number of farms that did not want to participate appeared to be relatively minimal. Usable data was provided by 2,437 farms participating in the survey. Approximately 400-500 additional farms provided information that was later determined to be incomplete. Respondents were required to have all pesticide applications and rates for a specific crop to be considered for inclusion in the survey. For example, an individual grower may have had good records for corn and soybeans acres but could not find the records for the insecticide applied to the hay crop. In this scenario, the corn and soybean fields would be used and the hay field would eventually be eliminated from the data set.

Calls were also made directly to custom pesticide applicators to complete any missing information not provided by the respondent. Surveys requiring a follow-up call to the local co-operative (co-op) or custom applicator were later sorted by co-op name. NDASS then called the co-ops and obtained information for all the incomplete farms associated with that crop. This streamlined the number of individual calls.

Farmers were interviewed over the phone during January though April of 2004. These were "cold calls;" the farmers did not get any type of notification about the survey prior to the contact. The interviews typically would last five to ten minutes.

**Data Collection Process**

1) Farmers were first asked to identify the number of acres of corn, soybeans, wheat and hay grown in the 2003 cropping season.
2) Then they were asked to identify how many acres of each crop type received fungicide, herbicide and/or insecticide;
3) Then they were asked to identify each specific type of pesticide used (using the crop-specific Pesticide Product References in Appendixes 2 – 5), the acres treated, the number of applications of that specific product, and the application rate;

**Table 1.** Summary of acres and corresponding percentage of each major crop receiving pesticide applications

| Crop Acres Surveyed | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Crop | Number of Respondents | Total Surveyed Acres | Herbicide Applied | | Insecticide Applied | | Fungicide Applied | |
| | | | Acres | (%) | Acres | (%) | Acres | (%) |
| **Corn** | **1,561** | **375,957** | **361,812** | (96%) | **74,990** | (20%) | **107** | (<1%) |
| **Soybean** | **1,474** | **429,761** | **413,798** | (96%) | **132,607** | (31%) | **0** | (<1%) |
| **Wheat** | **409** | **142,211** | **134,369** | (94%) | **16,033** | (11%) | **61,135** | (43%) |
| **Hay** | **1,411** | **106,632** | **930** | (1%) | **11,256** | (11%) | **0** | (<1%) |
| **Totals** | **2,437**[2] | **1,054,553** | **910,909** | (86%) | **236,433** | (22%) | **64,911** | (6%) |

[2] The total sum of respondents across all crops was 4,855. However since most farmers grew more than one type of major crop, the actual number of participating farms was 2,437.

**Table 2.** Farms and crop acreage by county and region

| County | Region | # of Farms | Corn | Wheat | Soybean | Hay | Total |
|---|---|---|---|---|---|---|---|
| | | | Acres | Acres | Acres | Acres | Acres |
| CLAY | 1 | 34 | 3,905 | 11,300 | 16,691 | 2,490 | 34,386 |
| GRANT | 1 | 31 | 7,630 | 5,743 | 10,580 | 183 | 24,136 |
| KITTSON | 1 | 31 | 295 | 17,012 | 10,230 | 3,206 | 30,743 |
| MAHNOMEN | 1 | 30 | 4,161 | 4,269 | 6,631 | 1,231 | 16,292 |
| MARSHALL | 1 | 31 | 828 | 8,879 | 6,674 | 1,973 | 18,354 |
| NORMAN | 1 | 33 | 1,328 | 8,742 | 8,417 | 2,496 | 20,983 |
| PENNINGTON | 1 | 33 | 65 | 12,094 | 14,026 | 4,473 | 30,658 |
| POLK | 1 | 32 | 865 | 14,745 | 10,225 | 2,688 | 28,523 |
| RED LAKE | 1 | 32 | 729 | 6,758 | 9,440 | 3,863 | 20,790 |
| ROSEAU | 1 | 40 | 338 | 13,548 | 4,686 | 3,662 | 22,234 |
| TRAVERSE | 1 | 26 | 9,594 | 3,045 | 13,814 | 595 | 27,048 |
| WILKIN | 1 | 32 | 5,725 | 21,504 | 18,759 | 182 | 46,170 |
| BECKER | 4 | 36 | 1,271 | 1,765 | 5,524 | 3,397 | 11,957 |
| BENTON | 4 | 24 | 2,886 | 30 | 1,390 | 799 | 5,105 |
| CASS | 4 | 38 | 565 | 0 | 0 | 6,370 | 6,935 |
| CROW WING | 4 | 33 | 1,260 | 0 | 895 | 3,000 | 5,155 |
| DOUGLAS | 4 | 31 | 1,674 | 574 | 2,095 | 939 | 5,282 |
| HUBBARD | 4 | 34 | 1,002 | 90 | 20 | 2,358 | 3,470 |
| KANDIYOHI | 4 | 33 | 6,852 | 355 | 6,090 | 538 | 13,835 |
| MORRISON | 4 | 39 | 2,769 | 33 | 580 | 1,573 | 4,955 |
| OTTER TAIL | 4 | 30 | 3,037 | 766 | 2,712 | 2,320 | 8,835 |
| POPE | 4 | 38 | 7,602 | 596 | 6,058 | 2,157 | 16,413 |
| SHERBURNE | 4 | 25 | 4,162 | 50 | 1,237 | 840 | 6,289 |
| STEARNS | 4 | 33 | 1,869 | 64 | 594 | 1,506 | 4,033 |
| TODD | 4 | 31 | 2,511 | 620 | 1,226 | 2,002 | 6,359 |
| WADENA | 4 | 37 | 539 | 0 | 70 | 2,076 | 2,685 |
| AITKIN | 5 | 38 | 333 | 0 | 42 | 5,558 | 5,933 |
| CHISAGO | 5 | 32 | 951 | 10 | 838 | 959 | 2,758 |
| ISANTI | 5 | 37 | 2,877 | 10 | 2,271 | 1,106 | 6,264 |
| KANABEC | 5 | 33 | 1,018 | 70 | 360 | 2,274 | 3,722 |
| MILLE LACS | 5 | 31 | 1,220 | 25 | 1,135 | 1,523 | 3,903 |
| PINE | 5 | 37 | 1,794 | 0 | 145 | 4,211 | 6,150 |
| BIG STONE | 6 | 31 | 7,190 | 2,328 | 10,277 | 423 | 20,218 |
| CHIPPEWA | 6 | 27 | 10,481 | 20 | 8,998 | 100 | 19,599 |
| LAC QUI PARLE | 6 | 30 | 9,085 | 670 | 10,335 | 248 | 20,338 |
| STEVENS | 6 | 32 | 12,194 | 2,068 | 13,020 | 632 | 27,914 |
| SWIFT | 6 | 29 | 12,252 | 30 | 10,644 | 232 | 23,158 |
| YELLOW MED. | 6 | 33 | 8,844 | 1,069 | 8,944 | 806 | 19,663 |
| LINCOLN | 7 | 33 | 6,126 | 1,018 | 6,624 | 1,001 | 14,769 |
| LYON | 7 | 30 | 6,485 | 78 | 5,896 | 531 | 12,990 |
| MURRAY | 7 | 29 | 6,317 | 0 | 6,905 | 805 | 14,027 |
| NOBLES | 7 | 35 | 6,536 | 0 | 6,150 | 469 | 13,155 |
| PIPESTONE | 7 | 32 | 6,979 | 35 | 6,891 | 746 | 14,651 |
| ROCK | 7 | 26 | 8,502 | 0 | 7,783 | 761 | 17,046 |
| BLUE EARTH | 8 | 35 | 8,399 | 37 | 7,783 | 184 | 16,403 |
| BROWN | 8 | 32 | 6,210 | 51 | 5,634 | 552 | 12,447 |
| COTTONWOOD | 8 | 27 | 10,664 | 350 | 10,192 | 140 | 21,346 |
| FARIBAULT | 8 | 27 | 10,440 | 0 | 9,368 | 20 | 19,828 |
| FREEBORN | 8 | 27 | 5,694 | 0 | 4,464 | 362 | 10,520 |
| JACKSON | 8 | 32 | 7,698 | 55 | 7,615 | 166 | 15,534 |
| LESUEUR | 8 | 28 | 4,767 | 251 | 3,094 | 695 | 8,807 |
| MARTIN | 8 | 32 | 11,956 | 0 | 10,895 | 155 | 23,006 |
| MCLEOD | 8 | 40 | 7,687 | 90 | 6,290 | 744 | 14,811 |
| MEEKER | 8 | 34 | 5,791 | 80 | 5,404 | 2,330 | 13,605 |

| County | Region | # of Farms | Corn | Wheat | Soybean | Hay | Total |
|---|---|---|---|---|---|---|---|
| | | | Acres | Acres | Acres | Acres | Acres |
| NICOLLET | 8 | 32 | 9,672 | 33 | 9,063 | 322 | 19,090 |
| REDWOOD | 8 | 31 | 9,584 | 38 | 9,121 | 476 | 19,219 |
| RENVILLE | 8 | 29 | 8,696 | 317 | 8,127 | 100 | 17,240 |
| RICE | 8 | 30 | 4,038 | 0 | 3,141 | 979 | 8,158 |
| SIBLEY | 8 | 28 | 4,086 | 48 | 3,343 | 575 | 8,052 |
| STEELE | 8 | 31 | 5,624 | 0 | 5,198 | 349 | 11,171 |
| WASECA | 8 | 27 | 5,572 | 40 | 4,956 | 317 | 10,885 |
| WATONWAN | 8 | 31 | 12,557 | 0 | 11,563 | 106 | 24,226 |
| WRIGHT | 8 | 30 | 1,235 | 0 | 2,589 | 569 | 4,393 |
| DODGE | 9 | 33 | 7,350 | 0 | 5,093 | 835 | 13,278 |
| FILLMORE | 9 | 31 | 4,771 | 0 | 3,091 | 1,501 | 9,363 |
| GOODHUE | 9 | 35 | 2,254 | 50 | 1,300 | 1,344 | 4,948 |
| HOUSTON | 9 | 33 | 3,104 | 0 | 2,346 | 1,318 | 6,768 |
| MOWER | 9 | 36 | 7,541 | 0 | 7,771 | 862 | 16,174 |
| OLMSTED | 9 | 31 | 2,499 | 15 | 1,796 | 1,007 | 5,317 |
| WABASHA | 9 | 33 | 5,265 | 0 | 2,548 | 2,419 | 10,232 |
| WINONA | 9 | 31 | 3,834 | 32 | 1,607 | 2,732 | 8,205 |
| ANOKA | 10 | 28 | 737 | 0 | 248 | 1,288 | 2,273 |
| CARVER | 10 | 34 | 4,331 | 163 | 2,169 | 857 | 7,520 |
| DAKOTA | 10 | 41 | 8,250 | 98 | 5,438 | 1,899 | 15,685 |
| SCOTT | 10 | 37 | 1,255 | 350 | 1,284 | 1,026 | 3,915 |
| WASHINGTON | 10 | 29 | 1,750 | 100 | 1,308 | 1,101 | 4,259 |

**Data Reporting and Limitations**

Due to the simplified method used to collect what is typically considered complex data, it is imperative that the reader understand the limitations of the datasets.

*Data are not "Weighted"*
Surveys conducted by NASS employ advanced sampling strategies and are designed to statistically represent a non-homogenous population, thus "weighting" the data to account for sample size, county size and crop acreage, etc. Such strategies can be very expensive and are not without their own limitations.[3] As previously mentioned, approximately 32 farms per county participated in the survey. Farmers that grew the four major crops were randomly selected from county lists of producers accessed by NASS.

Because respondents in each county were not selected in proportion to the actual number of producers of a given crop, over- or under-selection of those producing one or more of the four crops might result in unintentional bias in the results for specific crops and their related pesticide use. This bias could lead to problems in extrapolation of results, e.g., an over- or under-representation of product use and rates within a county, region or satewide.

Therefore, attempts to extrapolate data for purposes of estimating total pounds of a product or active ingredient used in a county, region or statewide must consider an

[3] For an explanation of survey methods and data quality associated with annual county-level data, visit the NASS "Quik Stats" Frequently Asked Questions website at http://www.nass.usda.gov:81/ipedbcnty/faqs.htm

appropriate statistical analysis of the dataset for the estimations to be valid. Failure to do so may provide over- or under-representation of the data. The MDA can be contacted to further discuss interpretation of the survey data.

Due to the method the pesticide data was collected, it is not possible to report on the number of crop acres receiving two or more products, though the individual applications and rates are captured. For example, some producers in south central Minnesota (Region 8) use a pre-emergence, soil-applied herbicide for grass control and follow up post-emergence for broadleaves. Following this general pesticide strategy, Surpass or Harness may be selected for pre-emergence weed control and Callisto as the post-emergence product. Acetochlor (Surpass/Harness) was reported in this region on 34% of the corn acres and mesotrione (Callisto) was reported on 19% of acres.

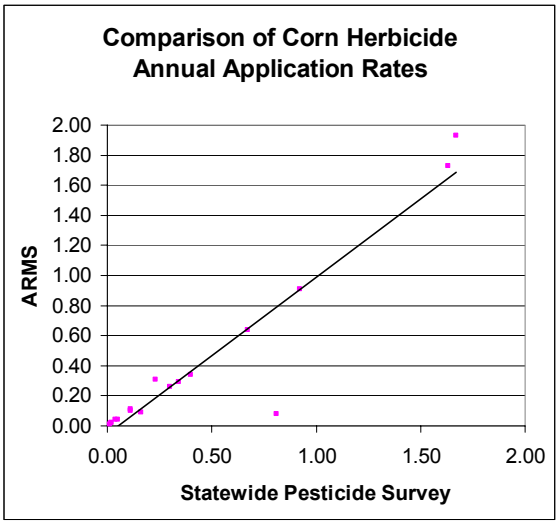
Similarly, products containing the same active ingredient, but not the same brand name, and applied to the same acres, would not be totaled and recorded as applications to the same field. For example, Aatrex 4L might be applied to 80 acres, with FieldMaster applied to a 60-acre subset of the same field. Both products contain atrazine but because two different products were used, the additive total of the atrazine (active ingredient) on the entire cropland would not be captured.

On individual fields, this survey indicates that the use of different brand name products containing the same active ingredients is infrequent. The average number of applications for most products was 1.0 applications per year. Glyphosate is one of the exceptions for both corn and soybeans. In this survey, there were 1.2 applications of glyphosate per year on corn (22% of all surveyed corn acres at a rate of 0.92 pounds/acre). The 2003 ARMS data cited above reports 1.2 applications per year on corn (22% of all statewide estimated corn acres over at a rate of 0.91 pounds). The number of applications per year on soybeans is 1.4 and 1.2 for this survey and the 2002 ARMS report, respectively.

The National Agricultural Statistics Service collects detailed pesticide and fertilizer use information via the Agricultural Resource Management Survey (ARMS) as part of their annual reporting service. Typically corn and two additional crops (rotated each year) are included. The 2003 corn chemical usage can be found by going to http://www.nass.usda.gov/mn/Agstat04/p031033.pdf.

While it is not the intent of this report to compare and contrast pesticide use to other information sources, additional analysis will likely be conducted in the future. It is worth noting, however, the strong correlations between the corn herbicide application rates (total) reported in the NASS ARMS 2003 data and the findings in this report. The comparison for 16 of the most commonly used corn herbicides is shown in Figure 2.

**Figure 2.** Comparison of statewide survey vs. NASS ARMS 2003 herbicide application rates on corn



# Statewide Pesticide Applications – Corn

Many pesticide active ingredients can be used in the production of corn. Corn producers responding to the survey associated with this report may have used one or more of the active ingredients listed in Table 3; however, data is only published for pesticides applied by 5 or more respondents. This is consistent with standard reporting protocol used by NASS in other agricultural chemical use reports.

To obtain a list of products (brand names) registered in Minnesota and containing the active ingredients listed below, visit http://state.ceris.purdue.edu/doc/mn/statemn.html, enter the database, submit "active ingredient" as the search option, enter the name of the active ingredient, click "submit," check the appropriate boxes, and "submit" to obtain a list of all registered products containing the active ingredient.

**Table 3.** Publication status for corn pesticide active ingredients

A * denotes data is not publishable due to use by < 5 respondents

| Active Ingredient | Published | Active Ingredient | Published |
|---|---|---|---|
| **Herbicides** | | | |
| 2,4-D | P | Sethoxydim | * |
| Acetochlor | P | Thifensulfuron | P |
| Alachlor | P | **Insecticides** | |
| Atrazine | P | Bifenthrin | P |
| Bentazon | * | Carbaryl | * |
| Bromoxynil | P | Carbofuran | P |
| Carfentrazone-ethyl | * | Chlorethoxyfos | * |
| Clopyralid | P | Chlorpyrifos | P |
| Cyanazine | * | Cyfluthrin | P |
| Dicamba | P | Esfenvalerate | * |
| Dicamba, Dimet. salt | P | Fipronil | P |
| Dicamba, Pot. salt | P | Lambda-cyhalothrin | P |
| Dicamba, Sodium salt | P | Permethrin | * |
| Diflufenzopyr-sodium | P | Phorate | * |
| Dimethenamid | P | Tebupirimphos | P |
| Dimethenamid-P | P | Tefluthrin | P |
| EPTC | P | Terbufos | P |
| Fenoxaprop | * | **Fungicides** | |
| Flufenacet | * | Chlorothalonil | * |
| Flumetsulam | P | | |
| Flumiclorac-pentyl | * | | |
| Foramsulfuron | P | | |
| Glufosinate-ammonium | P | | |
| Glyphosate | P | | |
| Glyphosate diam salt | P | | |
| Halosulfuron | P | | |
| Imazapyr | P | | |
| Imazethapyr | P | | |
| Mesotrione | P | | |
| Metribuzin | * | | |
| Nicosulfuron | P | | |
| Pelargonic acid | * | | |
| Pendimethalin | P | | |
| Primisulfuron | P | | |
| Propachlor | * | | |
| Rimsulfuron | P | | |
| S-Metolachlor | P | | |

A statewide summary of corn pesticide applications is provided in Table 4. Five percent (5%) of all Minnesota corn acres were surveyed for the 2003 season. Herbicides were applied to 96% of all surveyed corn acres. Insecticides were applied to 20% of all acres and less than 1% of surveyed acres received fungicides. Pesticides used on more than 10% of surveyed corn acres were atrazine, acetochlor, glyphosate, nicosulfuron, mesotrione, rimsulfuron, dicamba, and s-metolachlor.

**Table 4.** Pesticide applications and rates by active ingredient (A.I.) for corn statewide

| Agricultural Chemical | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| 2,4-D | 1 | 1.0 | 0.34 | 0.34 | 1,125 |
| Acetochlor | 25 | 1.0 | 1.62 | 1.63 | 153,876 |
| Alachlor | <1 | 1.0 | 1.44 | 1.44 | 1,555 |
| Atrazine | 30 | 1.0 | 0.67 | 0.67 | 75,371 |
| Bromoxynil | 2 | 1.0 | 0.22 | 0.23 | 1,289 |
| Clopyralid | 9 | 1.0 | 0.11 | 0.11 | 3,529 |
| Dicamba | 12 | 1.0 | 0.30 | 0.30 | 13,642 |
| Dicamba, Dimet. salt | 4 | 1.0 | 0.16 | 0.16 | 2,614 |
| Dicamba, Pot. salt | 4 | 1.0 | 0.38 | 0.40 | 5,444 |
| Dicamba, Sodium salt | 2 | 1.0 | 0.13 | 0.13 | 1,108 |
| Diflufenzopyr-sodium | 5 | 1.0 | 0.05 | 0.05 | 1,006 |
| Dimethenamid | 2 | 1.0 | 1.37 | 1.37 | 7,800 |
| Dimethenamid-P | 4 | 1.0 | 0.81 | 0.81 | 12,241 |
| EPTC | 3 | 1.0 | 3.64 | 3.64 | 34,203 |
| Flumetsulam | 9 | 1.0 | 0.04 | 0.04 | 1,259 |
| Foramsulfuron | 2 | 1.0 | 0.03 | 0.03 | 177 |
| Glufosinate-ammonium | 7 | 1.0 | 0.33 | 0.34 | 9,449 |
| Glyphosate | 22 | 1.2 | 0.76 | 0.92 | 75,148 |
| Glyphosate diam salt | 1 | 1.0 | 0.76 | 0.76 | 3,264 |
| Halosulfuron | <1 | 1.0 | 0.03 | 0.03 | 6 |
| Imazapyr | <1 | 1.0 | 0.01 | 0.01 | 19 |
| Imazethapyr | <1 | 1.0 | 0.04 | 0.04 | 57 |
| Mesotrione | 17 | 1.0 | 0.11 | 0.11 | 6,829 |
| Nicosulfuron | 20 | 1.0 | 0.02 | 0.02 | 1,666 |
| Pendimethalin | 1 | 1.0 | 0.89 | 0.90 | 3,783 |
| Primisulfuron | 2 | 1.0 | 0.02 | 0.02 | 202 |
| Rimsulfuron | 15 | 1.0 | 0.01 | 0.01 | 664 |
| S-Metolachlor | 12 | 1.0 | 1.66 | 1.67 | 77,216 |
| Thifensulfuron | <1 | 1.0 | 0.01 | 0.01 | 8 |
| **Insecticides** | | | | | |
| Bifenthrin | 2 | 1.0 | 0.07 | 0.07 | 533 |
| Carbofuran | <1 | 1.0 | 0.71 | 0.71 | 545 |
| Chlorpyrifos | 4 | 1.1 | 1.02 | 1.10 | 15,469 |

| Agricultural Chemical | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| Cyfluthrin | 6 | 1.0 | 0.01 | 0.01 | 133 |
| Fipronil | 2 | 1.0 | 0.12 | 0.12 | 752 |
| Lambda-cyhalothrin | <1 | 1.0 | 0.02 | 0.02 | 43 |
| Tebupirimphos | 6 | 1.0 | 0.13 | 0.13 | 2,653 |
| Tefluthrin | 2 | 1.0 | 0.09 | 0.09 | 807 |
| Terbufos | 1 | 1.0 | 0.99 | 0.99 | 3,263 |

Acetochlor, atrazine and s-metolachlor are three commonly used active ingredients for which the Minnesota Department of Agriculture has developed voluntary Best Management Practices to protect groundwater resources, and for which this report has collected publishable data. Figures 3 – 5 illustrate the range of rates reported for use of those three pesticides.

**Figure 3.** Atrazine (active ingredient) rate distribution across surveyed corn acres (113,000 Acres)

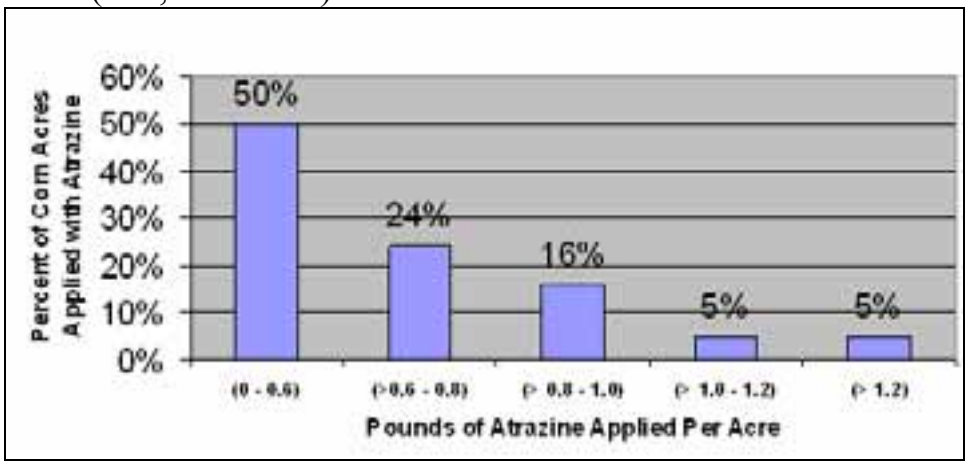



**Figure 4.** Acetochlor (active ingredient) rate distribution across surveyed corn acres (95,000 Acres)

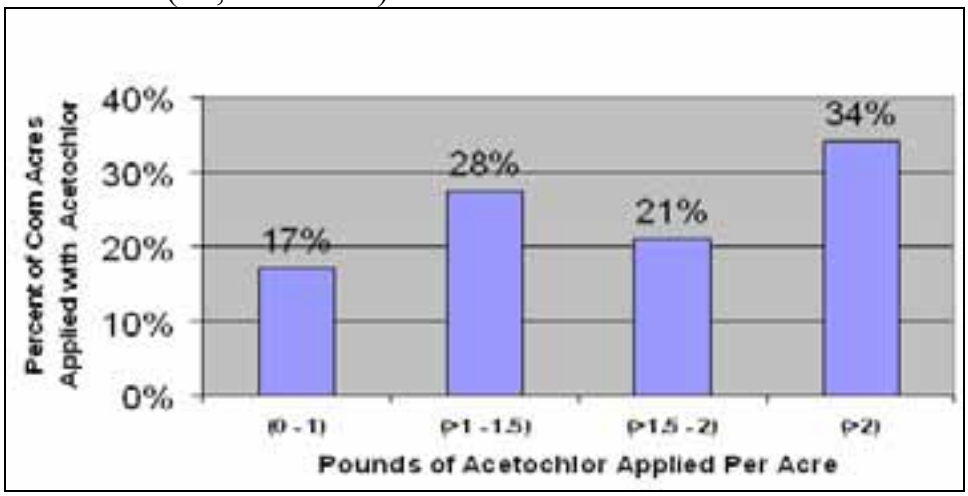
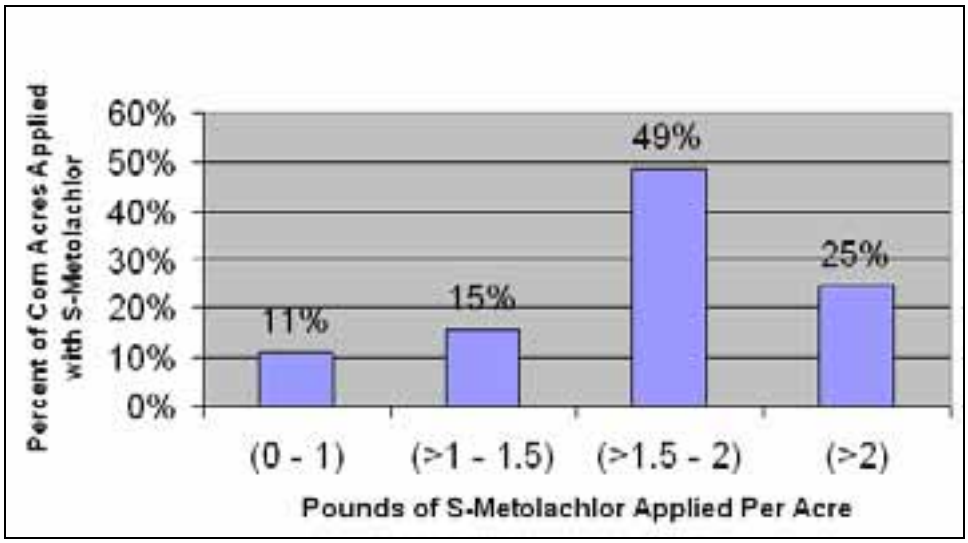


**Figure 5.** S-metolachlor (active ingredient) rate distribution across surveyed corn acres (48,000 Acres)



# Regional Pesticide Applications – Corn

Table 5 details the number of respondents with usable reports in each region, the number of corn acres in each region and the number of corn acres receiving herbicides, insecticides and fungicides. Tables 6 – 13 provide corn pesticide applications and rates by individual region.

**Table 5. S**ummary (by region) of surveyed corn acreage to which pesticides were applied

| Region | Number of Respondents | Corn Acres | Herbicide Acres | Insecticide Acres | Fungicide Acres |
|---|---|---|---|---|---|
| 1 | 121 | 35,463 | 33,633 | 642 | |
| 4 | 245 | 37,999 | 35,381 | 3,984 | |
| 5 | 80 | 8,193 | 7,381 | 900 | 107 |
| 6 | 153 | 60,046 | 57,904 | 18,357 | |
| 7 | 161 | 40,945 | 39,761 | 15,078 | |
| 8 | 491 | 140,370 | 137,385 | 24,918 | |
| 9 | 207 | 36,618 | 34,523 | 6,640 | |
| 10 | 103 | 16,323 | 15,844 | 4,471 | |
| **Totals** | **1,561** | **375,957** | **361,812** | **74,990** | **107** |

**Table 6.** Pesticide applications and rates for corn – Region 1

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* | *Pounds per Acre* | *Total Pounds* |
| **Herbicides** | | | (A.I.) | (A.I.) | (A.I.) |
| Acetochlor | 14 | 1.0 | 0.97 | 0.97 | 4,983 |
| Atrazine | 20 | 1.0 | 0.74 | 0.74 | 5,333 |
| Clopyralid | 1 | 1.0 | 0.10 | 0.10 | 45 |
| Dicamba | 14 | 1.0 | 0.33 | 0.33 | 1,596 |
| Dicamba, Dimet. salt | 8 | 1.0 | 0.12 | 0.12 | 325 |
| Dicamba, Sodium salt | 8 | 1.0 | 0.14 | 0.14 | 407 |
| Diflufenzopyr-sodium | 15 | 1.0 | 0.05 | 0.05 | 268 |
| EPTC | 12 | 1.0 | 3.33 | 3.33 | 14,737 |
| Flumetsulam | 1 | 1.0 | 0.04 | 0.04 | 17 |
| Foramsulfuron | 3 | 1.1 | 0.03 | 0.03 | 32 |
| Glufosinate-ammonium | 7 | 1.0 | 0.39 | 0.40 | 1,018 |
| Glyphosate | 14 | 1.2 | 0.64 | 0.89 | 4,589 |
| Mesotrione | 14 | 1.0 | 0.08 | 0.08 | 406 |
| Nicosulfuron | 34 | 1.0 | 0.03 | 0.03 | 319 |
| Rimsulfuron | 21 | 1.0 | 0.01 | 0.01 | 92 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Pesticides applied but not published included the following**: Bromoxynil, Dimethenamid, Dimethenamid-P, Fenoxaprop, Glyphosate diam salt, Halosulfuron, Imazapyr, Imazethapyr and S-Metolachlor

**Insecticides applied but not published included the following:** Carbaryl, Lambda-cyhalothrin and Tefluthrin.

**Table 7.** Pesticide applications and rates for corn – Region 4

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* | *Pounds per Acre* | *Total Pounds* |
| **Herbicides** | | | (A.I.) | (A.I.) | (A.I.) |
| 2,4-D | 2 | 1.0 | 0.26 | 0.26 | 216 |
| Acetochlor | 21 | 1.0 | 1.56 | 1.56 | 12,292 |
| Alachlor | 1 | 1.0 | 1.71 | 1.71 | 731 |
| Atrazine | 43 | 1.0 | 0.76 | 0.77 | 12,516 |
| Clopyralid | 5 | 1.0 | 0.11 | 0.11 | 198 |
| Dicamba | 10 | 1.0 | 0.31 | 0.31 | 1,238 |
| Dicamba, Dimet. salt | 8 | 1.0 | 0.20 | 0.20 | 605 |
| Dicamba, Pot. salt | 7 | 1.0 | 0.30 | 0.30 | 799 |
| Dicamba, Sodium salt | <1 | 1.0 | 0.13 | 0.13 | 20 |
| Diflufenzopyr-sodium | 5 | 1.0 | 0.05 | 0.05 | 87 |
| Dimethenamid-P | 10 | 1.0 | 0.70 | 0.70 | 2,619 |
| EPTC | 3 | 1.0 | 3.56 | 3.56 | 4,515 |
| Flumetsulam | 5 | 1.0 | 0.04 | 0.04 | 71 |
| Foramsulfuron | 6 | 1.0 | 0.03 | 0.03 | 78 |
| Glufosinate-ammonium | 4 | 1.2 | 0.32 | 0.42 | 593 |
| Glyphosate | 25 | 1.1 | 0.69 | 0.83 | 7,843 |
| Mesotrione | 9 | 1.0 | 0.08 | 0.09 | 280 |
| Nicosulfuron | 15 | 1.0 | 0.02 | 0.02 | 125 |
| Pendimethalin | 2 | 1.0 | 0.81 | 0.85 | 684 |
| Primisulfuron | 3 | 1.0 | 0.02 | 0.02 | 30 |
| Rimsulfuron | 13 | 1.0 | 0.01 | 0.01 | 62 |
| S-Metolachlor | 6 | 1.0 | 1.15 | 1.24 | 3,021 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 1 | 1.0 | 1.37 | 1.37 | 428 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following**: Bromoxynil, Carfentrazone-ethyl, Flufenacet, Glyphosate diam salt, Halosulfuron, Imazapyr, Imazethapyr and Thifensulfuron.
**Insecticides applied but not published included the following:** Bifenthrin, Carbofuran, Esfenvalerate, Fipronil and Terbufos.

**Table 8.** Pesticide applications and rates for corn – Region 5

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* | *Pounds per Acre* | *Total Pounds* |
| **Herbicides** | | | (A.I.) | (A.I.) | (A.I.) |
| Acetochlor | 36 | 1.0 | 1.62 | 1.62 | 4,787 |
| Atrazine | 47 | 1.0 | 0.81 | 0.81 | 3,087 |
| Glufosinate-ammonium | 21 | 1.0 | 0.30 | 0.30 | 524 |
| Glyphosate | 22 | 1.0 | 0.77 | 0.77 | 1,371 |
| Nicosulfuron | 4 | 1.0 | 0.03 | 0.03 | 10 |
| Pendimethalin | 15 | 1.0 | 0.80 | 0.80 | 966 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following**: 2,4-D, Bromoxynil, Clopyralid, Dicamba, Dicamba Dimet. Salt, Dicamba Sodium salt, Diflufenzopyr-sodium, Flumetsulam, Foramsulfuron, Halosulfuron, Imazapyr, Imazethapyr, Mesotrione, Rimsulfuron, S-Metolachlor and Thifensulfuron.
**Insecticides applied but not published included the following:** Chlorpyrifos.

**Table 9.** Pesticide applications and rates for corn – Region 6

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* | *Pounds per Acre* | *Total Pounds* |
| **Herbicides** | | | (A.I.) | (A.I.) | (A.I.) |
| Acetochlor | 13 | 1.0 | 1.58 | 1.58 | 12,041 |
| Atrazine | 14 | 1.0 | 0.54 | 0.57 | 4,974 |
| Clopyralid | 4 | 1.0 | 0.11 | 0.11 | 234 |
| Dicamba | 14 | 1.0 | 0.35 | 0.35 | 2,895 |
| Dicamba, Dimet. salt | 6 | 1.0 | 0.19 | 0.19 | 629 |
| Diflufenzopyr-sodium | 4 | 1.0 | 0.05 | 0.05 | 109 |
| Dimethenamid | 2 | 1.0 | 1.43 | 1.43 | 1,325 |
| Dimethenamid-P | 3 | 1.0 | 0.66 | 0.66 | 1,063 |
| EPTC | 4 | 1.0 | 4.12 | 4.12 | 10,185 |
| Flumetsulam | 4 | 1.0 | 0.04 | 0.04 | 83 |
| Foramsulfuron | 2 | 1.0 | 0.03 | 0.03 | 30 |
| Glufosinate-ammonium | 6 | 1.0 | 0.32 | 0.33 | 1,188 |
| Glyphosate | 35 | 1.1 | 0.63 | 0.82 | 17,319 |
| Mesotrione | 20 | 1.0 | 0.09 | 0.09 | 1,128 |
| Nicosulfuron | 23 | 1.0 | 0.02 | 0.02 | 315 |
| Rimsulfuron | 22 | 1.0 | 0.01 | 0.01 | 155 |
| S-Metolachlor | 8 | 1.0 | 1.75 | 1.75 | 8,865 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 8 | 1.2 | 0.86 | 1.33 | 6,691 |
| Cyfluthrin | 9 | 1.0 | 0.01 | 0.01 | 35 |
| Tebupirimphos | 9 | 1.0 | 0.13 | 0.13 | 707 |
| Tefluthrin | 3 | 1.0 | 0.11 | 0.11 | 191 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following**: 2,4-D, Bromoxynil, Carfentrazone-ethyl, Dicamba, Pot. Salt, Dicamba, Sodium salt, Glyphosate diam salt, Pelargonic acid, Primisulfuron, Propachlor and Thifensulfuron.
**Insecticides applied but not published included the following:** Bifenthrin, Fipronil, Lambda-cyhalothrin, Phorate and Terbufos.

**Table 10.** Pesticide applications and rates for corn – Region 7

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 20 | 1.0 | 1.60 | 1.68 | 13,962 |
| Atrazine | 16 | 1.0 | 0.62 | 0.66 | 4,170 |
| Clopyralid | 3 | 1.0 | 0.08 | 0.08 | 97 |
| Dicamba | 17 | 1.0 | 0.31 | 0.34 | 2,341 |
| Dicamba, Dimet. salt | 6 | 1.0 | 0.13 | 0.14 | 348 |
| Dicamba, Pot. salt | 7 | 1.0 | 0.38 | 0.38 | 1,046 |
| Diflufenzopyr-sodium | 6 | 1.0 | 0.05 | 0.05 | 122 |
| Dimethenamid-P | 4 | 1.0 | 0.83 | 0.83 | 1,460 |
| Flumetsulam | 3 | 1.0 | 0.03 | 0.03 | 36 |
| Glufosinate-ammonium | 7 | 1.0 | 0.32 | 0.33 | 974 |
| Glyphosate | 29 | 1.3 | 0.62 | 1.02 | 12,273 |
| Mesotrione | 14 | 1.0 | 0.10 | 0.10 | 610 |
| Nicosulfuron | 20 | 1.0 | 0.02 | 0.02 | 181 |
| Primisulfuron | 2 | 1.0 | 0.02 | 0.02 | 20 |
| Rimsulfuron | 16 | 1.0 | 0.01 | 0.01 | 72 |
| S-Metolachlor | 13 | 1.0 | 1.69 | 1.69 | 9,058 |
| **Insecticides** | | | | | |
| Bifenthrin | 4 | 1.0 | 0.08 | 0.08 | 119 |
| Chlorpyrifos | 6 | 1.0 | 1.04 | 1.04 | 2,529 |
| Cyfluthrin | 14 | 1.0 | 0.01 | 0.01 | 37 |
| Tebupirimphos | 14 | 1.0 | 0.13 | 0.13 | 740 |
| Tefluthrin | 4 | 1.0 | 0.08 | 0.08 | 119 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following**: 2,4-D, Bentazon, Bromoxynil, Dicamba, Sodium salt, Dimethenamid, EPTC, Foramsulfuron, Glyphosate diam, salt, Imazapyr, Imazethapyr and Sethoxydim.
**Insecticides applied but not published included the following:** Fipronil, Lambda-cyhalothrin and Terbufos.

**Table 11.** Pesticide applications and rates for corn – Region 8

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* | *Pounds per Acre* | *Total Pounds* |
| **Herbicides** | | | (A.I.) | (A.I.) | (A.I.) |
| 2,4-D | 1 | 1.0 | 0.35 | 0.35 | 330 |
| Acetochlor | 34 | 1.0 | 1.65 | 1.65 | 77,731 |
| Atrazine | 29 | 1.0 | 0.60 | 0.61 | 25,205 |
| Bromoxynil | 2 | 1.0 | 0.21 | 0.21 | 496 |
| Clopyralid | 11 | 1.0 | 0.11 | 0.11 | 1,755 |
| Dicamba | 12 | 1.0 | 0.29 | 0.29 | 4,954 |
| Dicamba, Dimet. salt | 3 | 1.0 | 0.14 | 0.14 | 652 |
| Dicamba, Pot. salt | 4 | 1.0 | 0.40 | 0.40 | 2,228 |
| Dicamba, Sodium salt | 3 | 1.0 | 0.12 | 0.12 | 563 |
| Diflufenzopyr-sodium | 6 | 1.0 | 0.05 | 0.05 | 393 |
| Dimethenamid | 3 | 1.0 | 1.37 | 1.37 | 5,969 |
| Dimethenamid-P | 5 | 1.0 | 0.89 | 0.89 | 5,941 |
| EPTC | 1 | 1.0 | 4.03 | 4.03 | 3,471 |
| Flumetsulam | 11 | 1.0 | 0.04 | 0.04 | 625 |
| Glufosinate-ammonium | 8 | 1.1 | 0.29 | 0.33 | 3,801 |
| Glyphosate | 19 | 1.3 | 0.59 | 0.99 | 25,736 |
| Mesotrione | 19 | 1.0 | 0.11 | 0.11 | 2,942 |
| Nicosulfuron | 15 | 1.0 | 0.02 | 0.02 | 468 |
| Pendimethalin | 1 | 1.0 | 0.96 | 0.96 | 998 |
| Primisulfuron | 3 | 1.0 | 0.02 | 0.02 | 84 |
| Rimsulfuron | 10 | 1.0 | 0.01 | 0.01 | 165 |
| S-Metolachlor | 15 | 1.0 | 1.75 | 1.76 | 37,391 |
| **Insecticides** | | | | | |
| Bifenthrin | 2 | 1.0 | 0.08 | 0.08 | 183 |
| Chlorpyrifos | 3 | 1.0 | 0.81 | 0.81 | 3,664 |
| Cyfluthrin | 5 | 1.0 | 0.01 | 0.01 | 39 |
| Fipronil | 2 | 1.0 | 0.11 | 0.11 | 295 |
| Tebupirimphos | 5 | 1.0 | 0.11 | 0.11 | 788 |
| Tefluthrin | 2 | 1.0 | 0.06 | 0.06 | 172 |
| Terbufos | 2 | 1.0 | 1.03 | 1.03 | 2,353 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following**: Alachlor, Bentazon, Carfentrazone-ethyl, Flufenacet, Foramsulfuron, Glyphosate diam salt, Halosulfuron, Imazapyr, Imazethapyr, Metribuzin, Sethoxydim and Thifensulfuron.
**Insecticides applied but not published included the following:** Carbofuran and Permethrin.

**Table 12.** Pesticide applications and rates for corn – Region 9

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* | *Pounds per Acre* | *Total Pounds* |
| **Herbicides** | | | (A.I.) | (A.I.) | (A.I.) |
| 2,4-D | 3 | 1.0 | 0.40 | 0.40 | 470 |
| Acetochlor | 33 | 1.0 | 1.87 | 1.88 | 22,445 |
| Alachlor | 1 | 1.0 | 1.58 | 1.58 | 469 |
| Atrazine | 57 | 1.0 | 0.71 | 0.74 | 15,663 |
| Bromoxynil | 5 | 1.0 | 0.24 | 0.24 | 421 |
| Clopyralid | 19 | 1.0 | 0.12 | 0.12 | 805 |
| Dicamba | 7 | 1.0 | 0.15 | 0.15 | 418 |
| Dicamba, Dimet. salt | 1 | 1.0 | 0.13 | 0.13 | 39 |
| Dicamba, Pot. salt | 5 | 1.2 | 0.37 | 0.54 | 1,075 |
| Dicamba, Sodium salt | 1 | 1.0 | 0.12 | 0.12 | 30 |
| Diflufenzopyr-sodium | 1 | 1.0 | 0.05 | 0.05 | 21 |
| Dimethenamid-P | 1 | 1.0 | 0.94 | 0.94 | 410 |
| Flumetsulam | 19 | 1.0 | 0.04 | 0.04 | 284 |
| Foramsulfuron | 1 | 1.0 | 0.03 | 0.03 | 9 |
| Glufosinate-ammonium | 8 | 1.0 | 0.31 | 0.31 | 902 |
| Glyphosate | 12 | 1.2 | 0.65 | 0.93 | 4,126 |
| Mesotrione | 20 | 1.0 | 0.13 | 0.13 | 987 |
| Nicosulfuron | 23 | 1.0 | 0.02 | 0.02 | 162 |
| Primisulfuron | 6 | 1.0 | 0.02 | 0.02 | 47 |
| Rimsulfuron | 17 | 1.0 | 0.01 | 0.01 | 66 |
| S-Metolachlor | 22 | 1.0 | 1.61 | 1.61 | 12,746 |
| **Insecticide** | | | | | |
| Chlorpyrifos | 2 | 1.0 | 1.13 | 1.13 | 632 |
| Cyfluthrin | 5 | 1.0 | 0.01 | 0.01 | 12 |
| Tebupirimphos | 5 | 1.0 | 0.14 | 0.14 | 232 |
| Tefluthrin | 6 | 1.0 | 0.12 | 0.12 | 241 |
| Terbufos | 1 | 1.0 | 1.00 | 1.00 | 311 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following**: Bentazon, Flumiclorac-pentyl, Halosulfuron, Imazapyr, Imazethapyr and Pendimethalin.
**Insecticides applied but not published included the following:** Bifenthrin, Carbofuran and Fipronil.

**Table 13.** Pesticide applications and rates for corn – Region 10

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* | *Pounds per Acre* | *Total Pounds* |
| **Herbicides** | | | (A.I.) | (A.I.) | (A.I.) |
| Acetochlor | 24 | 1.0 | 1.46 | 1.46 | 5,635 |
| Atrazine | 45 | 1.0 | 0.60 | 0.60 | 4,422 |
| Clopyralid | 23 | 1.0 | 0.10 | 0.10 | 378 |
| Dicamba | 7 | 1.0 | 0.17 | 0.17 | 183 |
| Flumetsulam | 23 | 1.0 | 0.04 | 0.04 | 137 |
| Glufosinate-ammonium | 8 | 1.0 | 0.35 | 0.35 | 448 |
| Glyphosate | 13 | 1.1 | 0.79 | 0.87 | 1,891 |
| Mesotrione | 25 | 1.0 | 0.12 | 0.12 | 473 |
| Nicosulfuron | 26 | 1.0 | 0.02 | 0.02 | 87 |
| Pendimethalin | 6 | 1.0 | 0.95 | 0.95 | 877 |
| Primisulfuron | 4 | 1.0 | 0.02 | 0.02 | 14 |
| Rimsulfuron | 25 | 1.0 | 0.01 | 0.01 | 48 |
| S-Metolachlor | 19 | 1.0 | 1.64 | 1.64 | 5,115 |
| **Insecticides** | | | | | |
| Cyfluthrin | 8 | 1.0 | 0.01 | 0.01 | 9 |
| Tebupirimphos | 8 | 1.0 | 0.14 | 0.14 | 186 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following:** Alachlor, Cyanazine, Dicamba, Dimet. Salt. Dicamba, Pot. Salt, Dicamba, Sodium salt, Diflufenzopyr-sodium, Dimethenamid-P, Foramsulfuron, Imazapyr and Imazethapyr.
**Insecticides applied but not published included the following:** Bifenthrin, Chlorethoxyfos, Chlorpyrifos, Fipronil, Lambda-cyhalothrin, Phorate, Tefluthrin and Terbufos.

# Statewide Pesticide Applications – Soybeans

Many pesticide active ingredients can be used in the production of soybeans. Soybean producers responding to the survey associated with this report may have used one or more of the active ingredients listed in Table 14; however, data is only published for pesticides applied by 5 or more respondents. This is consistent with standard reporting protocol used by NASS in other agricultural chemical use reports.

To obtain a list of products (brand names) registered in Minnesota and containing the active ingredients listed below, visit http://state.ceris.purdue.edu/doc/mn/statemn.html, enter the database, submit "active ingredient" as the search option, enter the name of the active ingredient, click "submit," check the appropriate boxes, and "submit" to obtain a list of all registered products containing the active ingredient.

**Table 14.** Publication status for soybean pesticide active ingredients

A * denotes data is not publishable due to use by < 5 respondents

| Active Ingredient | Published | Active Ingredient | Published |
|---|---|---|---|
| **Herbicides** | | **Insecticide** | |
| 2,4-D | * | Carbofuran | * |
| Acifluorfen | P | Chlorpyrifos | P |
| Alachlor | P | Esfenvalerate | P |
| Bentazon | P | Lambda-cyhalothrin | P |
| Chlorimuron-ethyl | P | Permethrin | P |
| Clethodim | P | Phorate | * |
| Clomazone | * | Zeta-cypermethrin | P |
| Cloransulam-methyl | P | | |
| Dicamba | * | | |
| Dimethenamid-P | * | | |
| Ethalfluralin | * | | |
| Fenoxaprop | P | | |
| Fluazifop-P-butyl | P | | |
| Flufenacet | * | | |
| Flumetsulam | P | | |
| Flumiclorac-pentyl | * | | |
| Flumioxazin | P | | |
| Fomesafen | P | | |
| Glufosinate-ammonium | * | | |
| Glyphosate | P | | |
| Glyphosate diam salt | P | | |
| Imazamox | P | | |
| Imazethapyr | P | | |
| Lactofen | P | | |
| Linuron | * | | |
| Metribuzin | P | | |
| Paraquat | * | | |
| Pendimethalin | P | | |
| Quizalofop-P-ethyl | P | | |
| Quizalofop-ethyl | * | | |
| S-Metolachlor | P | | |
| Sethoxydim | P | | |
| Sulfentrazone | P | | |
| Thifensulfuron | P | | |
| Trifluralin | P | | |

A statewide summary of soybean pesticide applications is provided in Table 15. Six percent (6%) of all Minnesota soybean acres were surveyed for the 2003 season. Herbicides were applied to 96% of all surveyed soybean acres. Insecticides were applied to 31% of all acres and less than 1% of surveyed acres received fungicides. Pesticides used on more than 10% of soybean acres were gyphosate and lambda-cyhalothrin.

**Table 15.** Pesticide applications and rates by active ingredient (a.i.) for soybeans statewide

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acifluorfen | <1 | 1.2 | 0.18 | 0.23 | 186 |
| Alachlor | <1 | 1.0 | 1.60 | 1.60 | 788 |
| Bentazon | 1 | 1.1 | 0.77 | 0.83 | 2,422 |
| Chlorimuron-ethyl | <1 | 1.0 | 0.00 | 0.00 | 1 |
| Clethodim | 2 | 1.0 | 0.09 | 0.09 | 667 |
| Cloransulam-methyl | 3 | 1.0 | 0.03 | 0.03 | 387 |
| Fenoxaprop | 1 | 1.0 | 0.11 | 0.11 | 345 |
| Fluazifop-P-butyl | 1 | 1.0 | 0.04 | 0.04 | 141 |
| Flumetsulam | <1 | 1.0 | 0.14 | 0.14 | 280 |
| Flumioxazin | <1 | 1.1 | 0.07 | 0.08 | 121 |
| Fomesafen | 4 | 1.0 | 0.18 | 0.18 | 3,397 |
| Glyphosate | 79 | 1.4 | 0.75 | 1.05 | 354,259 |
| Glyphosate diam salt | 6 | 1.3 | 0.62 | 0.80 | 22,191 |
| Imazamox | 7 | 1.0 | 0.03 | 0.03 | 893 |
| Imazethapyr | 6 | 1.0 | 0.05 | 0.05 | 1,331 |
| Lactofen | 1 | 1.0 | 0.09 | 0.09 | 376 |
| Metribuzin | <1 | 1.1 | 0.29 | 0.33 | 623 |
| Pendimethalin | 6 | 1.0 | 1.00 | 1.00 | 24,816 |
| Quizalofop-P-ethyl | <1 | 1.0 | 0.06 | 0.06 | 33 |
| S-Metolachlor | <1 | 1.0 | 1.17 | 1.17 | 1,552 |
| Sethoxydim | 1 | 1.0 | 0.24 | 0.24 | 799 |
| Sulfentrazone | 1 | 1.0 | 0.22 | 0.22 | 697 |
| Thifensulfuron | 1 | 1.0 | 0.00 | 0.00 | 11 |
| Trifluralin | 4 | 1.0 | 0.79 | 0.79 | 14,268 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 9 | 1.0 | 0.55 | 0.55 | 20,473 |
| Esfenvalerate | 6 | 1.0 | 0.03 | 0.03 | 810 |
| Lambda-cyhalothrin | 12 | 1.0 | 0.02 | 0.02 | 1,172 |
| Permethrin | <1 | 1.0 | 0.10 | 0.10 | 122 |
| Zeta-cypermethrin | <1 | 1.0 | 0.07 | 0.07 | 150 |

# Regional Pesticide Applications – Soybeans

Table 16 details the number of respondents with usable reports in each region, the number of soybean acres in each region and the number of soybean acres receiving herbicides, insecticides and fungicides. No fungicide was applied to on surveyed soybean acres. Tables 17 – 24 provide soybean pesticide applications and rates by individual region.

**Table 16. S**ummary (by region) of surveyed soybean acreage to which pesticides were applied

| Region | Number of Respondents | Soybean Acres | Herbicide Acres | Insecticide Acres | Fungicide Acres |
|---|---|---|---|---|---|
| 1 | 253 | 130,173 | 122,035 | 16,586 | |
| 4 | 144 | 28,491 | 27,991 | 10,426 | |
| 5 | 37 | 4,791 | 4,586 | 1,331 | |
| 6 | 165 | 62,218 | 59,996 | 15,030 | |
| 7 | 160 | 40,249 | 39,039 | 17,581 | |
| 8 | 479 | 127,840 | 125,049 | 59,989 | |
| 9 | 156 | 25,552 | 25,008 | 9,397 | |
| 10 | 80 | 10,447 | 10,094 | 2,267 | |
| **Totals** | **1,474** | **429,761** | **413,798** | **132,607** | **0** |

**Table 17.** Pesticide applications and rates for soybean – Region 1

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Bentazon | 2 | 1.0 | 0.79 | 0.79 | 1,975 |
| Clethodim | 1 | 1.0 | 0.06 | 0.06 | 69 |
| Cloransulam-methyl | 5 | 1.1 | 0.02 | 0.02 | 174 |
| Fomesafen | 3 | 1.0 | 0.18 | 0.18 | 662 |
| Glyphosate | 64 | 1.4 | 0.52 | 0.71 | 82,350 |
| Glyphosate diam salt | 3 | 1.7 | 0.28 | 0.50 | 3,258 |
| Imazamox | 22 | 1.0 | 0.03 | 0.03 | 801 |
| Imazethapyr | 5 | 1.0 | 0.06 | 0.06 | 392 |
| Lactofen | 2 | 1.0 | 0.09 | 0.09 | 285 |
| Pendimethalin | 9 | 1.0 | 1.11 | 1.11 | 13,410 |
| Sethoxydim | 2 | 1.0 | 0.24 | 0.24 | 713 |
| Thifensulfuron | 1 | 1.0 | 0.00 | 0.00 | 4 |
| Trifluralin | 6 | 1.0 | 0.86 | 0.86 | 6,600 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 1 | 1.0 | 0.37 | 0.37 | 516 |
| Esfenvalerate | 5 | 1.0 | 0.03 | 0.03 | 233 |
| Lambda-cyhalothrin | 5 | 1.0 | 0.02 | 0.02 | 160 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following**: Acifluorfen, Alachlor, Flumetsulam, Flumioxazin, Quizalofop-P-ethyl, S-Metolachlor and Sulfentrazone.

**Table 18.** Pesticide applications and rates for soybean – Region 4

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Clethodim | 3 | 1.1 | 0.12 | 0.13 | 104 |
| Cloransulam-methyl | 2 | 1.0 | 0.02 | 0.02 | 9 |
| Fomesafen | 5 | 1.0 | 0.23 | 0.23 | 322 |
| Glyphosate | 94 | 1.3 | 0.58 | 0.74 | 25,574 |
| Glyphosate diam salt | 5 | 1.9 | 0.29 | 0.56 | 1,605 |
| Imazethapyr | 13 | 1.0 | 0.06 | 0.06 | 209 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 11 | 1.0 | 0.51 | 0.51 | 1,620 |
| Esfenvalerate | 8 | 1.0 | 0.03 | 0.03 | 82 |
| Lambda-cyhalothrin | 16 | 1.0 | 0.02 | 0.02 | 102 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following**: Acifluorfen, Alachlor, Bentazon, Imazamox, Pendimethalin, Quizalofop-P-ethyl, Thifensulfuron and Trifluralin.
**Insecticides applied but not published included the following:** Zeta-cypermethrin.

**Table 19.** Pesticide applications and rates for soybean – Region 5

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* | *Pounds per Acre* | *Total Pounds* |
| **Herbicides** | | | (A.I.) | (A.I.) | (A.I.) |
| Glyphosate | 90 | 1.0 | 0.90 | 0.90 | 3,900 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following**: Chlorimuron-ethyl, Cloransulam-methyl, Fenoxaprop, Fluazifop-P-butyl, Imazethapyr, Sulfentrazone and Thifensulfuron.
**Insecticides applied but not published included the following:** Chlorpyrifos and Esfenvalerate.

**Table 20.** Pesticide applications and rates for soybean – Region 6

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Fomesafen | 2 | 1.0 | 0.22 | 0.22 | 262 |
| Glyphosate | 86 | 1.4 | 0.56 | 0.78 | 58,976 |
| Glyphosate diam salt | 8 | 1.5 | 0.49 | 0.74 | 6,127 |
| Imazamox | 2 | 1.0 | 0.03 | 0.03 | 37 |
| Imazethapyr | 4 | 1.0 | 0.06 | 0.06 | 154 |
| Pendimethalin | 4 | 1.0 | 0.89 | 0.89 | 2,481 |
| Chlorpyrifos | 10 | 1.0 | 0.54 | 0.54 | 3,274 |
| Esfenvalerate | 5 | 1.0 | 0.03 | 0.03 | 101 |
| Lambda-cyhalothrin | 6 | 1.0 | 0.03 | 0.03 | 97 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following**: Acifluorfen, Bentazon, Clethodim, Cloransulam-methyl, Quizalofop-P-ethyl, Sethoxydim, Sulfentrazone and Trifluralin.
**Insecticides applied but not published included the following:** Zeta-cypermethrin.

**Table 21.** Pesticide applications and rates for soybean – Region 7

**Pesticide Applications And Rates By Active Ingredient For Soybeans, Region 7**

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Clethodim | 2 | 1.0 | 0.09 | 0.09 | 64 |
| Fomesafen | 4 | 1.0 | 0.22 | 0.22 | 340 |
| Glyphosate | 80 | 1.4 | 0.54 | 0.74 | 32,224 |
| Glyphosate diam salt | 15 | 1.1 | 0.54 | 0.57 | 3,539 |
| Imazethapyr | 4 | 1.0 | 0.05 | 0.05 | 85 |
| Pendimethalin | 5 | 1.0 | 1.02 | 1.02 | 2,047 |
| Trifluralin | 6 | 1.0 | 0.82 | 0.82 | 2,039 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 12 | 1.0 | 0.53 | 0.53 | 2,507 |
| Lambda-cyhalothrin | 16 | 1.0 | 0.02 | 0.02 | 140 |
| Zeta-cypermethrin | 4 | 1.0 | 0.08 | 0.08 | 137 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following**: Acifluorfen, Cloransulam-methyl, Fenoxaprop, Fluazifop-P-butyl, Imazamox, Metribuzin, S-Metolachlor, Sethoxydim and Thifensulfuron.
**Insecticides applied but not published included the following:** Esfenvalerate and Permethrin.

**Table 22.** Pesticide applications and rates for soybean – Region 8

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Clethodim | 3 | 1.0 | 0.08 | 0.09 | 338 |
| Cloransulam-methyl | 3 | 1.0 | 0.03 | 0.03 | 138 |
| Fenoxaprop | 2 | 1.0 | 0.10 | 0.10 | 197 |
| Fluazifop-P-butyl | 2 | 1.0 | 0.04 | 0.04 | 93 |
| Flumioxazin | 1 | 1.1 | 0.07 | 0.08 | 79 |
| Fomesafen | 8 | 1.0 | 0.16 | 0.16 | 1,714 |
| Glyphosate | 80 | 1.5 | 0.49 | 0.76 | 117,087 |
| Glyphosate diam salt | 9 | 1.1 | 0.57 | 0.63 | 7,594 |
| Imazamox | 1 | 1.0 | 0.03 | 0.03 | 22 |
| Imazethapyr | 6 | 1.0 | 0.05 | 0.05 | 343 |
| Lactofen | 1 | 1.2 | 0.08 | 0.10 | 84 |
| Metribuzin | 1 | 1.0 | 0.27 | 0.27 | 355 |
| Pendimethalin | 6 | 1.0 | 0.84 | 0.84 | 6,028 |
| S-Metolachlor | 0 | 1.0 | 1.10 | 1.10 | 619 |
| Sulfentrazone | 1 | 1.0 | 0.19 | 0.19 | 236 |
| Thifensulfuron | 1 | 1.0 | 0.00 | 0.00 | 4 |
| Trifluralin | 6 | 1.0 | 0.72 | 0.72 | 5,294 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 14 | 1.0 | 0.54 | 0.54 | 9,673 |
| Esfenvalerate | 7 | 1.0 | 0.03 | 0.03 | 301 |
| Lambda-cyhalothrin | 19 | 1.0 | 0.02 | 0.02 | 546 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following**: Acifluorfen, Alachlor, Bentazon, Chlorimuron-ethyl, Flumetsulam, Quizalofop-P-ethyl and Sethoxydim.
**Insecticides applied but not published included the following:** Permethrin.

**Table 23.** Pesticide applications and rates for soybean – Region 9

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Clethodim | 2 | 1.0 | 0.08 | 0.08 | 46 |
| Cloransulam-methyl | 3 | 1.0 | 0.03 | 0.03 | 29 |
| Glyphosate | 96 | 1.4 | 0.60 | 0.83 | 25,369 |
| Imazethapyr | 8 | 1.0 | 0.06 | 0.06 | 125 |
| Sulfentrazone | 3 | 1.0 | 0.30 | 0.30 | 211 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 8 | 1.0 | 0.52 | 0.52 | 1,011 |
| Esfenvalerate | 3 | 1.0 | 0.02 | 0.02 | 15 |
| Lambda-cyhalothrin | 17 | 1.0 | 0.02 | 0.02 | 97 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following**: Chlorimuron-ethyl, Fenoxaprop, Fluazifop-P-butyl, Fomesafen, Glyphosate diam salt, Imazamox, Lactofen, Metribuzin, Pendimethalin, S-Metolachlor, Thifensulfuron and Trifluralin.
**Insecticides applied but not published included the following:**
Lambda-cyhalothrin, Permethrin and Zeta-cypermethrin.

**Table 24.** Pesticide applications and rates for soybean – Region 10

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Glyphosate | 99 | 1.2 | 0.70 | 0.80 | 8,780 |
| Imazethapyr | 3 | 1.0 | 0.05 | 0.05 | 18 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 9 | 1.0 | 0.50 | 0.50 | 439 |
| Lambda-cyhalothrin | 15 | 1.0 | 0.02 | 0.02 | 31 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following**: Alachlor, Bentazon, Clethodim, Fenoxaprop, Fluazifop-P-butyl, Fomesafen, Glyphosate diam salt, Quizalofop-P-ethyl, Sulfentrazone, Thifensulfuron and Trifluralin.
**Insecticides applied but not published included the following:** Esfenvalerate.

# Statewide Pesticide Applications – Wheat

Many pesticide active ingredients can be used in the production of wheat. Wheat producers responding to the survey associated with this report may have used one or more of the active ingredients listed in Table 25; however, data is only published for pesticides applied by 5 or more respondents. This is consistent with standard reporting protocol used by NASS in other agricultural chemical use reports.

To obtain a list of products (brand names) registered in Minnesota and containing the active ingredients listed below, visit http://state.ceris.purdue.edu/doc/mn/statemn.html, enter the database, submit "active ingredient" as the search option, enter the name of the active ingredient, click "submit," check the appropriate boxes, and "submit" to obtain a list of all registered products containing the active ingredient.

## Table 25. Publication status for wheat pesticide active ingredients

A * denotes data is not publishable due to use by < 5 respondents

| Active Ingredient | Published | Active Ingredient | Published |
|---|---|---|---|
| **Herbicides** | | **Insecticides** | |
| 2,4-D | P | Carbofuran | * |
| Bromoxynil | P | Chlorpyrifos | * |
| Bromoxynil octanoate | P | Disulfoton | * |
| Clodinafop-propargil | P | Methyl parathion | P |
| Clopyralid | P | **Fungicides** | |
| Dicamba | P | Propiconazole | P |
| Fenoxaprop | P | Tebuconazole | P |
| Flucarbazone-sodium | P | Trifloxystrobin | P |
| Fluroxypyr | P | | |
| Glyphosate | P | | |
| Glyphosate diam salt | * | | |
| Imazamethabenz | * | | |
| MCPA | P | | |
| Metsulfuron-methyl | * | | |
| Thifensulfuron | P | | |
| Tribenuron-methyl | P | | |
| Trifluralin | * | | |

A statewide summary of wheat pesticide applications is provided in Table 26. Eight percent (8%) of all Minnesota wheat acres were surveyed for the 2003 season. Herbicides were applied to 94% of all surveyed wheat acres. Insecticides were applied to 11% of all acres and 43% of surveyed acres received fungicides. Pesticides used on more than 10% of wheat acres were 2,4-D, bromoxynil octanoate, fenoxaprop, MCPA, thifensulfuron, methyl parathion, propiconazole, and tebuconazole.

**Table 26.** Pesticide applications and rates by active ingredient (a.i.) for wheat statewide

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| 2,4-D | 14 | 1.0 | 0.48 | 0.48 | 9,284 |
| Bromoxynil | 6 | 1.0 | 0.27 | 0.27 | 2,364 |
| Bromoxynil octanoate | 42 | 1.0 | 0.27 | 0.27 | 15,862 |
| Clodinafop-propargil | 6 | 1.0 | 0.05 | 0.05 | 412 |
| Clopyralid | 8 | 1.0 | 0.09 | 0.09 | 1,073 |
| Dicamba | 7 | 1.0 | 0.07 | 0.07 | 732 |
| Fenoxaprop | 36 | 1.0 | 0.06 | 0.06 | 3,137 |
| Flucarbazone-sodium | 3 | 1.0 | 0.02 | 0.02 | 92 |
| Fluroxypyr | 5 | 1.0 | 0.07 | 0.07 | 498 |
| Glyphosate | <1 | 1.0 | 0.54 | 0.54 | 283 |
| MCPA | 67 | 1.0 | 0.31 | 0.31 | 29,742 |
| Thifensulfuron | 10 | 1.0 | 0.01 | 0.01 | 141 |
| Tribenuron-methyl | 2 | 1.0 | 0.01 | 0.01 | 22 |
| **Insecticides** | | | | | |
| Methyl parathion | 10 | 1.0 | 0.38 | 0.38 | 5,155 |
| **Fungicides** | | | | | |
| Propiconazole | 22 | 1.1 | 0.08 | 0.08 | 2,666 |
| Tebuconazole | 23 | 1.0 | 0.11 | 0.11 | 3,687 |
| Trifloxystrobin | 2 | 1.5 | 0.06 | 0.08 | 194 |

# Regional Pesticide Applications – Wheat

Table 27 details the number of respondents with usable reports in each region, the number of wheat acres in each region and the number of wheat acres receiving herbicides, insecticides and fungicides. Tables 28 – 35 provide wheat pesticide applications and rates by individual region.

**Table 27. S**ummary (by region) of surveyed wheat acreage to which pesticides were applied

| Region | Number of Respondents | Wheat Acres | Herbicide Acres | Insecticide Acres | Fungicide Acres |
|---|---|---|---|---|---|
| 1 | 231 | 127,639 | 121,910 | 16,003 | 59,997 |
| 4 | 50 | 4,943 | 4,508 | | 475 |
| 5 | 5 | 115 | 30 | | |
| 6 | 56 | 6,185 | 5,562 | 440 | 80 |
| 7 | 21 | 1,131 | 937 | | 20 |
| 8 | 29 | 1,390 | 937 | | 23 |
| 9 | 3 | 97 | 15 | | |
| 10 | 14 | 711 | 470 | | |
| **Totals** | **409** | **142,211** | **134,369** | **16,443** | **60,615** |

**Table 28.** Pesticide applications and rates for wheat – Region 1

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| 2,4-D | 12 | 1.0 | 0.48 | 0.48 | 7,045 |
| Bromoxynil | 6 | 1.0 | 0.27 | 0.27 | 2,130 |
| Bromoxynil octanoate | 46 | 1.0 | 0.27 | 0.27 | 15,221 |
| Clodinafop-propargil | 7 | 1.0 | 0.05 | 0.05 | 408 |
| Clopyralid | 8 | 1.0 | 0.09 | 0.09 | 878 |
| Dicamba | 8 | 1.0 | 0.07 | 0.07 | 682 |
| Fenoxaprop | 39 | 1.0 | 0.06 | 0.06 | 2,981 |
| Flucarbazone-sodium | 3 | 1.0 | 0.02 | 0.02 | 92 |
| Fluroxypyr | 6 | 1.0 | 0.07 | 0.07 | 498 |
| MCPA | 72 | 1.0 | 0.31 | 0.31 | 27,537 |
| Thifensulfuron | 12 | 1.0 | 0.01 | 0.01 | 140 |
| Tribenuron-methyl | 3 | 1.0 | 0.01 | 0.01 | 21 |
| **Insecticides** | | | | | |
| Methyl parathion | 11 | 1.0 | 0.38 | 0.38 | 5,031 |
| **Fungicides** | | | | | |
| Propiconazole | 25 | 1.1 | 0.08 | 0.08 | 2,609 |
| Tebuconazole | 26 | 1.0 | 0.11 | 0.11 | 3,625 |
| Trifloxystrobin | 2 | 1.5 | 0.06 | 0.08 | 194 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following**: Glyphosate, Glyphosate diam salt, Imazamethabenz and Metsulfuron-methyl.
**Insecticides applied but not published included the following:** Carbofuran, Chlorpyrifos and Disulfoton.

**Table 29.** Pesticide applications and rates for wheat – Region 4

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* | *Pounds per Acre* | *Total Pounds* |
| **Herbicides** | | | (A.I.) | (A.I.) | (A.I.) |
| 2,4-D | 25 | 1.0 | 0.45 | 0.45 | 548 |
| Bromoxynil | 11 | 1.0 | 0.25 | 0.25 | 140 |
| Bromoxynil octanoate | 17 | 1.0 | 0.23 | 0.23 | 196 |
| Clopyralid | 14 | 1.0 | 0.09 | 0.09 | 65 |
| Fenoxaprop | 45 | 1.0 | 0.05 | 0.05 | 103 |
| MCPA | 41 | 1.0 | 0.30 | 0.30 | 606 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following**: Dicamba, Glyphosate, Thifensulfuron and Tribenuron-methyl.
**Fungicides applied but not published included the following**: Propiconazole and Tebuconazole.

**Table 30.** Pesticide applications and rates for wheat – Region 5

**No data was publishable for wheat in Region 5**

**Herbicides applied but not published included the following**: Bromoxynil octanoate, Fenoxaprop, MCPA.

**Table 31.** Pesticide applications and rates for wheat – Region 6

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| 2,4-D | 30 | 1.0 | 0.46 | 0.46 | 874 |
| Bromoxynil octanoate | 23 | 1.0 | 0.27 | 0.27 | 375 |
| Clopyralid | 20 | 1.0 | 0.09 | 0.09 | 109 |
| MCPA | 55 | 1.0 | 0.40 | 0.40 | 1,377 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following**: Bromoxynil, Clodinafop-propargil, Dicamba, Fenoxaprop and Trifluralin.
**Insecticides applied but not published included the following:** Methyl parathion.
**Fungicides applied but not published included the following**: Tebuconazole.

**Table 32.** Pesticide applications and rates for wheat – Region 7

| Agricultural Chemical | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* | *Pounds per Acre* | *Total Pounds* |
| **Herbicides** | | | | | |
| 2,4-D | 46 | 1.0 | 0.41 | 0.41 | 213 |
| MCPA | 36 | 1.0 | 0.30 | 0.30 | 123 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following**: Bromoxynil, Clopyralid and Dicamba.
**Fungicides applied but not published included the following**: Propiconazole.

**Table 33.** Pesticide applications and rates for wheat – Region 8

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* | *Pounds per Acre* | *Total Pounds* |
| **Herbicides** | | | (A.I.) | (A.I.) | (A.I.) |
| 2,4-D | 30 | 1.1 | 0.59 | 0.62 | 262 |
| MCPA | 35 | 1.0 | 0.17 | 0.17 | 84 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following**: Bromoxynil, Bromoxynil octanoate, Clopyralid, Dicamba, Fenoxaprop and Trifluralin.
**Fungicides applied but not published included the following**: Propiconazole.

**Table 34.** Pesticide applications and rates for wheat – Region 9

**No data was publishable for wheat in Region 9**

**Herbicides applied but not published included the following**: 2,4-D and Fenoxaprop.

**Table 35.** Pesticide applications and rates for wheat – Region 10

**Pesticide Applications And Rates By Active Ingredient**
**Wheat Region 10**

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| 2,4-D | 60 | 1.0 | 0.79 | 0.79 | 337 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following**: Bromoxynil octanoate, Glyphosate and MCPA.

# Statewide Pesticide Applications – Hay

Many pesticide active ingredients can be used in the production of hay. Hay producers responding to the survey associated with this report may have used one or more of the active ingredients listed in Table 36; however, data is only published for pesticides applied by 5 or more respondents. This is consistent with standard reporting protocol used by NASS in other agricultural chemical use reports.

To obtain a list of products (brand names) registered in Minnesota and containing the active ingredients listed below, visit http://state.ceris.purdue.edu/doc/mn/statemn.html, enter the database, submit "active ingredient" as the search option, enter the name of the active ingredient, click "submit," check the appropriate boxes, and "submit" to obtain a list of all registered products containing the active ingredient.

**Table 36.** Publication status for hay pesticide active ingredients

A * denotes data is not publishable due to use by < 5 respondents

| Active Ingredient | Published |
|---|---|
| **Herbicides** | |
| 2,4-D | P |
| Bromoxynil | * |
| Clethodim | * |
| Clopyralid | * |
| EPTC | * |
| Glyphosate | P |
| Imazamox | P |
| Imazethapyr | * |
| MCPA | * |
| Metribuzin | * |
| Metsulfuron-methyl | * |
| Sethoxydim | * |
| Trifluralin | * |
| **Insecticides** | |
| Carbaryl | * |
| Chlorpyrifos | P |
| Cyfluthrin | P |
| Dimethoate | P |
| Esfenvalerate | * |
| Lambda-cyhalothrin | P |
| Malathion | * |
| Permethrin | P |
| Zeta-cypermethrin | P |

A statewide summary of hay pesticide applications is provided in Table 37. Five percent (5%) of all Minnesota hay acres were surveyed for the 2003 season. Herbicides were applied to 1% of all surveyed hay acres. Insecticides were applied to 11% of all acres and less than 1% of surveyed acres received fungicides. No single pesticide was used on more than 10% of all hay acres.

**Table 37.** Pesticide applications and rates by active ingredient (a.i.) for hay statewide

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| 2,4-D | * | 1.0 | 0.63 | 0.63 | 84 |
| Glyphosate | * | 1.0 | 1.26 | 1.26 | 222 |
| Imazamox | * | 1.0 | 0.04 | 0.04 | 8 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 1 | 1.2 | 0.59 | 0.69 | 917 |
| Cyfluthrin | 1 | 1.2 | 0.03 | 0.03 | 27 |
| Dimethoate | 1 | 1.0 | 0.43 | 0.43 | 351 |
| Lambda-cyhalothrin | 6 | 1.1 | 0.02 | 0.02 | 123 |
| Permethrin | 1 | 1.3 | 0.13 | 0.17 | 257 |
| Zeta-cypermethrin | * | 1.1 | 0.03 | 0.03 | 10 |

# Regional Pesticide Applications – Hay

Table 38 details the number of respondents with usable reports in each region, the number of hay acres in each region and the number of hay acres receiving herbicides, insecticides and fungicides. Tables 39 – 46 provide hay pesticide applications and rates by individual region.

**Table 38.** Summary (by region) of surveyed hay acreage to which pesticides were applied

| Region | Number of Respondents | Hay Acres | Herbicide Acres | Insecticide Acres | Fungicide Acres |
|---|---|---|---|---|---|
| 1 | 168 | 27,042 | 175 | 710 | |
| 4 | 367 | 29,875 | 176 | 673 | |
| 5 | 184 | 15,631 | 104 | 419 | |
| 6 | 47 | 2,441 | | 460 | |
| 7 | 100 | 4,313 | 48 | 830 | |
| 8 | 220 | 9,141 | 55 | 3,300 | |
| 9 | 201 | 12,018 | 372 | 3,185 | |
| 10 | 124 | 6,171 | | 1,679 | |
| **Totals** | **1,411** | **106,632** | **930** | **11,256** | **0** |

## Table 39. Pesticide applications and rates for hay – Region 1

**No data is publishable for hay in Region 1.**

**Herbicides applied but not published included the following**: 2,4-D, Clethodim, Clopyralid and Imazamox.
**Insecticides applied but not published included the following:** Cyfluthrin, Dimethoate and Lambda-cyhalothrin.

## Table 40. Pesticide applications and rates for hay – Region 4

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Insecticides** | | | | | |
| Lambda-cyhalothrin | 1 | 1.0 | 0.02 | 0.02 | 7 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following**: 2,4-D, Bromoxynil, Glyphosate, Imazamox and Imazethapyr.
**Insecticides applied but not published included the following:** Carbaryl, Cyfluthrin, Dimethoate, Malathion, Permethrin and Zeta-cypermethrin.

## Table 41. Pesticide applications and rates for hay – Region 5

**No data is publishable for hay in Region 5.**

**Herbicides applied but not published included the following**: Clethodim, EPTC and MCPA.
**Insecticides applied but not published included the following:** Cyfluthrin and Permethrin.

**Table 42.** Pesticide applications and rates for hay – Region 6

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* | *Pounds per Acre* | *Total Pounds* |
| **Insecticides** | | | (A.I.) | (A.I.) | (A.I.) |
| Lambda-cyhalothrin | 12 | 1.5 | 0.02 | 0.03 | 9 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Insecticides applied but not published included the following:** Chlorpyrifos and Cyfluthrin.

**Table 43.** Pesticide applications and rates for hay – Region 7

**Pesticide Applications And Rates By Active Ingredient**
**Hay, Region 7**

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* | *Pounds per Acre* | *Total Pounds* |
| **Insecticides** | | | | | |
| Dimethoate | 7 | 1.0 | 0.33 | 0.33 | 97 |
| Lambda-cyhalothrin | 6 | 1.0 | 0.02 | 0.02 | 5 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following**: Sethoxydim and Trifluralin.
**Insecticides applied but not published included the following:** Chlorpyrifos, Cyfluthrin, Permethrin and Sethoxydim.

**Table 44.** Pesticide applications and rates for hay – Region 8

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Insecticides** | | | | | |
| Chlorpyrifos | 8 | 1.2 | 0.47 | 0.58 | 414 |
| Lambda-cyhalothrin | 19 | 1.2 | 0.02 | 0.02 | 42 |
| Permethrin | 9 | 1.4 | 0.13 | 0.17 | 147 |
| Zeta-cypermethrin | 2 | 1.1 | 0.03 | 0.03 | 7 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following**: Bromoxynil, EPTC, Imazethapyr and Metribuzin.
**Insecticides applied but not published included the following:** Esfenvalerate and Malathion.

**Table 45.** Pesticide applications and rates for hay – Region 9

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* | *Pounds per Acre* | *Total Pounds* |
| **Insecticides** | | | | | |
| Chlorpyrifos | 2 | 1.0 | 0.47 | 0.47 | 107 |
| Cyfluthrin | 3 | 1.1 | 0.02 | 0.02 | 7 |
| Lambda-cyhalothrin | 14 | 1.1 | 0.02 | 0.02 | 30 |
| Permethrin | 4 | 1.2 | 0.14 | 0.18 | 87 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Herbicides applied but not published included the following**: Glyphosate, Imazamox, Metsulfuron-methyl and Sethoxydim.
**Insecticides applied but not published included the following:** Dimethoate and Zeta-cypermethrin.

**Table 46.** Pesticide applications and rates for hay – Region 10

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* | *Pounds per Acre* | *Total Pounds* |
| **Insecticides** | | | (A.I.) | (A.I.) | (A.I.) |
| Cyfluthrin | 4 | 1.4 | 0.03 | 0.04 | 11 |
| Lambda-cyhalothrin | 21 | 1.2 | 0.02 | 0.02 | 24 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this region. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or sub-regional levels.

**Insecticides applied but not published included the following:** Chlorpyrifos, Malathion and Permethrin.

# Region 1 County Data

## Clay County

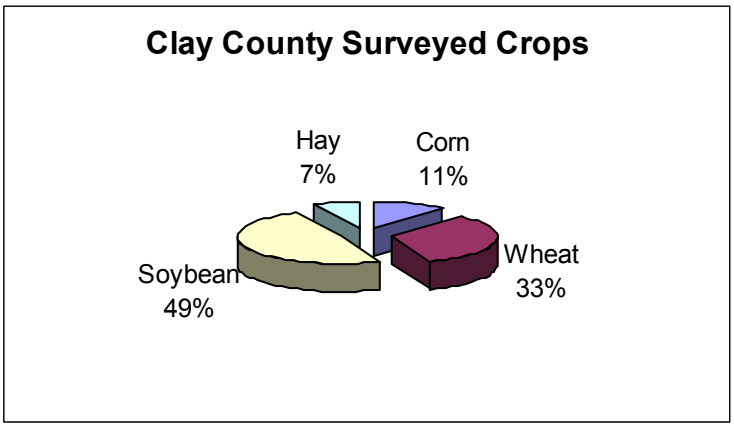



**Table 47.** Clay County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| 2,4-D | 6 | 1.0 | 0.34 | 0.34 | 757 |
| Bromoxynil octanoate | 16 | 1.0 | 0.27 | 0.27 | 1,465 |
| Clopyralid | 2 | 1.0 | 0.10 | 0.10 | 81 |
| Fenoxaprop | 20 | 1.0 | 0.05 | 0.05 | 377 |
| Glyphosate | 27 | 1.2 | 0.67 | 0.79 | 7,472 |
| Glyphosate diam salt | 8 | 1.4 | 0.50 | 0.72 | 1,974 |
| MCPA | 21 | 1.0 | 0.31 | 0.31 | 2,283 |
| Nicosulfuron | 6 | 1.0 | 0.03 | 0.03 | 53 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Propiconazole, Tebuconazole, Trifloxystrobin, Acetochlor, Acifluorfen, Atrazine, Bentazon, Chethodim, Cloransulam-methyl, Dicamba, Dicamba, Dimet. Salt, Dicamba, Sodium salt, Diflufenzopyr-sodium and Dimethenamid-P., EPTC, Flumetsulam, Fluroxypyr, Foramsulfuron, Imazamox, Imazethapyr, Lactofen, Mesotrione, Quizalofop-P-ethyl, Rimsulfuron, S-Metolachlor, Sulfentrazone, Thifensulfuron and Trifluralin.
**Insecticides applied but not published included the following:** Chlorpyrifos, and Lambda-cyhalothrin.
**Fungicides applied but not published included the following**: Propiconazole, Tebuconazole and Trifloxystrobin.

Grant County

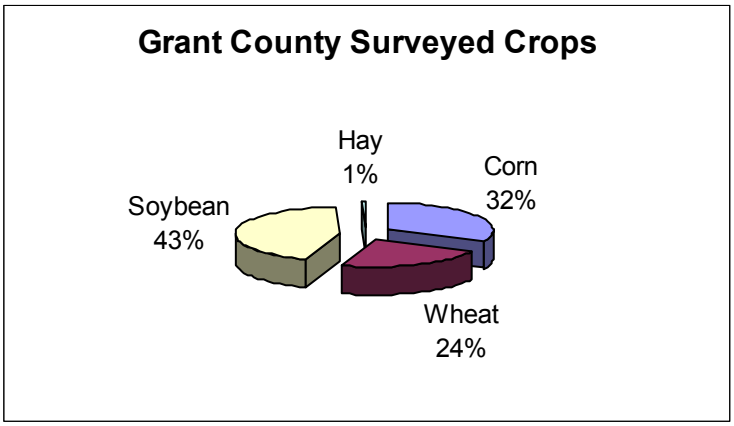



**Table 48.** Grant County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| 2,4-D | 8 | 1.00 | 0.65 | 0.65 | 1,329 |
| Atrazine | 2 | 1.00 | 0.58 | 0.58 | 343 |
| Bromoxynil octanoate | 2 | 1.00 | 0.22 | 0.22 | 89 |
| Clopyralid | 3 | 1.00 | 0.09 | 0.09 | 61 |
| Dicamba | 6 | 1.00 | 0.32 | 0.32 | 459 |
| Fenoxaprop | 9 | 1.00 | 0.05 | 0.05 | 97 |
| Glyphosate | 54 | 1.50 | 0.72 | 1.07 | 14,053 |
| MCPA | 11 | 1.00 | 0.33 | 0.33 | 896 |
| Mesotrione | 9 | 1.00 | 0.09 | 0.09 | 208 |
| Nicosulfuron | 22 | 1.00 | 0.03 | 0.03 | 142 |
| Rimsulfuron | 18 | 1.00 | 0.01 | 0.01 | 56 |
| **Insecticides** | | | | | |
| Esfenvalerate | 17 | 1.00 | 0.03 | 0.03 | 133 |
| Lambda-cyhalothrin | 8 | 1.00 | 0.02 | 0.02 | 45 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Acetochlor, Bromoxynil, Clethodim, Cloransulam-methyl, Dicamba, Dimet. Salt Dicamba, Sodium salt, Diflufenzopyr-sodium, EPTC, Flumetsulam, Fomesafen, Foramsulfuron, Glufosinate-ammonium, Imazethapyr, Sulfentrazone and Thifensulfuron.
**Fungicides applied but not published included the following**: Propiconazole, Tebuconazole and Trifloxystrobin.

Kittson County

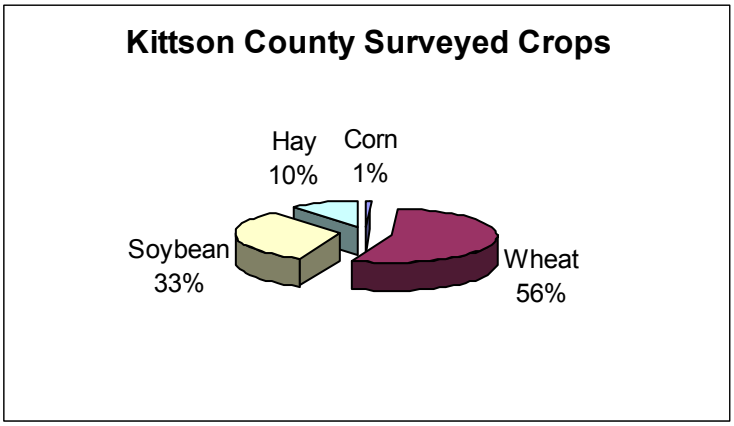



**Table 49.** Kittson County pesticide applications and rates

**Pesticide Applications And Rates By Active Ingredient**
**Kittson County**

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Bromoxynil octanoate | 27 | 1.0 | 0.24 | 0.24 | 2049 |
| Fenoxaprop | 27 | 1.0 | 0.06 | 0.06 | 521 |
| Glyphosate | 35 | 1.2 | 0.64 | 0.75 | 8137 |
| MCPA | 31 | 1.0 | 0.26 | 0.26 | 2522 |
| **Fungicides** | | | | | |
| Tebuconazole | 23 | 1.0 | 0.11 | 0.11 | 788 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Atrazine, Clodinafop-propargil, Clopyralid, Dicamba, Ethalfluralin, Flucarbazone-sodium, Flumioxazin, Fluroxypyr, Foramsulfuron, Imazamox, Sethoxydim, Thifensulfuron and Tribenuron-methyl.
**Insecticides applied but not published included the following:** Chlorpyrifos and Esfenvalerate.
**Fungicides applied but not published included the following**: Propiconazole.

Mahnomen County

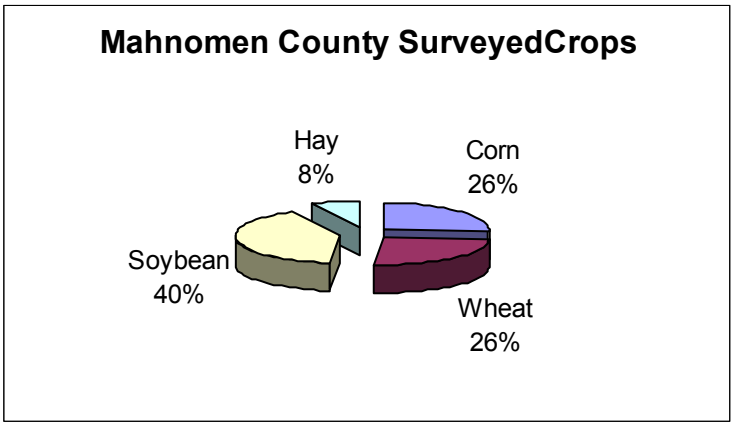



**Table 50.** Mahnomen County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Bromoxynil octanoate | 18 | 1.0 | 0.24 | 0.24 | 712 |
| Cloransulam-methyl | 12 | 1.3 | 0.02 | 0.03 | 59 |
| Fenoxaprop | 31 | 1.0 | 0.06 | 0.06 | 293 |
| Glyphosate | 22 | 1.2 | 0.71 | 0.87 | 3,061 |
| Imazamox | 15 | 1.2 | 0.02 | 0.03 | 72 |
| MCPA | 23 | 1.0 | 0.25 | 0.25 | 964 |
| Thifensulfuron | 4 | 1.0 | 0.02 | 0.02 | 9 |
| Tribenuron-methyl | 4 | 1.0 | 0.01 | 0.01 | 4 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Acetochlor, Clethodim, Dicamba, Dicamba, Dimet. Salt, Dicamba, Sodium salt, Diflufenzopyr-sodium, Dimethenamid-P, EPTC, Flumetsulam, Fomesafen, Imazethapyr, Nicosulfuron, Pendimethalin, Rimsulfuron, S-Metolachlor and Trifluralin.
**Insecticides applied but not published included the following:** Esfenvalerate, Lambda-cyhalothrin and Methyl parathion.
**Fungicides applied but not published included the following**:
Propiconazole and Tebuconazole.

Marshall County

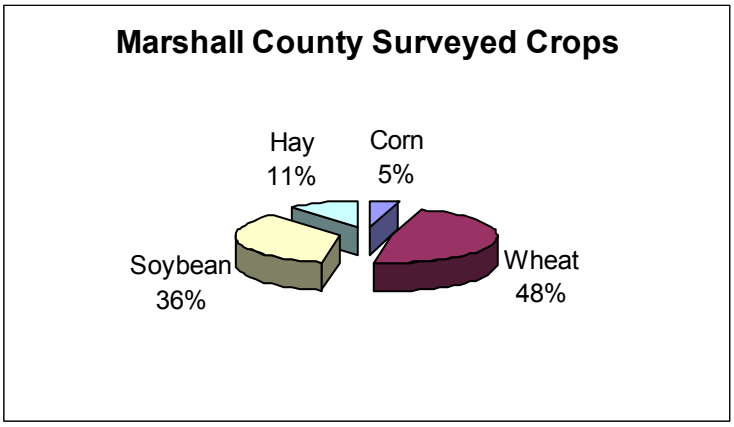



**Table 51.** Marshall County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Bromoxynil octanoate | 38 | 1.0 | 0.28 | 0.28 | 1,986 |
| Fenoxaprop | 18 | 1.0 | 0.05 | 0.05 | 177 |
| Glyphosate | 15 | 1.3 | 0.62 | 0.78 | 2,161 |
| Imazamox | 9 | 1.0 | 0.03 | 0.03 | 46 |
| MCPA | 40 | 1.0 | 0.31 | 0.31 | 2,250 |
| Thifensulfuron | 9 | 1.0 | 0.01 | 0.01 | 12 |
| **Fungicides** | | | | | |
| Tebuconazole | 16 | 1.0 | 0.11 | 0.11 | 319 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**:
2,4-D, Atrazine, Bentazon, Clodinafop-propargil, Clopyralid, Dicamba, Flucarbazone-sodium, Foramsulfuron, Nicosulfuron, Paraquat, Sethoxydim, Tribenuron-methyl and Trifluralin.
**Insecticides applied but not published included the following:** Carbofuran, Esfenvalerate and Methyl parathion.
**Fungicides applied but not published included the following**: Propiconazole.

Norman County

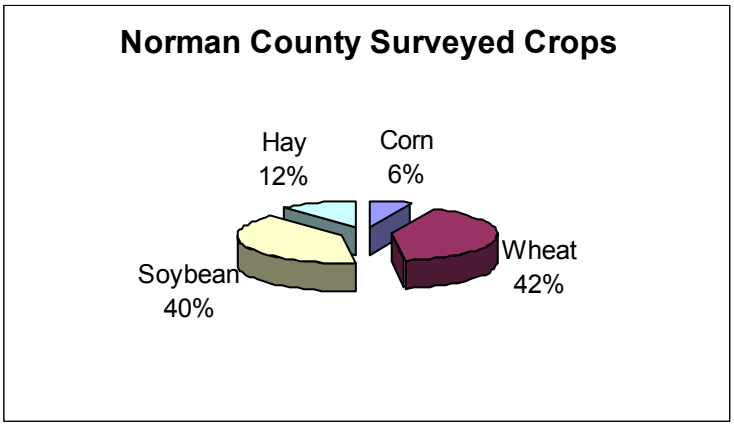



**Table 52.** Norman County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Bromoxynil octanoate | 19 | 1.0 | 0.24 | 0.24 | 954 |
| Fenoxaprop | 20 | 1.0 | 0.05 | 0.05 | 208 |
| Glyphosate | 27 | 1.2 | 0.75 | 0.94 | 5,259 |
| MCPA | 22 | 1.0 | 0.25 | 0.25 | 1,165 |
| Pendimethalin | 10 | 1.0 | 1.17 | 1.17 | 2,386 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Acetochlor, Bentazon, Bromoxynil, Clodinafop-propargil, Clopyralid, Cloransulam-methyl, Dicamba, Dicamba, Sodium salt, Diflufenzopyr-sodium, EPTC, Flucarbazone-sodium, Fluroxypyr, Glyphosate diam salt, Halosulfuron, Imazamox, Imazethapyr, Lactofen, Nicosulfuron, Rimsulfuron, Sethoxydim, Thifensulfuron and Trifluralin.
**Insecticides applied but not published included the following:** Carbaryl, Chlorpyrifos and Lambda-cyhalothrin.
**Fungicides applied but not published included the following**: Propiconazole and Tebuconazole.

Pennington County

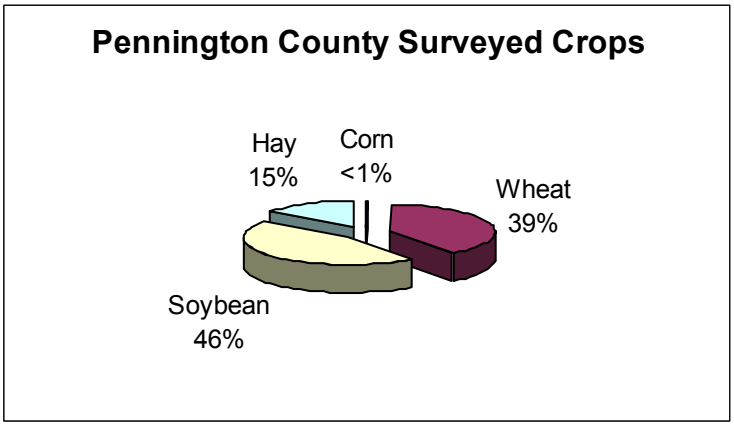



**Table 53.** Pennington County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| 2,4-D | 11 | 1.0 | 0.49 | 0.49 | 1,711 |
| Bromoxynil octanoate | 12 | 1.0 | 0.26 | 0.26 | 936 |
| Clopyralid | 11 | 1.0 | 0.09 | 0.09 | 326 |
| Fenoxaprop | 12 | 1.0 | 0.07 | 0.07 | 240 |
| Glyphosate | 9 | 1.5 | 0.62 | 0.92 | 2,555 |
| Imazamox | 36 | 1.0 | 0.03 | 0.03 | 311 |
| MCPA | 36 | 1.0 | 0.41 | 0.41 | 4,509 |
| Thifensulfuron | 15 | 1.0 | 0.01 | 0.01 | 25 |
| **Fungicides** | | | | | |
| Propiconazole | 22 | 1.2 | 0.06 | 0.07 | 454 |
| Tebuconazole | 9 | 1.0 | 0.11 | 0.11 | 311 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Alachlor, Bentazon, Clodinafop-propargil, Dicamba, Sodium salt, Diflufenzopyr-sodium, Dimethenamid-P, Glufosinate-ammonium, Metsulfuron-methyl, Nicosulfuron, Pendimethalin, S-Metolachlor, Sethoxydim and Tribenuron-methyl.
**Insecticides applied but not published included the following:** Methyl parathion.
**Fungicides applied but not published included the following**: Trifloxystrobin.

Polk County

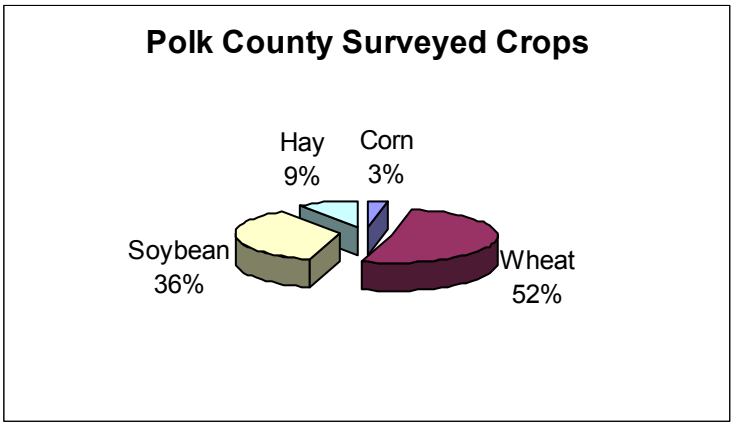



**Table 54.** Polk County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Bromoxynil octanoate | 9 | 1.0 | 0.24 | 0.24 | 615 |
| Dicamba | 13 | 1.0 | 0.08 | 0.08 | 287 |
| Fenoxaprop | 15 | 1.0 | 0.05 | 0.05 | 221 |
| Fluroxypyr | 12 | 1.0 | 0.07 | 0.07 | 264 |
| Glyphosate | 28 | 2.0 | 0.87 | 1.70 | 13,351 |
| Imazamox | 5 | 1.0 | 0.02 | 0.02 | 30 |
| MCPA | 21 | 1.0 | 0.30 | 0.30 | 1,818 |
| **Insecticides** | | | | | |
| Methyl parathion | 24 | 1.0 | 0.43 | 0.43 | 2,908 |
| **Fungicides** | | | | | |
| Propiconazole | 11 | 1.0 | 0.11 | 0.11 | 366 |
| Tebuconazole | 34 | 1.0 | 0.11 | 0.11 | 1,091 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Bentazon, Clodinafop-propargil, Clopyralid, Dicamba, Dimet. Salt, Dicamba, Sodium salt, Diflufenzopyr-sodium, Foramsulfuron, Nicosulfuron, Pendimethalin, Sethoxydim, Thifensulfuron and Trifluralin.
**Insecticides applied but not published included the following:** Chlorpyrifos, Disulfoton, Esfenvalerate and Lambda-cyhalothrin.

Red Lake County

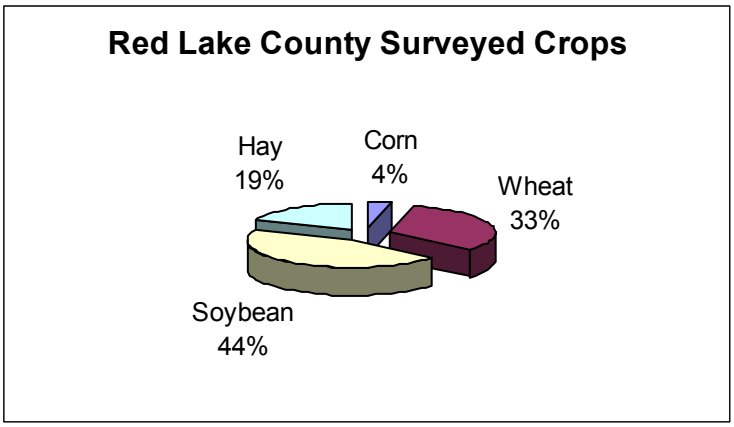



**Table 55.** Red Lake County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| 2,4-D | 6 | 1.0 | 0.44 | 0.44 | 540 |
| Bromoxynil | 7 | 1.0 | 0.26 | 0.26 | 389 |
| Clopyralid | 6 | 1.0 | 0.09 | 0.09 | 111 |
| Fenoxaprop | 19 | 1.0 | 0.06 | 0.06 | 259 |
| Glyphosate | 16 | 1.4 | 0.70 | 0.95 | 3,096 |
| Imazamox | 26 | 1.0 | 0.03 | 0.03 | 162 |
| MCPA | 25 | 1.0 | 0.29 | 0.29 | 1,482 |
| **Fungicides** | | | | | |
| Propiconazole | 7 | 1.0 | 0.08 | 0.08 | 125 |
| Tebuconazole | 13 | 1.0 | 0.11 | 0.11 | 292 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Atrazine, Bromoxynil octanoate, Clopyralid, Cloransulam-methyl, Dicamba, Dicamba, Sodium salt, Diflufenzopyr-sodium, Fluroxypyr, Foramsulfuron, Nicosulfuron, Pendimethalin, Rimsulfuron, S-Metolachlor, Thifensulfuron, Tribenuron-methyl and Trifluralin.
**Insecticides applied but not published included the following:** Dimethoate, Esfenvalerate and Lambda-cyhalothrin.
**Fungicides applied but not published included the following**: Trifloxystrobin.

Roseau County

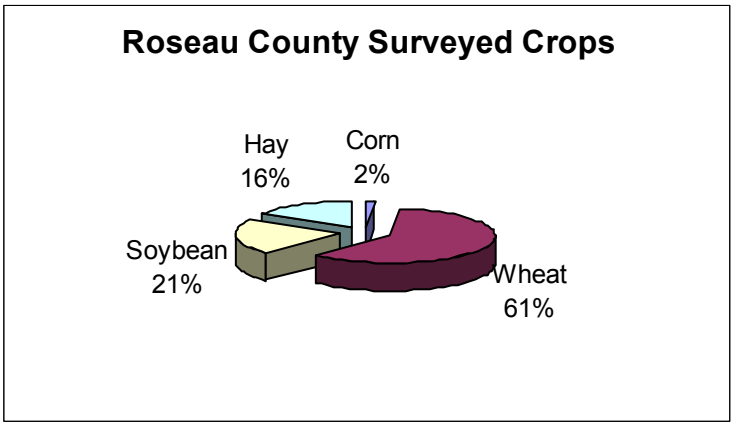



**Table 56.** Roseau County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Bromoxynil octanoate | 46 | 1.0 | 0.31 | 0.31 | 3,224 |
| Clodinafop-propargil | 11 | 1.0 | 0.04 | 0.04 | 98 |
| Fenoxaprop | 30 | 1.0 | 0.10 | 0.10 | 647 |
| Glyphosate | 7 | 1.3 | 0.54 | 0.70 | 1,059 |
| Imazamox | 6 | 1.0 | 0.03 | 0.03 | 43 |
| MCPA | 52 | 1.0 | 0.31 | 0.31 | 3,571 |
| **Insecticides** | | | | | |
| Methyl parathion | 18 | 1.0 | 0.28 | 0.28 | 1,075 |
| **Fungicides** | | | | | |
| Propiconazole | 28 | 1.0 | 0.10 | 0.10 | 649 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Atrazine, Bentazon, Bromoxynil, Clopyralid, Dicamba, Dicamba, Dimet. Salt, Flumetsulam, Foramsulfuron, Imazamethabenz, Nicosulfuron, Pendimethalin, Rimsulfuron, Sethoxydim, Thifensulfuron, Tribenuron-methyl and Trifluralin.
**Fungicides applied but not published included the following**:
Tebuconazole.

Traverse County

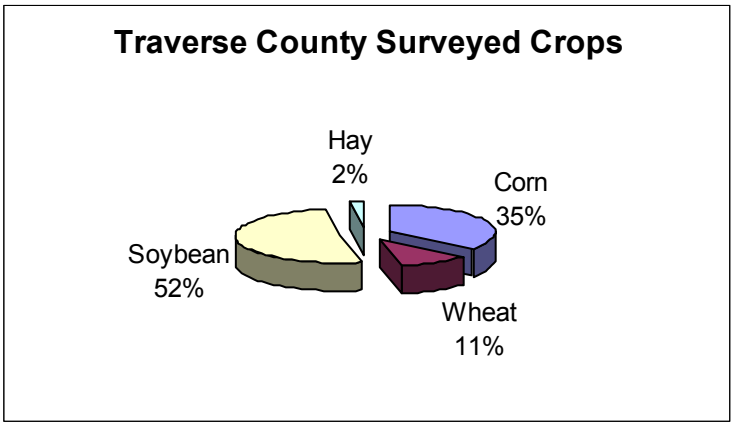



**Table 57.** Traverse County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Atrazine | 17 | 1.0 | 0.82 | 0.82 | 3,683 |
| Dicamba | 7 | 1.0 | 0.38 | 0.38 | 755 |
| Diflufenzopyr-sodium | 6 | 1.0 | 0.05 | 0.05 | 71 |
| Glufosinate-ammonium | 8 | 1.0 | 0.40 | 0.40 | 873 |
| Glyphosate | 54 | 1.3 | 0.73 | 0.92 | 13,588 |
| MCPA | 7 | 1.0 | 0.35 | 0.35 | 656 |
| Nicosulfuron | 8 | 1.0 | 0.02 | 0.02 | 52 |
| Rimsulfuron | 7 | 1.0 | 0.01 | 0.01 | 20 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Acetochlor, Bromoxynil, Bromoxynil octanoate, Clethodim, Clopyralid, Cloransulam-methyl, Dicamba, Dimet. Salt, Dicamba, Sodium salt, Dimethenamid, Dimethenamid-P, EPTC, Flumetsulam, Fomesafen, Foramsulfuron, Imazethapyr, Lactofen, Mesotrione, Pendimethalin and Trifluralin.
**Insecticides applied but not published included the following:**
Cyfluthrin, Esfenvalerate and Lambda-cyhalothrin.

Wilkin County

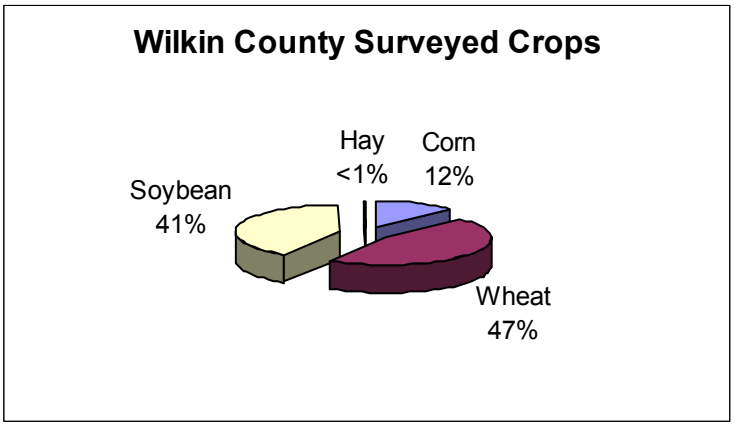



**Table 58.** Wilkin County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 5 | 1.0 | 0.89 | 0.89 | 2,253 |
| Bromoxynil octanoate | 21 | 1.0 | 0.26 | 0.26 | 2,567 |
| Dicamba | 9 | 1.0 | 0.10 | 0.10 | 387 |
| EPTC | 5 | 1.0 | 3.56 | 3.56 | 9,012 |
| Fenoxaprop | 5 | 1.0 | 0.06 | 0.06 | 123 |
| Fomesafen | 4 | 1.0 | 0.19 | 0.19 | 312 |
| Glyphosate | 29 | 1.4 | 0.69 | 0.98 | 13,294 |
| MCPA | 38 | 1.0 | 0.31 | 0.31 | 5,416 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Atrazine, Bromoxynil, Clethodim, Clopyralid, Dicamba, Dimet. Salt, Diflufenzopyr-sodium, Flumetsulam, Fluroxypyr, Foramsulfuron, Glufosinate-ammonium, Glyphosate diam salt, Imazamethabenz, Imazamox, Imazapyr, Imazethapyr, Lactofen, Mesotrione, Nicosulfuron, Pendimethalin, Rimsulfuron, Thifensulfuron and Trifluralin.
**Insecticides applied but not published included the following:**
Esfenvalerate, Lambda-cyhalothrin and Tefluthrin.
**Fungicides applied but not published included the following**:
Propiconazole and Trifloxystrobin.

# Region 4 County Data

## Becker County

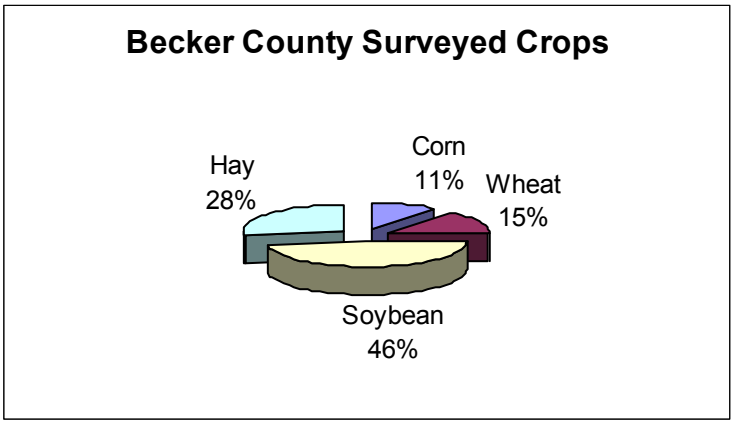



**Table 59.** Becker County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Glyphosate | 58 | 1.2 | 0.71 | 0.85 | 5,857 |
| Glyphosate diam salt | 6 | 1.9 | 0.47 | 0.89 | 714 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Acetochlor, Atrazine, Bromoxynil octanoate, Clopyralid, Cloransulam-methyl, Dicamba, Dicamba, Sodium salt, Diflufenzopyr-sodium, Ethalfluralin, Fenoxaprop, Flumetsulam, Fomesafen, Foramsulfuron, Imazamox, Imazethapyr, MCPA, Mesotrione, Nicosulfuron, Primisulfuron, Rimsulfuron and S-Metolachlor.
**Fungicides applied but not published included the following**: Propiconazole and Tebuconazole.

Benton County

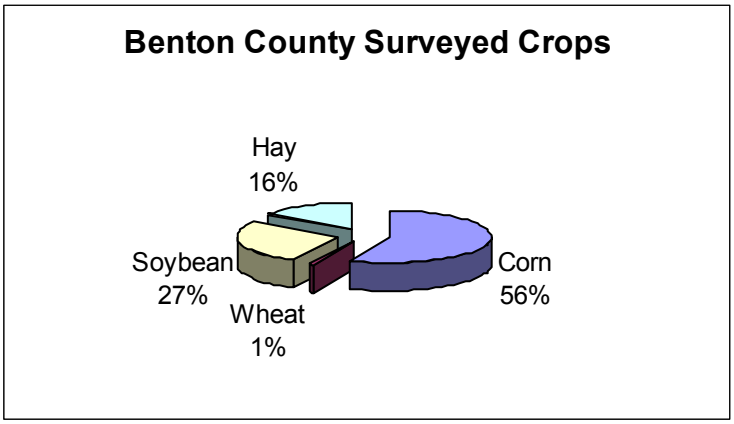



**Table 60.** Benton County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 35 | 1.0 | 1.79 | 1.79 | 3,166 |
| Atrazine | 31 | 1.0 | 0.88 | 0.88 | 1,400 |
| Glyphosate | 45 | 1.2 | 0.59 | 0.71 | 1,625 |
| Insecticide | | | | | |
| Lambda-cyhalothrin | 17 | 1.0 | 0.02 | 0.02 | 19 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Bromoxynil, Bromoxynil octanoate, Dicamba, Dicamba, Sodium slat, Halosulfuron, MCPA, Nicosulfuron and Pendimethalin.

Cass County

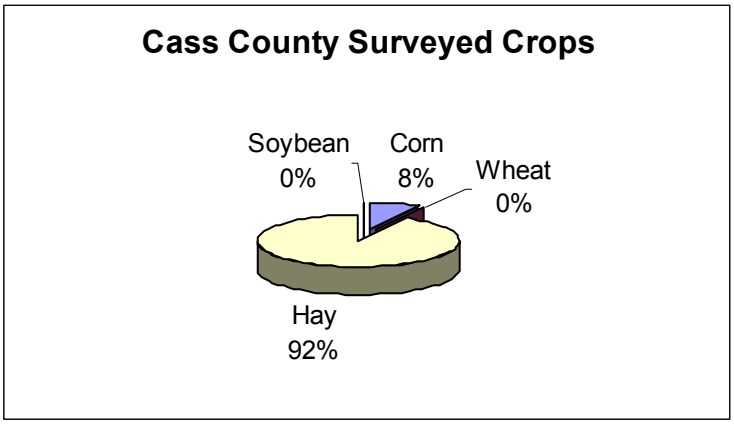



**Table 61.** Cass County pesticide applications and rates

**No data is publishable for Cass County.**

**Herbicides applied but not published included the following**: Alachlor, Atrazine, Foramsulfuron and Glyphosate.

Crow Wing County

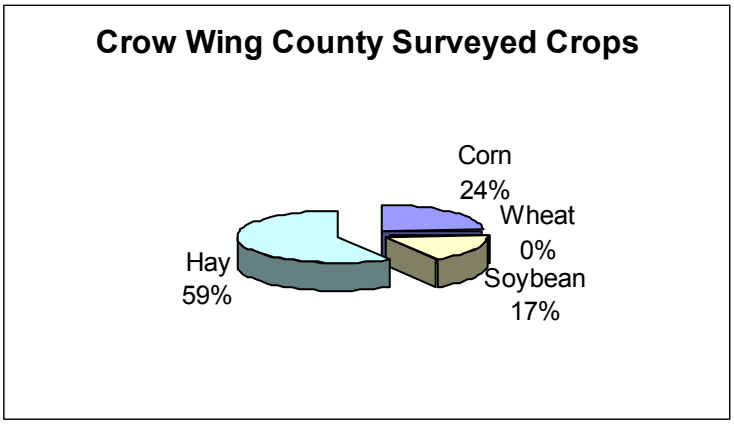



**Table 62.** Crow Wing County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Glyphosate | 31 | 1.0 | 0.69 | 0.73 | 1,152 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Acetochlor, Atrazine, Clopyralid, Flumetsulam, Nicosulfuron and Rimsulfuron.

Douglas County

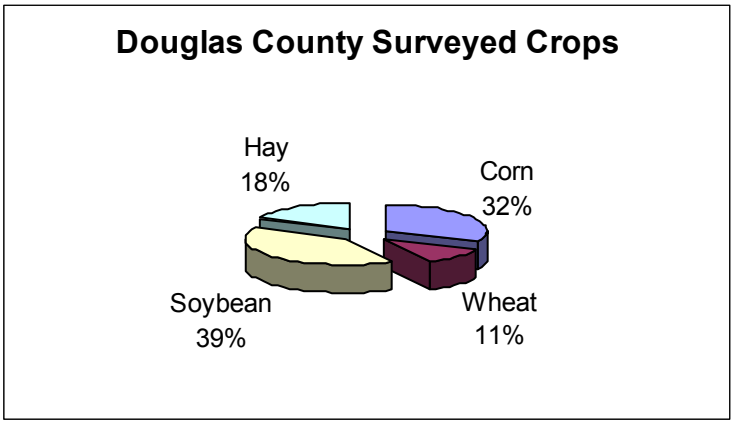



**Table 63.** Douglas County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Atrazine | 8 | 1.0 | 0.53 | 0.53 | 235 |
| Clopyralid | 5 | 1.0 | 0.09 | 0.09 | 26 |
| Dicamba | 9 | 1.0 | 0.31 | 0.31 | 140 |
| Flumetsulam | 5 | 1.0 | 0.03 | 0.03 | 8 |
| Glyphosate | 38 | 1.1 | 0.72 | 0.82 | 1,652 |
| Imazethapyr | 7 | 1.0 | 0.06 | 0.06 | 20 |
| Nicosulfuron | 15 | 1.0 | 0.02 | 0.02 | 19 |
| Rimsulfuron | 10 | 1.0 | 0.01 | 0.01 | 6 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Acetochlor, Bromoxynil, Clethodim, Cloransulam-methyl, Dicamba, Pot. Salt, Dicamba, Sodium salt, Diflufenzopyr-sodium, EPTC, Fenoxaprop, Foramsulfuron, Glufosinate-ammonium, Glyphosate diam salt, Imazapyr, MCPA, Pendimethalin, Thifensulfuron, Tribenuron-methyl and Trifluralin.
**Insecticides applied but not published included the following:** Chlorpyrifos, Esfenvalerate, Lambda-cyhalothrin and Malathion.

Hubbard County

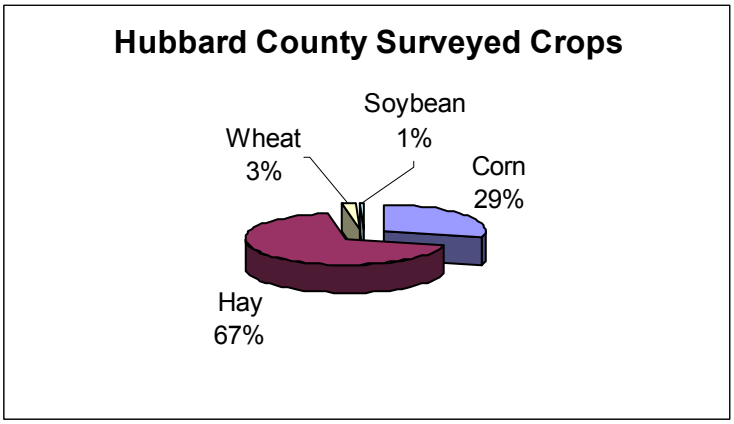



**Table 64.** Hubbard County pesticide applications and rates

**No data is publishable for Hubbard County.**

**Herbicides applied but not published included the following**: 2,4-D, Atrazine, Dicamba, Dicamba, Sodium salt, Diflufenzopyr-sodium, Dimethenamid-P, Fenoxaprop, Fomesafen, Glyphosate, Nicosulfuron and Primisulfuron.

Kandiyohi County

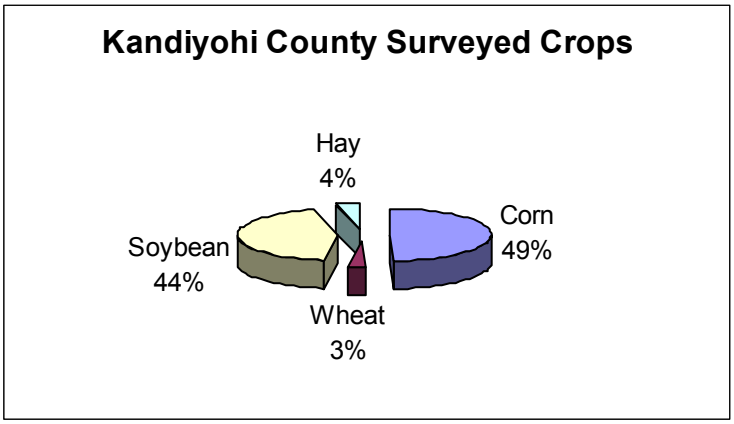



**Table 65.** Kandiyohi County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Atrazine | 20 | 1.0 | 0.47 | 0.47 | 1,338 |
| Dicamba | 14 | 1.0 | 0.30 | 0.30 | 568 |
| Dicamba, Dimet. salt | 4 | 1.1 | 0.12 | 0.13 | 73 |
| Diflufenzopyr-sodium | 4 | 1.1 | 0.05 | 0.05 | 29 |
| Foramsulfuron | 6 | 1.1 | 0.03 | 0.04 | 27 |
| Glufosinate-ammonium | 8 | 1.1 | 0.36 | 0.41 | 426 |
| Glyphosate | 52 | 1.5 | 0.70 | 1.05 | 7,600 |
| Mesotrione | 13 | 1.0 | 0.09 | 0.09 | 153 |
| S-Metolachlor | 13 | 1.0 | 1.31 | 1.31 | 2,293 |
| Chlorpyrifos | 18 | 1.0 | 0.51 | 0.51 | 1,292 |
| Lambda-cyhalothrin | 11 | 1.0 | 0.02 | 0.02 | 34 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Bromoxynil, Carfentrazone-ethyl, Clopyralid, Cloransulam-methyl, Dicamba, Pot. Salt, Dimethenamid-P, EPTC, Fenoxaprop, Flumetsulam, Flumiclorac-pentyl, Glyphosate diam salt, Imazamox, Imazethapyr, MCPA, Nicosulfuron, Pendimethalin, Primisulfuron and Rimsulfuron.
**Insecticides applied but not published included the following:** Carbofuran, Chlorpyrifos, Lambda-cyhalothrin and Zeta-cypermethrin.

Morrison County

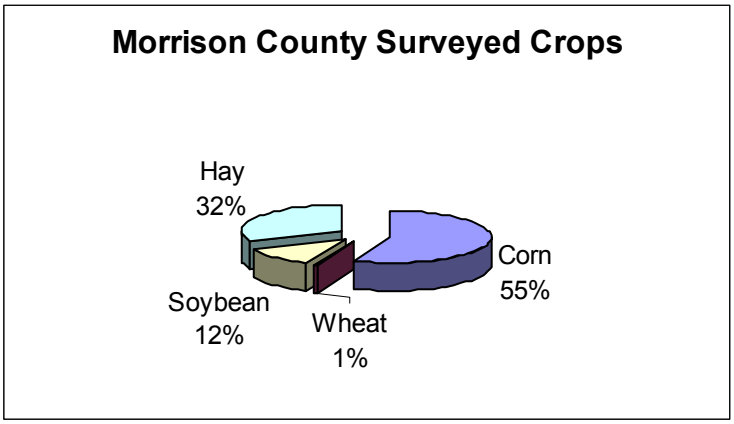



**Table 66.** Morrison County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 23 | 1.0 | 1.95 | 1.95 | 2,234 |
| Atrazine | 33 | 1.0 | 0.73 | 0.73 | 1,189 |
| Glyphosate | 27 | 1.0 | 0.71 | 0.73 | 967 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Alachlor, Clopyralid, Dicamba, Pot. Salt, Dimethenamid-P, Flumetsulam, Foramsulfuron, Imazamox, Imazethapyr, Nicosulfuron, Pendimethalin, Rimsulfuron and S-Metolachlor.
**Insecticides applied but not published included the following:**
Chlorpyrifos, Dimethoate and Lambda-cyhalothrin.

Otter Tail County

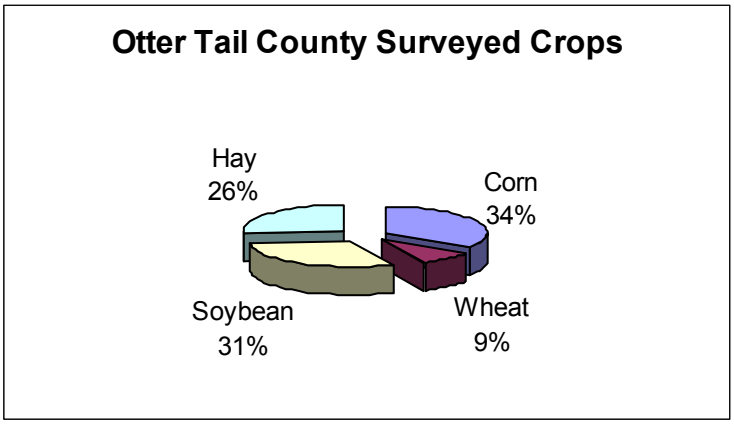



**Table 67.** Otter Tail County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Atrazine | 5 | 1.0 | 0.52 | 0.52 | 234 |
| Glyphosate | 35 | 1.3 | 0.79 | 1.03 | 3,235 |
| MCPA | 6 | 1.0 | 0.20 | 0.20 | 97 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Acetochlor, Alachlor, Bromoxynil, Bromoxynil octanoate, Clethodim, Clopyralid, Dicamba, Dicamba, Pot. Salt, EPTC, Fenoxaprop, Flumetsulam, Fomesafen, Foramsulfuron, Glyphosate diam salt, Nicosulfuron, Primisulfuron, Rimsulfuron and Thifensulfuron.
**Insecticides applied but not published included the following:** Esfenvalerate and Lambda-cyhalothrin.

Pope County

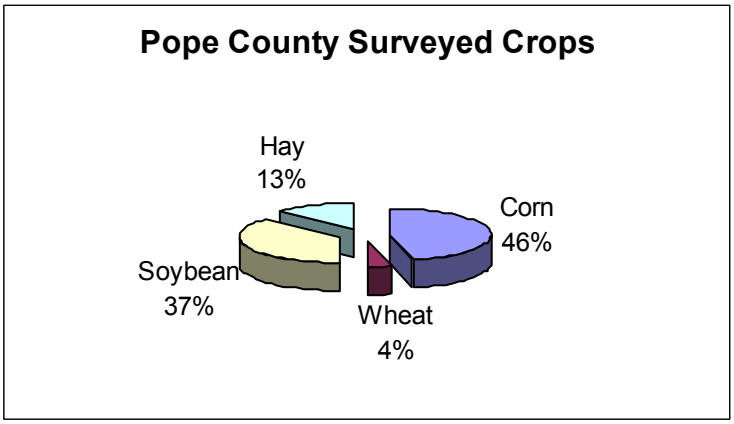



**Table 68.** Pope County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Atrazine | 25 | 1.0 | 0.48 | 0.48 | 1,960 |
| Clopyralid | 5 | 1.0 | 0.09 | 0.09 | 73 |
| Dicamba, Dimet. salt | 12 | 1.0 | 0.21 | 0.21 | 396 |
| Diflufenzopyr-sodium | 5 | 1.0 | 0.05 | 0.05 | 40 |
| Foramsulfuron | 2 | 1.0 | 0.03 | 0.03 | 13 |
| Glyphosate | 39 | 1.2 | 0.82 | 0.96 | 6,105 |
| Mesotrione | 9 | 1.0 | 0.08 | 0.08 | 111 |
| Nicosulfuron | 19 | 1.0 | 0.02 | 0.02 | 70 |
| Rimsulfuron | 18 | 1.0 | 0.01 | 0.01 | 36 |
| Insectides | 11 | | | | |
| Esfenvalerate | 6 | 1.0 | 0.03 | 0.03 | 57 |
| Lambda-cyhalothrin | 25 | 1.0 | 0.02 | 0.02 | 19 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Acetochlor, Acifluorfen, Alachlor, Bentazon, Bromoxynil, Dicamba, Dicamba, Pot. Salt, Dimethenamid-P, EPTC, Fenoxaprop, Flufenacet, Flumetsulam, Fornesafen,Glufosinate ammonium, Imazamox, MCPA, Pendimethalin, Primisulfuron and Thifensulfuron.
**Insecticides applied but not published included the following:** Chlorpyrifos, Cyfluthrin and Zeta-cypermethrin.

Sherburne County

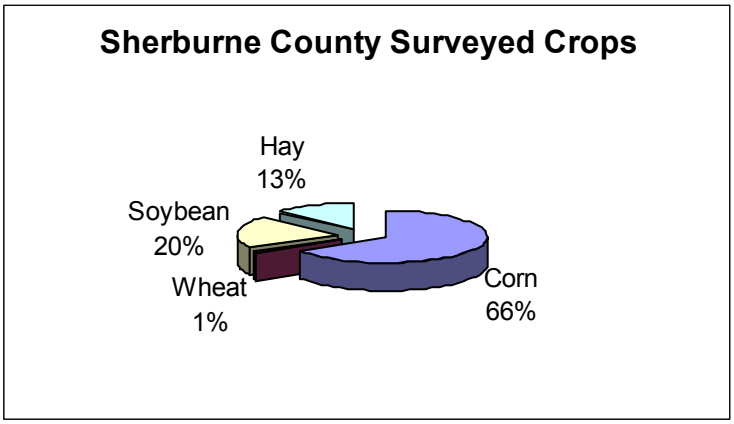



**Table 69.** Sherburne County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Atrazine | 37 | 1.0 | 1.65 | 1.65 | 3,825 |
| Glyphosate | 23 | 1.2 | 0.71 | 0.84 | 1,224 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Acetochlor, Alachlor, Dicamba, Dicamba, Dimet. Salt, Diflufenzopyr-sodium, Dimethenamid-P, Foramsulfuron, Linuron, Nicosulfuron, Pendimethalin, Primisulfuron and S-Metolachlor.
**Insecticides applied but not published included the following:** Bifenthrin, Esfenvalerate, Fipronil, Lambda-cyhalothrin and Terbufos.

Stearns County

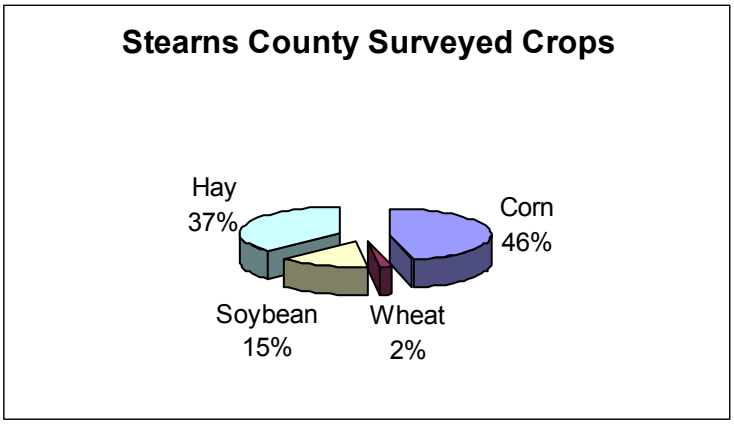



**Table 70.** Stearns County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 10 | 1.0 | 1.75 | 1.75 | 700 |
| Atrazine | 13 | 1.0 | 0.60 | 0.60 | 325 |
| Glyphosate | 31 | 1.1 | 0.64 | 0.69 | 858 |
| Nicosulfuron | 6 | 1.0 | 0.02 | 0.02 | 5 |
| Rimsulfuron | 6 | 1.0 | 0.02 | 0.02 | 6 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Clopyralid, Dicamba, Dicamba, Dimet. Salt, Dicamba, Pot. Salt, Dimethenamid-P, Flumetsulam, Foramsulfuron, Imazethapyr, Pendimethalin, Primisulfuron, Thifensulfuron and Chlorpyrifos.

Todd County

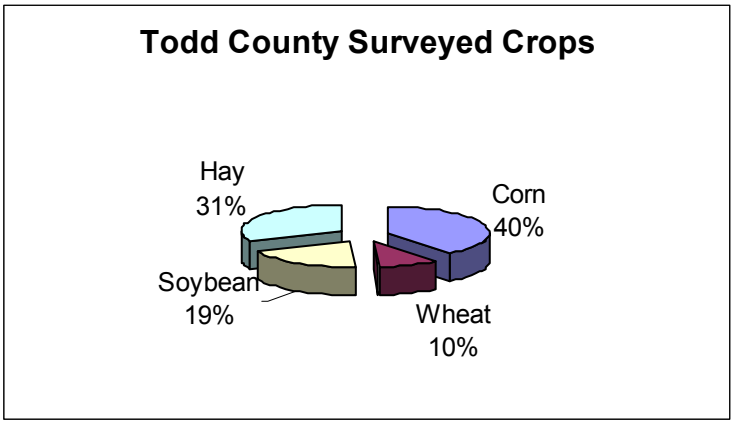



**Table 71.** Todd County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 6 | 1.0 | 1.55 | 1.59 | 561 |
| Atrazine | 15 | 1.0 | 0.89 | 0.90 | 842 |
| Foramsulfuron | 5 | 1.1 | 0.03 | 0.03 | 9 |
| Glyphosate | 24 | 1.8 | 0.88 | 1.55 | 2,335 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Bromoxynil, Clopyralid, Cloransulam-methyl, Dicamba, Dicamba, Dimet. Salt, Dicamba, Pot. Salt, Diflufenzopyr-sodium, Flumetsulam, Glufosinate-ammonium, Imazethapyr, MCPA, Nicosulfuron, Pendimethalin, Primisulfuron, Quizalofop-P-ethyl, Rimsulfuron and Thifensulfuron.
**Insecticides applied but not published included the following:** Chlorpyrifos, Esfenvalerate and Permethrin.

Wadena County

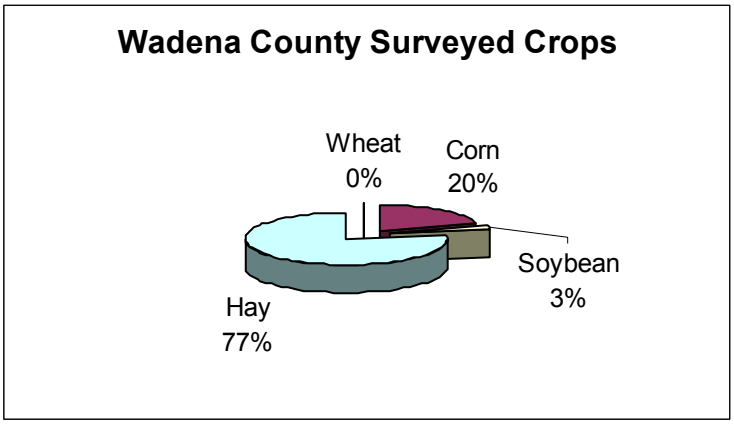



**Table 72.** Wadena County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 6 | 1 | 2.56 | 2.56 | 404 |
| Atrazine | 8 | 1 | 0.77 | 0.77 | 170 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Dicamba, Foramsulfuron, Glyphosate, Imazamox, Imazethapyr, Nicosulfuron and Primisulfuron.
**Insecticides applied but not published included the following:** Carbaryl and Chlorpyrifos.

# Region 5 County Data

Atkin County

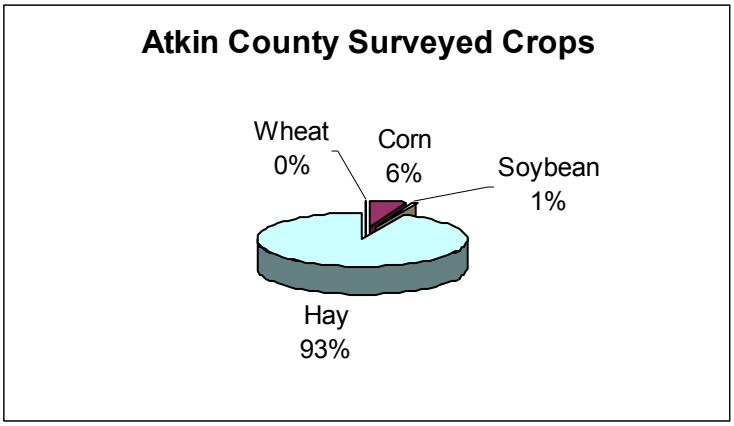



**Table 73.** Aitkin County pesticide applications and rates

**No data is publishable for Atkin County.**

**Herbicides applied but not published included the following:** Atrazine and Glyphosate.

Chisago County

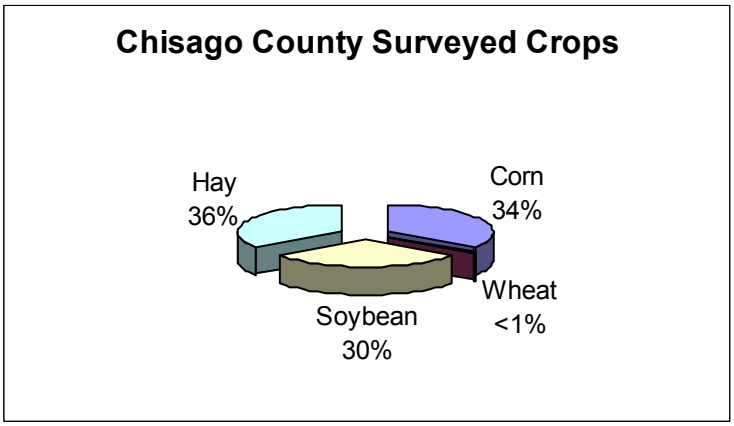



**Table 74.** Chisago County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 20 | 1.0 | 1.57 | 1.57 | 858 |
| Atrazine | 20 | 1.0 | 0.60 | 0.60 | 325 |
| Glyphosate | 26 | 1.0 | 0.76 | 0.76 | 550 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Chlorimuron-ethyl, Clopyralid, Dicamba, Dicamba, Dimet. Salt, Fenoxaprop, Fluazifop-P-butyl, Flumetsulam, Glufosinate-ammonium, MCPA, Mesotrione, Nicosulfuron, Rimsulfuron, S-Metolachlor and Thifensulfuron.

Isanti County

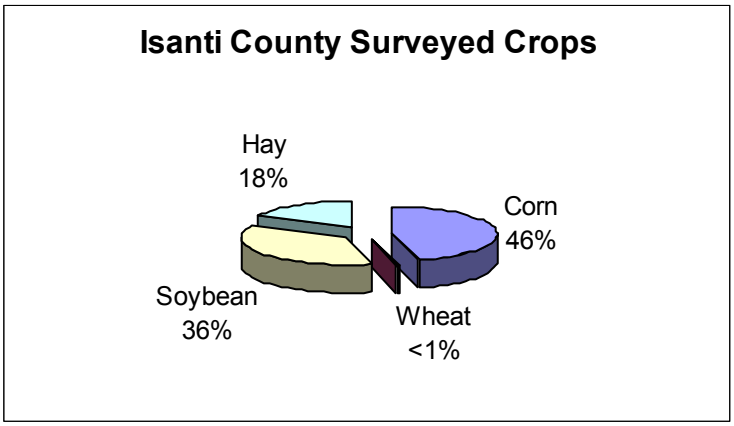



**Table 75.** Isanti County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 16 | 1.0 | 1.82 | 1.82 | 1,851 |
| Atrazine | 18 | 1.0 | 0.92 | 0.92 | 1,044 |
| Glyphosate | 35 | 1.0 | 0.85 | 0.85 | 1,884 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Clethodim, Cloransulam-methyl, Glufosinate-ammonium, Pendimethalin and Sulfentrazone.
**Insecticides applied but not published included the following:** Chlorpyrifos, Esfenvalerate and Permethrin.

Kanabec County

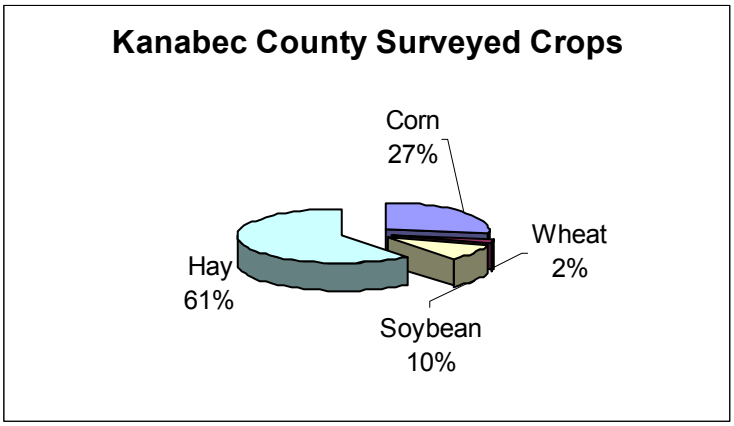



**Table 76.** Kanabec County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 19 | 1.0 | 1.46 | 1.46 | 1,059 |
| Atrazine | 24 | 1.0 | 0.60 | 0.60 | 534 |
| Glyphosate | 14 | 1.0 | 0.77 | 0.77 | 387 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**:
Bromoxynil octanoate, Dicamba, EPTC, Fenoxaprop, Glufosinate-ammonium, MCPA, Nicosulfuron, Pendimethalin and Rimsulfuron.

Mille Lacs County

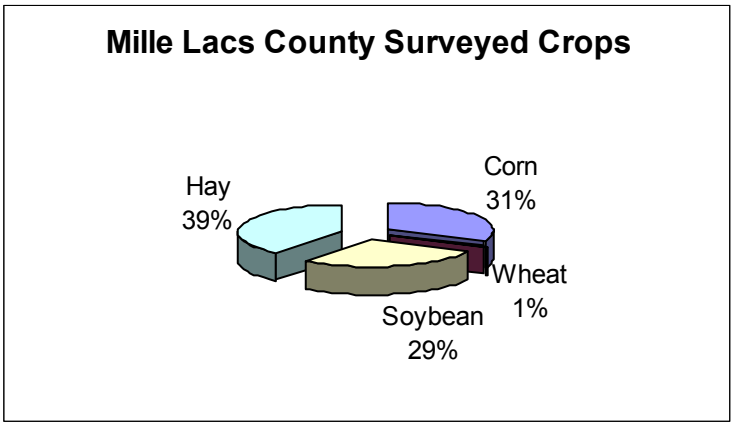



**Table 77.** Mille Lacs pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 11 | 1.0 | 1.36 | 1.36 | 560 |
| Atrazine | 14 | 1.0 | 0.89 | 0.89 | 491 |
| Glyphosate | 41 | 1.0 | 1.04 | 1.04 | 1,658 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**:
Clopyralid, Dicamba, Dicamba, Sodium salt, Flumetsulam, Glufosinate-ammonium, Halosulfuron, Imazapyr, Imazethapyr, Nicosulfuron, Rimsulfuron, S-Metolachlor and Thifensulfuron.

Pine County

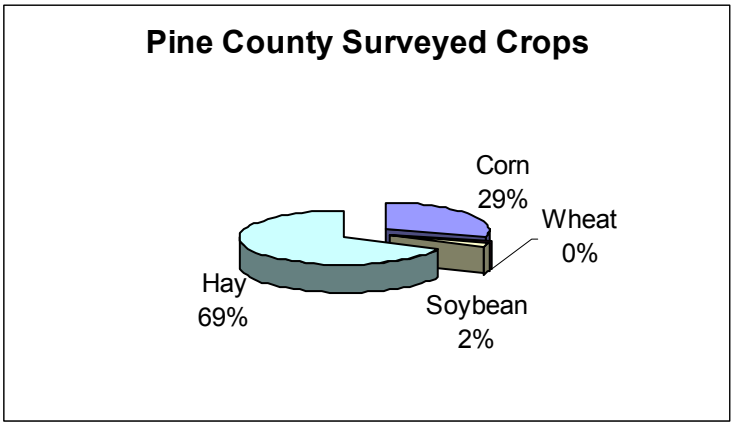



**Table 78.** Pine County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Atrazine | 11 | 1 | 1.00 | 1.00 | 679 |
| Glyphosate | 16 | 1 | 0.73 | 0.73 | 713 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Chlorothalonil, 2,4-D, Acetochlor, Bromoxynil, Clopyralid, Dicamba, Dicamba, Dimet. Salt, Diflufenzopyr-sodium, Flumetsulam, Foramsulfuron, Imazapyr, Imazethapyr, Mesotrione, Nicosulfuron, Pendimethalin and S-Metolachlor.
**Insecticides applied but not published included the following:** Cyfluthrin.
**Fungicides applied but not published included the following**: Chlorothalonil.

# Region 6 County Data

## Big Stone County

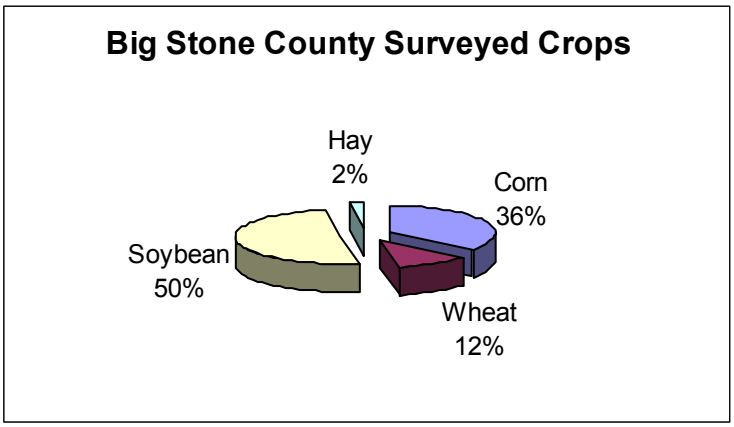



**Table 79.** Big Stone County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Atrazine | 5 | 1 | 0.48 | 0.48 | 470 |
| Clopyralid | 4 | 1 | 0.10 | 0.10 | 80 |
| Dicamba | 3 | 1 | 0.40 | 0.40 | 279 |
| Glufosinate-ammonium | 3 | 1.0 | 0.37 | 0.37 | 219 |
| Glyphosate | 68 | 1.2 | 0.78 | 0.92 | 12,586 |
| MCPA | 7 | 1.0 | 0.50 | 0.50 | 698 |
| Mesotrione | 12 | 1.0 | 0.09 | 0.09 | 222 |
| Nicosulfuron | 3 | 1.0 | 0.03 | 0.03 | 17 |
| Rimsulfuron | 1 | 1.0 | 0.01 | 0.01 | 3 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Acetochlor, Bromoxynil, Bromoxynil octanoate, Clodinafop-propargil, Dicamba, Dimet. Salt, Dicamba, Sodium salt, Diflufenzopyr-sodium, Dimethenamid, Dimethenamid-P, EPTC, Flumetsulam, Foramsulfuron, Glyphosate diam salt, Pelargonic acid, Primisulfuron and S-Metolachlor.

**Insecticides applied but not published included the following:**
Chlorpyrifos, Lambda-cyhalothrin and Zeta-cypermethrin.

Chippewa County

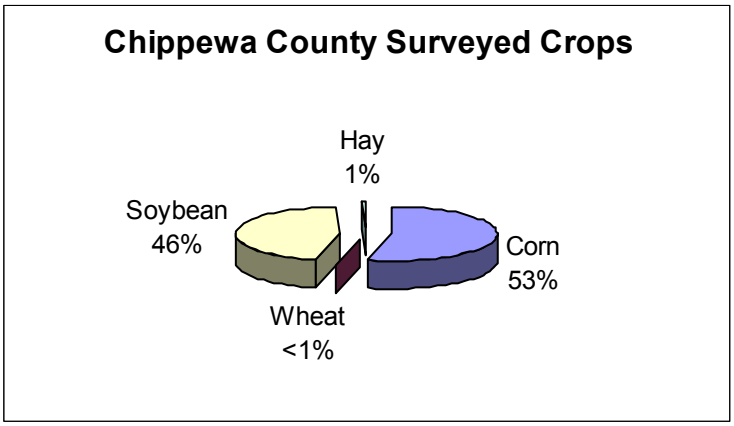



**Table 80.** Chippewa County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Dicamba | 23 | 1.0 | 0.39 | 0.39 | 1,769 |
| Glyphosate | 57 | 1.3 | 0.72 | 0.96 | 10,734 |
| Glyphosate diam salt | 9 | 1.9 | 1.01 | 1.87 | 3,227 |
| Nicosulfuron | 4 | 1.0 | 0.02 | 0.02 | 16 |
| Rimsulfuron | 4 | 1.0 | 0.01 | 0.01 | 9 |
| S-Metolachlor | 12 | 1.0 | 1.87 | 1.87 | 4,567 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 11 | 1.0 | 0.92 | 0.92 | 1,984 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**:
Acetochlor, Atrazine, Clethodim, Clopyralid, Cloransulam-methyl, Dicamba, Dimet. Salt, Diflufenzopyr-sodium, Dimethenamid, Dimethenamid-P, EPTC, Ethalfluralin, Flumetsulam, Fomesafen, Foramsulfuron, Imazamox, Imazethapyr, Propachlor and Trifluralin.
**Insecticides applied but not published included the following:**
Bifenthrin, Cyfluthrin, Lambda-cyhalothrin, Tebupirimphos and Tefluthrin.

Lac Qui Parle County

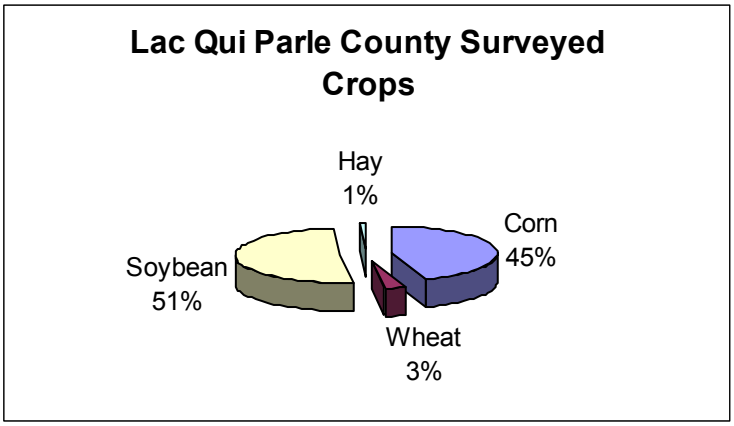



**Table 81.** Lac Qui Parle County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| 2,4-D | 3 | 1.0 | 0.44 | 0.44 | 284 |
| Atrazine | 7 | 1.2 | 0.47 | 0.56 | 840 |
| Clopyralid | 3 | 1.0 | 0.09 | 0.09 | 48 |
| Glyphosate | 60 | 1.2 | 0.72 | 0.89 | 10,886 |
| Glyphosate diam salt | 9 | 1.4 | 0.67 | 0.93 | 1,787 |
| Mesotrione | 8 | 1.0 | 0.09 | 0.09 | 145 |
| Nicosulfuron | 6 | 1.0 | 0.02 | 0.02 | 27 |
| Rimsulfuron | 5 | 1.0 | 0.01 | 0.01 | 11 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 19 | 1.0 | 0.84 | 0.84 | 3,294 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Acetochlor, Acifluorfen, Bentazon, Bromoxynil, Dicamba, Dicamba, Dimet. Salt, Dicamba, Sodium salt, Diflufenzopyr-sodium, Flumetsulam, Glufosinate-ammonium, Imazamox, Imazethapyr, MCPA, Primisulfuron, S-Metolachlor and Trifluralin.
**Insecticides applied but not published included the following:** Cyfluthrin, Esfenvalerate, Fipronil, Lambda-cyhalothrin, Tebupirimphos and Tefluthrin.

Stevens County

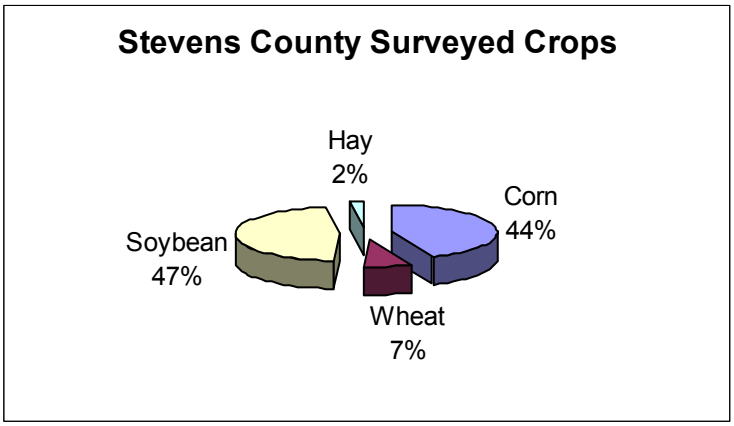



**Table 82.** Stevens County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Atrazine | 6 | 1.0 | 0.44 | 0.44 | 697 |
| Bromoxynil octanoate | 3 | 1.0 | 0.29 | 0.29 | 234 |
| Clopyralid | 3 | 1.0 | 0.10 | 0.10 | 75 |
| Glufosinate-ammonium | 3 | 1.0 | 0.29 | 0.29 | 204 |
| Glyphosate | 57 | 1.4 | 0.78 | 1.13 | 17,834 |
| MCPA | 4 | 1.0 | 0.29 | 0.29 | 338 |
| Mesotrione | 17 | 1.0 | 0.09 | 0.09 | 423 |
| Nicosulfuron | 17 | 1.0 | 0.02 | 0.02 | 104 |
| Rimsulfuron | 17 | 1.0 | 0.01 | 0.01 | 53 |
| **Insecticides** | | | | | |
| Esfenvalerate | 5 | 1.0 | 0.04 | 0.04 | 53 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Acetochlor, Bentazon, Bromoxynil, Clethodim, Dicamba, Dicamba, Dimet. Salt, Diflufenzopyr-sodium, EPTC, Fenoxaprop, Flumetsulam, Fomesafen, Foramsulfuron, Imazethapyr, Pendimethalin, Thifensulfuron and Trifluralin.
**Insecticides applied but not published included the following:** Lambda-cyhalothrin and Methyl parathion.
**Fungicides applied but not published included the following**: Tebuconazole.

Swift County

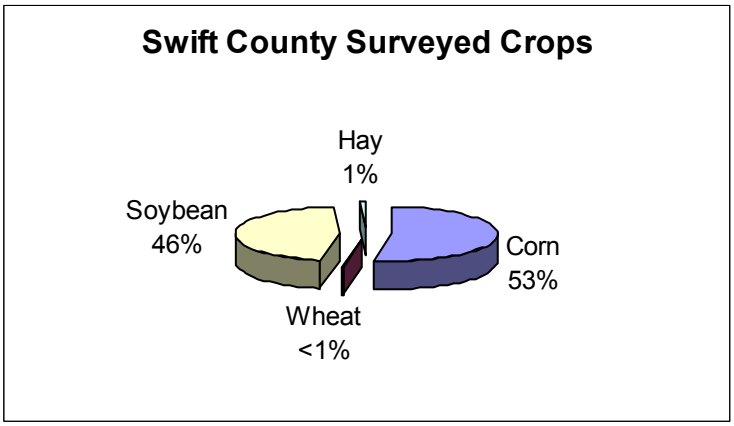



**Table 83.** Swift County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 4 | 1.0 | 2.19 | 2.19 | 1,806 |
| Atrazine | 11 | 1.0 | 0.78 | 0.78 | 1,986 |
| Dicamba | 5 | 1.0 | 0.29 | 0.29 | 347 |
| Glufosinate-ammonium | 8 | 1.0 | 0.31 | 0.31 | 569 |
| Glyphosate | 57 | 1.5 | 0.82 | 1.20 | 15,861 |
| Mesotrione | 7 | 1.0 | 0.10 | 0.10 | 159 |
| Nicosulfuron | 13 | 1.0 | 0.02 | 0.02 | 69 |
| Rimsulfuron | 14 | 1.0 | 0.01 | 0.01 | 37 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Clethodim, Clopyralid, Dicamba, Dimet. Salt, Dicamba, Pot. Salt, Dicamba, Sodium salt, Diflufenzopyr-sodium, Dimethenamid, Dimethenamid-P, Flumetsulam, Fomesafen, Glyphosate diam salt, Imazamox, Quizalofop-P-ethyl, S-Metolachlor and Thifensulfuron.
**Insecticides applied but not published included the following:** Bifenthrin, Chlorpyrifos, Cyfluthrin, Esfenvalerate, Lambda-cyhalothrin, Phorate and Tebupirimphos.

Yellow Medicine County

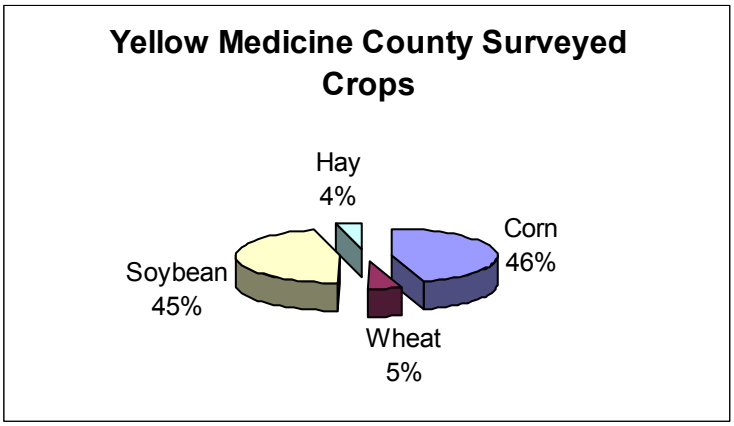



**Table 84.** Yellow Medicine County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 7 | 1.0 | 1.54 | 1.54 | 2,228 |
| Atrazine | 10 | 1.0 | 0.48 | 0.48 | 964 |
| Dicamba | 8 | 1.0 | 0.25 | 0.25 | 374 |
| Glyphosate | 45 | 1.3 | 0.74 | 0.95 | 8,390 |
| Glyphosate diam salt | 8 | 1.3 | 0.73 | 0.96 | 1,513 |
| MCPA | 4 | 1.0 | 0.42 | 0.42 | 316 |
| Mesotrione | 6 | 1.0 | 0.10 | 0.10 | 115 |
| Nicosulfuron | 17 | 1.0 | 0.02 | 0.02 | 79 |
| Rimsulfuron | 17 | 1.0 | 0.01 | 0.01 | 39 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 16 | 1.0 | 0.63 | 0.63 | 1,973 |
| Cyfluthrin | 9 | 1.0 | 0.01 | 0.01 | 11 |
| Lambda-cyhalothrin | 6 | 1.1 | 0.02 | 0.03 | 31 |
| Tebupirimphos | 9 | 1.0 | 0.13 | 0.13 | 223 |
| Acetochlor | 7 | 1.0 | 1.54 | 1.54 | 2,228 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Bromoxynil octanoate, Carfentrazone-ethyl, Clopyralid, Dicamba, Dimet. Salt, Dicamba, Pot. Salt, Dicamba, Sodium salt, Diflufenzopyr-sodium, Dimethenamid, Dimethenamid-P, EPTC, Fenoxaprop, Flumetsulam, Foramsulfuron, Glufosinate-ammonium, Imazamox, Imazethapyr, Pendimethalin, Quizalofop-P-ethyl, S-Metolachlor, Sethoxydim, Sulfentrazone and Trifluralin.
**Insecticides applied but not published included the following:** Bifenthrin, Esfenvalerate, Tefluthrin and Terbufos.

# Region 7 County Data

## Lincoln County

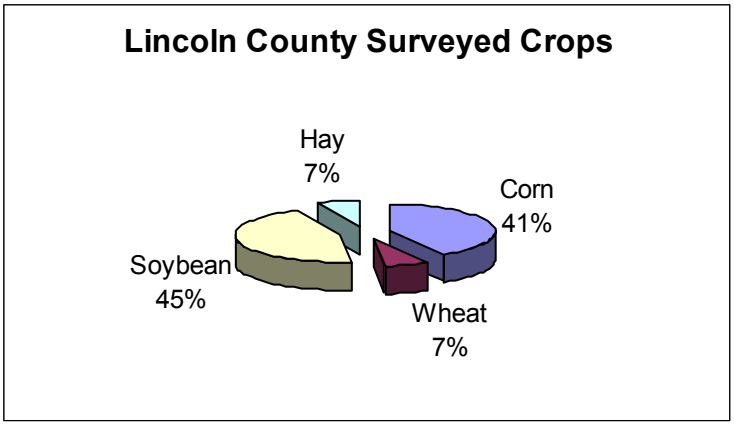



**Table 85.** Lincoln County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| 2,4-D | 4 | 1.0 | 0.38 | 0.38 | 206 |
| Acetochlor | 7 | 1.0 | 1.66 | 1.66 | 1,769 |
| Atrazine | 6 | 1.0 | 0.42 | 0.42 | 345 |
| Clopyralid | 2 | 1.0 | 0.11 | 0.11 | 39 |
| Dicamba | 13 | 1.0 | 0.23 | 0.23 | 453 |
| Diflufenzopyr-sodium | 6 | 1.0 | 0.05 | 0.05 | 42 |
| Flumetsulam | 2 | 1.0 | 0.04 | 0.04 | 14 |
| Glyphosate | 55 | 1.2 | 0.71 | 0.87 | 7,065 |
| MCPA | 2 | 1.0 | 0.27 | 0.27 | 97 |
| Mesotrione | 7 | 1.0 | 0.08 | 0.08 | 83 |
| Nicosulfuron | 17 | 1.0 | 0.02 | 0.02 | 58 |
| Rimsulfuron | 13 | 1.0 | 0.01 | 0.01 | 20 |
| **Insecticides** | | | | | |
| Lambda-cyhalothrin | 2 | 1.0 | 0.02 | 0.02 | 7 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Acifluorfen, Bromoxynil, Clethodim, Cloransulam-methyl, Dicamba, Dimet. Salt, Dicamba, Sodium salt, Dimethenamid-P, Fomesafen, Glufosinate-ammonium, Glyphosate diam salt, Imazamox, Imazethapyr, Primisulfuron and Trifluralin.
**Insecticides applied but not published included the following:** Chlorpyrifos, Cyfluthrin, Tebupirimphos, Terbufos and Zeta-cypermethrin.

Lyon County

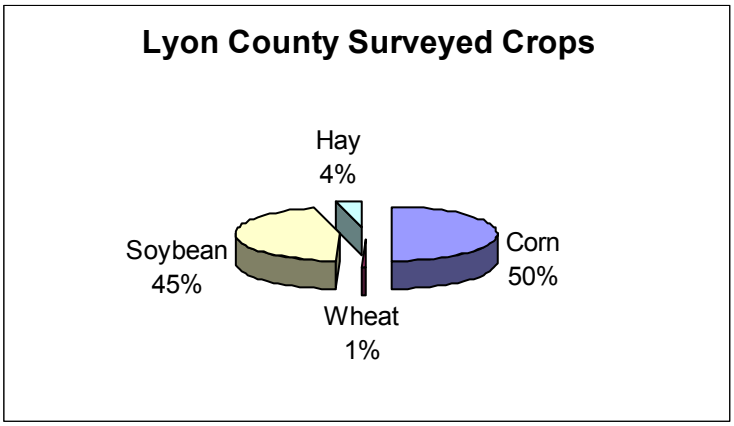



**Table 86.** Lyon County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 13 | 1.0 | 1.69 | 1.69 | 2,827 |
| Atrazine | 7 | 1.0 | 0.55 | 0.55 | 527 |
| Dicamba | 16 | 1.0 | 0.35 | 0.35 | 731 |
| Glyphosate | 64 | 1.3 | 0.78 | 1.02 | 8,446 |
| Nicosulfuron | 8 | 1.0 | 0.02 | 0.02 | 22 |
| Rimsulfuron | 6 | 1.0 | 0.01 | 0.01 | 8 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 7 | 1.0 | 0.50 | 0.50 | 440 |
| Cyfluthrin | 8 | 1.0 | 0.01 | 0.01 | 7 |
| Lambda-cyhalothrin | 5 | 1.0 | 0.02 | 0.02 | 15 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Bentazon, Clopyralid, Dicamba, Dimet. Salt, Diflufenzopyr-sodium, Dimethenamid-P, EPTC, Foramsulfuron. Glufosinate-ammonium, Glyphosate diam salt, Imazapyr, Imazethapyr, MCPA, Mesotrione, Pendimethalin, Primisulfuron, S-Metolachlor, Sethoxydim and Trifluralin.
**Insecticides applied but not published included the following:** Dimethoate, Permethrin, Tebupirimphos, Tefluthrin and Zeta-cypermethrin.
**Fungicides applied but not published included the following**: Propiconazole.

Murray County

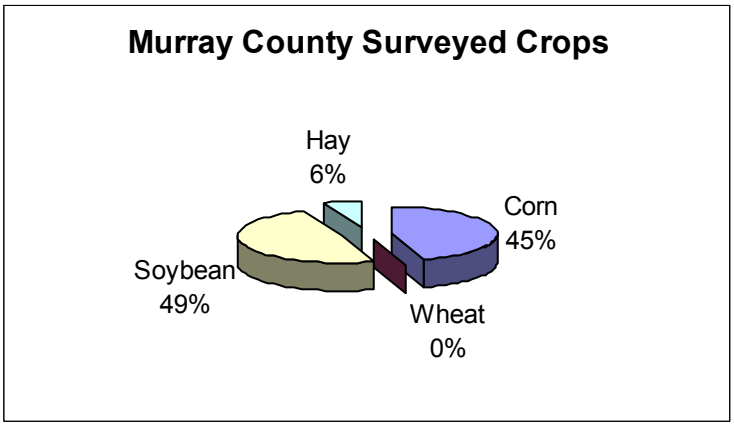



**Table 87.** Murray County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 14 | 1.0 | 1.74 | 1.74 | 3,490 |
| Atrazine | 9 | 1.0 | 0.74 | 0.74 | 885 |
| Dicamba, Pot. salt | 9 | 1.0 | 0.39 | 0.39 | 463 |
| Glyphosate | 54 | 1.5 | 0.74 | 1.14 | 8,684 |
| Nicosulfuron | 10 | 1.0 | 0.02 | 0.02 | 33 |
| S-Metolachlor | 9 | 1.0 | 1.52 | 1.52 | 1,831 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 17 | 1.0 | 0.67 | 0.67 | 1,584 |
| Cyfluthrin | 17 | 1.0 | 0.01 | 0.01 | 16 |
| Tebupirimphos | 17 | 1.0 | 0.14 | 0.14 | 322 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Clethodim, Dicamba, Dicamba, Dimet. Salt, Diflufenzopyr-sodium, Fenoxaprop, Fluazifop-P-butyl, Fomesafen, Glyphosate diam salt, Imazamox, Imazapyr, Imazethapyr, Mesotrione, Pendimethalin, Rimsulfuron and Trifluralin.
**Insecticides applied but not published included the following:** Dimethoate, Esfenvalerate, Lambda-cyhalothrin, Permethrin and Tefluthrin.

Nobles County

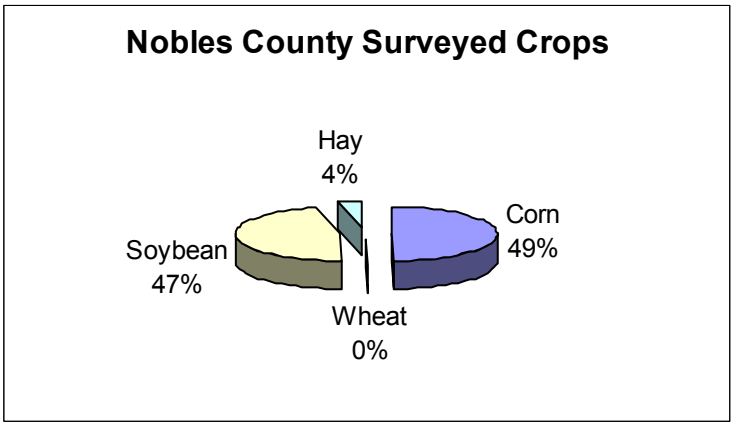



**Table 88.** Nobles County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 10 | 1.0 | 1.56 | 1.56 | 2,260 |
| Atrazine | 6 | 1.0 | 0.81 | 0.81 | 763 |
| Dicamba | 8 | 1.2 | 0.34 | 0.41 | 465 |
| Glufosinate-ammonium | 5 | 1.0 | 0.31 | 0.32 | 254 |
| Glyphosate | 35 | 1.3 | 0.75 | 0.98 | 5,069 |
| Mesotrione | 11 | 1.0 | 0.14 | 0.14 | 232 |
| S-Metolachlor | 9 | 1.0 | 1.91 | 1.91 | 2,416 |
| Trifluralin | 10 | 1.0 | 0.78 | 0.78 | 1,162 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 11 | 1.0 | 0.88 | 0.88 | 1,437 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Cloransulam-methyl, Dicamba, Dimet. Salt, Dicamba, Pot. Salt, Diflufenzopyr-sodium, Dimethenamid, Dimethenamid-P, EPTC, Fenoxaprop, Fluazifop-P-butyl, Flufenacet, Fomesafen, Glyphosate diam salt, Imazethapyr, Metribuzin, Nicosulfuron, Pendimethalin, Primisulfuron, Rimsulfuron, Sethoxydim and Thifensulfuron.
**Insecticides applied but not published included the following:** Bifenthrin, Cyfluthrin, Lambda-cyhalothrin, Tebupirimphos, Tefluthrin and Zeta-cypermethrin.

Pipestone County

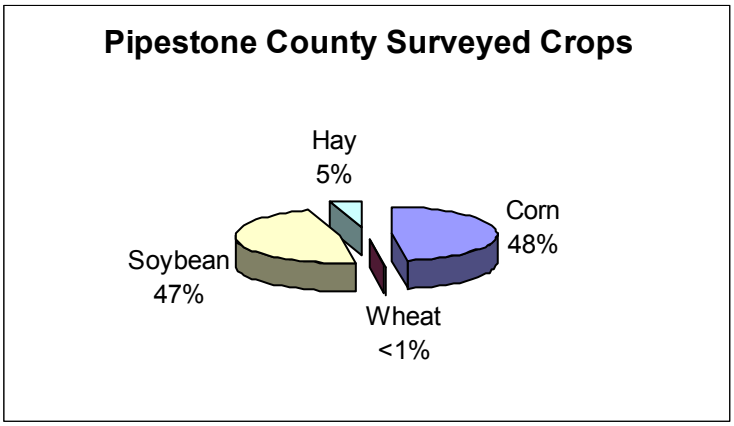



**Table 89.** Pipestone County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Atrazine | 12 | 1.0 | 0.69 | 0.69 | 1,172 |
| Glufosinate-ammonium | 6 | 1.0 | 0.32 | 0.32 | 274 |
| Glyphosate | 50 | 1.3 | 0.73 | 0.92 | 6,777 |
| Glyphosate diam salt | 7 | 1.0 | 0.58 | 0.58 | 563 |
| Nicosulfuron | 10 | 1.0 | 0.01 | 0.01 | 22 |
| Rimsulfuron | 9 | 1.0 | 0.01 | 0.01 | 11 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 9 | 1.0 | 0.82 | 0.82 | 1,032 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Acetochlor, Bromoxynil, Clethodim, Clopyralid, Dicamba, Dicamba, Dimet. Salt, Dicamba, Pot. Salt, Diflufenzopyr-sodium, Dimethenamid-P, EPTC, Flumetsulam, Flumiclorac-pentyl, Foramsulfuron, Imazamox, Imazethapyr, MCPA, Mesotrione, Pendimethalin, S-Metolachlor, Sethoxydim, Thifensulfuron, Trifluralin and Bifenthrin.
**Insecticides applied but not published included the following:** Cyfluthrin, Dimethoate, Esfenvalerate, Lambda-cyhalothrin, Tebupirimphos, Tefluthrin and Terbufos.

Rock County

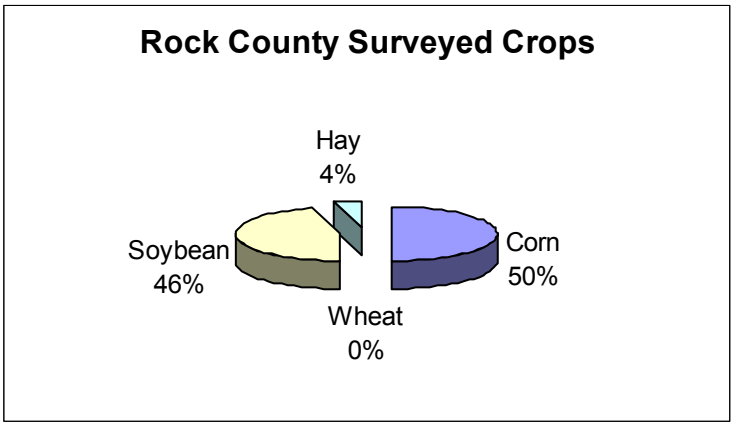



**Table 90.** Rock County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 7 | 1.2 | 1.48 | 1.81 | 2,133 |
| Atrazine | 4 | 1.4 | 0.48 | 0.65 | 476 |
| Glyphosate | 45 | 1.4 | 0.78 | 1.09 | 8,455 |
| Glyphosate diam salt | 36 | 1.0 | 0.64 | 0.64 | 3,933 |
| Nicosulfuron | 5 | 1.0 | 0.02 | 0.02 | 18 |
| Rimsulfuron | 5 | 1.0 | 0.01 | 0.01 | 9 |
| Chlorpyrifos | 5 | 1.0 | 0.54 | 0.54 | 495 |
| Cyfluthrin | 6 | 1.0 | 0.01 | 0.01 | 7 |
| Lambda-cyhalothrin | 17 | 1.0 | 0.02 | 0.02 | 61 |
| Tebupirimphos | 6 | 1.0 | 0.13 | 0.13 | 142 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Clethodim, Dicamba, Dicamba, Dimet. Salt, Dicamba, Pot. Salt, Diflufenzopyr-sodium, Dimethenamid-P, Fomesafen, Glufosinate-ammonium, Imazapyr, Imazethapyr, Mesotrione, Pendimethalin, S-Metolachlor, Sethoxydim and Trifluralin.
**Insecticides applied but not published included the following:** Fipronil, Permethrin, Tefluthrin and Terbufos.

# Region 8 County Data

## Blue Earth County

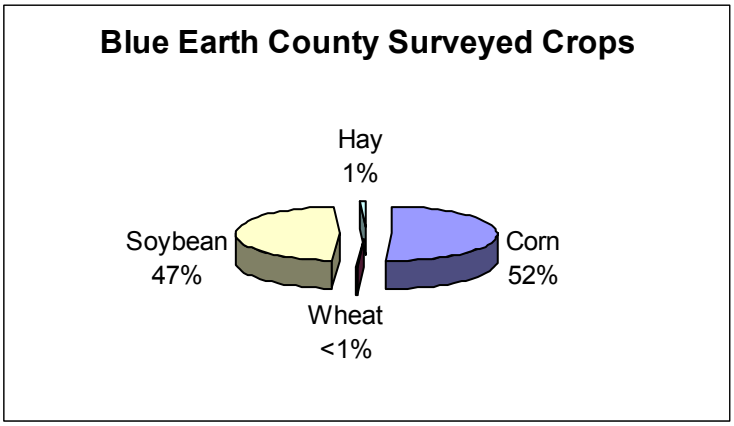



**Table 91.** Blue Earth County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 26 | 1.0 | 2.04 | 2.04 | 9,164 |
| Atrazine | 7 | 1.0 | 0.73 | 0.73 | 869 |
| Clopyralid | 11 | 1.0 | 0.14 | 0.14 | 263 |
| Flumetsulam | 11 | 1.0 | 0.05 | 0.05 | 97 |
| Glyphosate | 46 | 1.4 | 0.78 | 1.13 | 8,927 |
| Lambda-cyhalothrin | 9 | 1.0 | 0.02 | 0.02 | 37 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Carfentrazone-ethyl, Dicamba, Dicamba, Dimet. Salt, Dicamba, Pot. Salt, Diflufenzopyr-sodium, Dimethenamid, Dimethenamid-P, Fomesafen, Foramsulfuron, Glufosinate-ammonium, Glyphosate diam salt, Mesotrione, Nicosulfuron, Rimsulfuron, S-Metolachlor and Trifluralin.
**Insecticides applied but not published included the following:**
Chlorpyrifos, Cyfluthrin, Esfenvalerate, Permethrin, Tebupirimphos and Tefluthrin.

Brown County

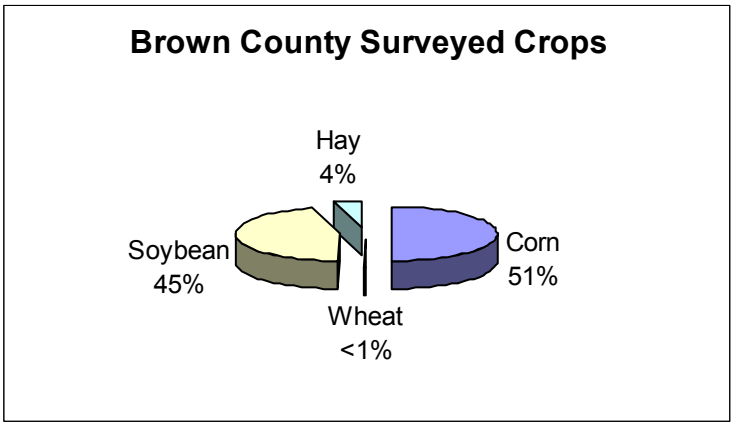



**Table 92.** Brown County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 19 | 1.0 | 1.69 | 1.69 | 4,030 |
| Atrazine | 28 | 1.0 | 0.53 | 0.53 | 1,863 |
| Clopyralid | 5 | 1.0 | 0.07 | 0.07 | 47 |
| Cloransulam-methyl | 4 | 1.0 | 0.03 | 0.03 | 15 |
| Flumetsulam | 5 | 1.0 | 0.02 | 0.02 | 16 |
| Glyphosate | 30 | 1.1 | 0.78 | 0.86 | 3,180 |
| Glyphosate diam salt | 9 | 1.0 | 0.73 | 0.73 | 847 |
| Mesotrione | 29 | 1.0 | 0.09 | 0.09 | 336 |
| Nicosulfuron | 15 | 1.0 | 0.02 | 0.02 | 41 |
| Pendimethalin | 6 | 1.0 | 0.71 | 0.71 | 550 |
| Rimsulfuron | 15 | 1.0 | 0.01 | 0.01 | 20 |
| S-Metolachlor | 12 | 1.0 | 1.80 | 1.80 | 2,591 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 9 | 1.1 | 0.69 | 0.77 | 823 |
| Lambda-cyhalothrin | 19 | 1.0 | 0.02 | 0.02 | 45 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Acifluorfen, Bromoxynil, Carfentrazone-ethyl, Clethodim, Dicamba, Dicamba, Dimet. Salt, Dicamba, Pot. Salt, Dimethenamid, Dimethenamid-P, EPTC, Fluazifop-P-butyl, Flumioxazin, Fomesafen, Glufosinate-ammonium, Imazamox, Imazethapyr, Metribuzin, Primisulfuron, Sethoxydim, Sulfentrazone, Thifensulfuron and Trifluralin.
**Insecticides applied but not published included the following:** Carbofuran, Permethrin and Tefluthrin.

Cottonwood County

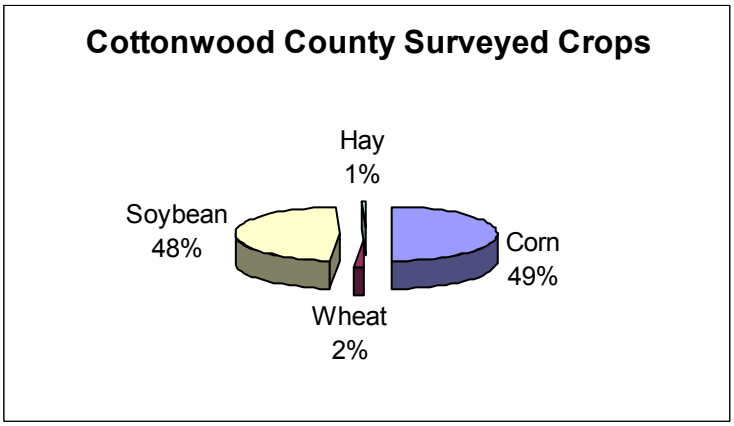



**Table 93.** Cottonwood County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 17 | 1.0 | 1.40 | 1.40 | 5,171 |
| Atrazine | 8 | 1.0 | 0.74 | 0.74 | 1,221 |
| Clethodim | 3 | 1.0 | 0.08 | 0.08 | 47 |
| Diflufenzopyr-sodium | 5 | 1.0 | 0.03 | 0.03 | 33 |
| Fenoxaprop | 5 | 1.0 | 0.08 | 0.08 | 84 |
| Fomesafen | 6 | 1.0 | 0.14 | 0.14 | 162 |
| Glyphosate | 57 | 1.6 | 0.67 | 1.08 | 13,181 |
| Mesotrione | 8 | 1.0 | 0.07 | 0.07 | 127 |
| Nicosulfuron | 9 | 1.0 | 0.02 | 0.02 | 40 |
| Rimsulfuron | 3 | 1.0 | 0.01 | 0.01 | 6 |
| **Insecticides** | | | | | |
| Esfenvalerate | 10 | 1.0 | 0.02 | 0.02 | 55 |
| Lambda-cyhalothrin | 8 | 1.0 | 0.02 | 0.02 | 35 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Bromoxynil octanoate, Clopyralid, Dicamba, Dicamba, Dimet. Salt, Dicamba, Pot. Salt, Dicamba, Sodium salt, Fluazifop-P-butyl, Flumetsulam, Glufosinate-ammonium, Glyphosate diam salt, Imazamox, Imazethapyr, MCPA, Pendimethalin, S-Metolachlor, Thifensulfuron and Trifluralin.
**Insecticides applied but not published included the following:** Chlorpyrifos, Cyfluthrin, Fipronil, Lambda-cyhalothrin, Tebupirimphos, Tefluthrin and Terbufos.

Fairbault County

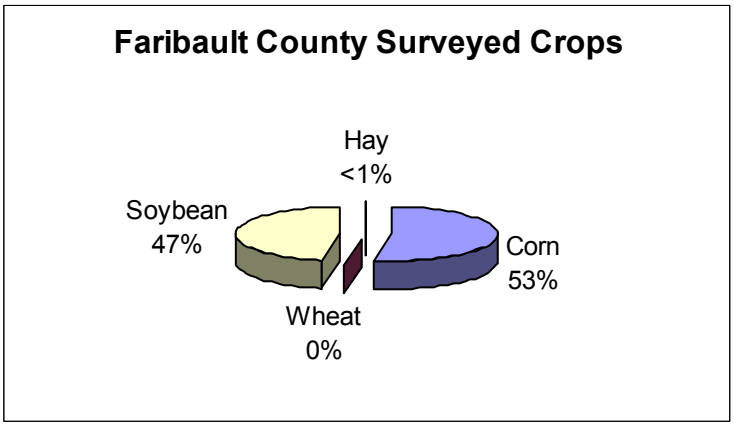



**Table 94.** Fairbault County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 15 | 1.0 | 1.44 | 1.44 | 4,191 |
| Atrazine | 20 | 1.0 | 0.51 | 0.51 | 1,966 |
| Dicamba | 12 | 1.0 | 0.28 | 0.28 | 678 |
| Glyphosate | 51 | 1.7 | 0.74 | 1.25 | 12,737 |
| Glyphosate diam salt | 4 | 1.1 | 0.59 | 0.63 | 437 |
| Mesotrione | 12 | 1.0 | 0.12 | 0.12 | 279 |
| Nicosulfuron | 7 | 1.0 | 0.02 | 0.02 | 27 |
| S-Metolachlor | 18 | 1.0 | 1.57 | 1.57 | 5,697 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 16 | 1.0 | 0.38 | 0.38 | 1,205 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Bentazon, Clopyralid, Dimethenamid, Dimethenamid-P, Flumetsulam, Fomesafen, Foramsulfuron, Glufosinate-ammonium, Imazethapyr, Lactofen, Primisulfuron and Rimsulfuron.
**Insecticides applied but not published included the following:** Carbofuran, Cyfluthrin, Lambda-cyhalothrin, Permethrin, Tebupirimphos and Tefluthrin.

Freeborn County

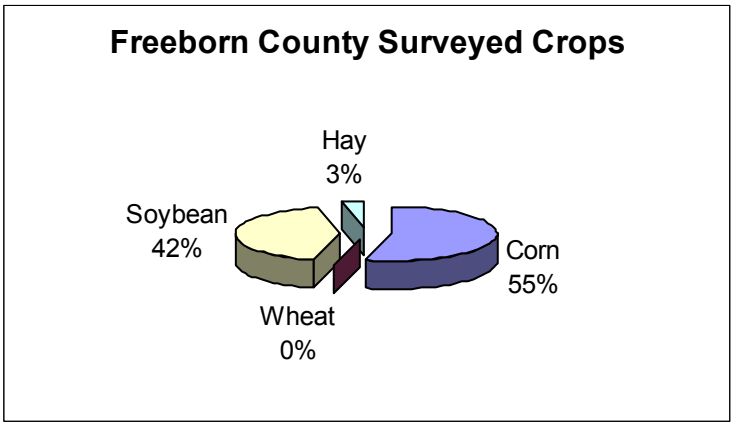



**Table 95.** Freeborn County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 25 | 1.0 | 2.22 | 2.22 | 5,752 |
| Atrazine | 17 | 1.0 | 0.66 | 0.66 | 1,219 |
| Dicamba, Pot. salt | 13 | 1.0 | 0.36 | 0.36 | 505 |
| Glyphosate | 34 | 1.4 | 0.72 | 1.03 | 3,723 |
| Mesotrione | 13 | 1.0 | 0.11 | 0.11 | 143 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 7 | 1.0 | 0.49 | 0.49 | 340 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Clopyralid, Cloransulam-methyl, Dicamba, Dicamba, Dimet. Salt, Diflufenzopyr-sodium, Dimethenamid, Dimethenamid-P, Flumetsulam, Fomesafen, Glufosinate-ammonium, Imazethapyr, Lactofen, Nicosulfuron, Rimsulfuron, S-Metolachlor, Sulfentrazone and Trifluralin.
**Insecticides applied but not published included the following:** Carbofuran, Esfenvalerate and Permethrin.

Jackson County

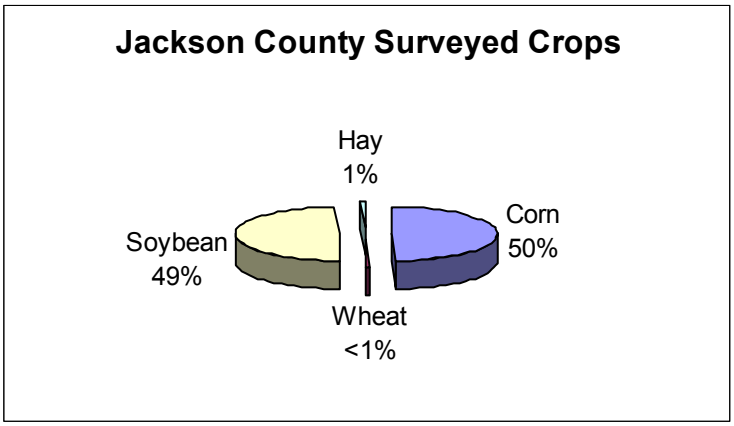



**Table 96.** Jackson County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 20 | 1.0 | 1.51 | 1.51 | 4,716 |
| Atrazine | 14 | 1.0 | 0.49 | 0.49 | 1,043 |
| Fomesafen | 17 | 1.0 | 0.22 | 0.22 | 577 |
| Glyphosate | 45 | 1.5 | 0.80 | 1.17 | 8,133 |
| Imazethapyr | 11 | 1.0 | 0.06 | 0.06 | 95 |
| Mesotrione | 6 | 1.0 | 0.11 | 0.11 | 103 |
| Nicosulfuron | 9 | 1.0 | 0.02 | 0.02 | 29 |
| Pendimethalin | 10 | 1.0 | 0.93 | 0.93 | 1,402 |
| Trifluralin | 9 | 1.0 | 0.90 | 0.90 | 1,270 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 13 | 1.0 | 0.69 | 0.69 | 1,344 |
| Lambda-cyhalothrin | 24 | 1.0 | 0.02 | 0.02 | 81 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D,Bromoxynil, Clethodim, Clopyralid, Cloransulam-methyl, Dicamba, Dicamba, Dimet. Salt, Dicamba, Sodium salt, Diflufenzopyr-sodium, Dimethenamid-P, Fenoxaprop, Fluazifop-P-butyl, Flumetsulam, Glufosinate-ammonium, Glyphosate diam salt, Imazapyr, MCPA, Metribuzin, Rimsulfuron, S-Metolachlor and Sulfentrazone.
**Insecticides applied but not published included the following:** Bifenthrin, Fipronil and Permethrin.

Le Sueur County

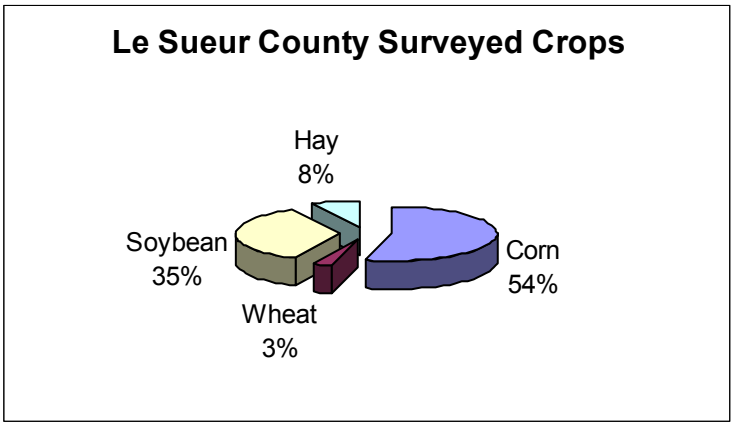



**Table 97.** Le Sueur County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 27 | 1.0 | 1.91 | 1.91 | 4,563 |
| Atrazine | 28 | 1.0 | 0.79 | 0.79 | 1,925 |
| Clopyralid | 9 | 1.0 | 0.15 | 0.15 | 109 |
| Flumetsulam | 9 | 1.0 | 0.05 | 0.05 | 39 |
| Glyphosate | 25 | 1.2 | 0.72 | 0.87 | 1,920 |
| Glyphosate diam salt | 11 | 1.0 | 0.77 | 0.80 | 772 |
| Mesotrione | 17 | 1.0 | 0.14 | 0.14 | 204 |
| S-Metolachlor | 12 | 1.0 | 1.61 | 1.61 | 1,647 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 8 | 1.0 | 0.68 | 0.68 | 465 |
| Lambda-cyhalothrin | 4 | 1.4 | 0.02 | 0.02 | 8 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Bromoxynil, Dicamba, Dicamba, Dimet. salt,Dicamba, Pot. Salt, Diflufenzopyr-sodium, Dimethenamid-P, EPTC, Fenoxaprop, Fluazifop-P-butyl, Flufenacet, Fomesafen, Glufosinate-ammonium, MCPA, Metribuzin, Nicosulfuron, Pendimethalin, Primisulfuron, Rimsulfuron, Sethoxydim, Thifensulfuron and Trifluralin.
**Insecticides applied but not published included the following:** Esfenvalerate, Tefluthrin and Zeta-cypermethrin.

Martin County

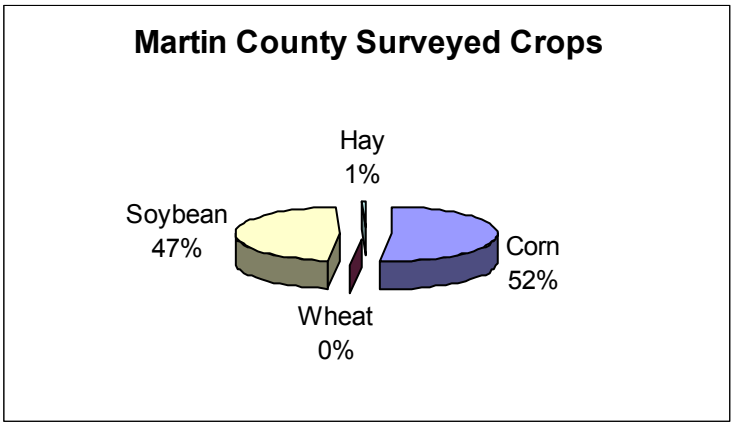



**Table 98.** Martin County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 37 | 1.0 | 1.61 | 1.61 | 13,775 |
| Atrazine | 9 | 1.0 | 0.55 | 0.55 | 1,095 |
| Clopyralid | 8 | 1.0 | 0.11 | 0.11 | 200 |
| Dicamba | 9 | 1.0 | 0.25 | 0.25 | 505 |
| Diflufenzopyr-sodium | 16 | 1.0 | 0.05 | 0.05 | 190 |
| Flumetsulam | 8 | 1.0 | 0.04 | 0.04 | 72 |
| Fomesafen | 16 | 1.0 | 0.10 | 0.10 | 386 |
| Glyphosate | 34 | 1.4 | 0.83 | 1.19 | 9,378 |
| Imazethapyr | 12 | 1.0 | 0.03 | 0.03 | 74 |
| Mesotrione | 6 | 1.0 | 0.13 | 0.13 | 185 |
| Trifluralin | 6 | 1.0 | 0.69 | 0.69 | 911 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 9 | 1.0 | 0.50 | 0.50 | 1,078 |
| Lambda-cyhalothrin | 14 | 1.0 | 0.03 | 0.03 | 89 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2, 4-D, Alachlor, Clethodim, Cloransulam-methyl, Dicamba, Dimet. Salt, Dicamba, Sodium salt, Dimethenamid, Dimethenamid-P, Fenoxaprop, Fluazifop-P-butyl, Foramsulfuron, Glufosinate-ammonium, Glyphosate diam salt, Metribuzin, Nicosulfuron, Pendimethalin, Rimsulfuron, S-Metolachlor and Thifensulfuron.
**Insecticides applied but not published included the following:** Bifenthrin, Esfenvalerate, Tefluthrin and Zeta-cypermethrin.

McLeod County

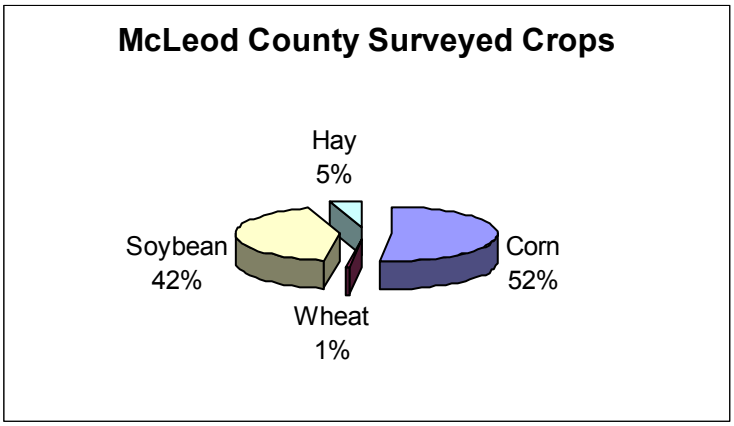



**Table 99.** McLeod County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| 2,4-D | 1 | 1.1 | 0.47 | 0.53 | 81 |
| Acetochlor | 21 | 1.0 | 1.59 | 1.59 | 5,042 |
| Atrazine | 23 | 1.0 | 0.58 | 0.58 | 1,957 |
| Clopyralid | 2 | 1.1 | 0.10 | 0.11 | 37 |
| Dicamba | 13 | 1.0 | 0.23 | 0.23 | 431 |
| Flumetsulam | 2 | 1.1 | 0.03 | 0.04 | 13 |
| Glufosinate-ammonium | 13 | 1.0 | 0.38 | 0.39 | 776 |
| Glyphosate | 53 | 1.5 | 0.88 | 1.33 | 10,376 |
| Mesotrione | 2 | 1.0 | 0.12 | 0.12 | 43 |
| Nicosulfuron | 4 | 1.0 | 0.02 | 0.02 | 12 |
| Primisulfuron | 9 | 1.0 | 0.02 | 0.02 | 29 |
| Rimsulfuron | 3 | 1.0 | 0.01 | 0.01 | 5 |
| S-Metolachlor | 9 | 1.0 | 1.52 | 1.52 | 2,040 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 14 | 1.0 | 0.51 | 0.51 | 1,039 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Chlorimuron-ethyl, Cloransulam-methyl, Dicamba, Dimet. Salt, Diflufenzopyr-sodium, Dimethenamid, Dimethenamid-P, EPTC, Fenoxaprop, Fluazifop-P-butyl, Flufenacet, Fomesafen, Imazethapyr, Metribuzin, Pendimethalin, Sulfentrazone and Thifensulfuron.
**Insecticides applied but not published included the following:** Bifenthrin, Cyfluthrin, Esfenvalerate, Lambda-cyhalothrin, Tebupirimphos, and Zeta-cypermethrin.

Meeker County

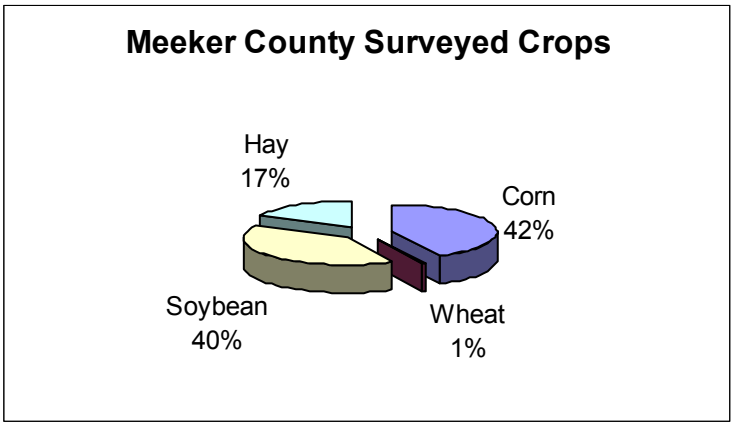



**Table 100.** Meeker County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Atrazine | 14 | 1.1 | 0.78 | 0.87 | 1,707 |
| Clopyralid | 4 | 1.0 | 0.10 | 0.10 | 53 |
| Flumetsulam | 4 | 1.0 | 0.04 | 0.04 | 19 |
| Glufosinate-ammonium | 10 | 1.2 | 0.28 | 0.33 | 468 |
| Glyphosate | 52 | 1.5 | 0.84 | 1.24 | 8,693 |
| Nicosulfuron | 7 | 1.0 | 0.02 | 0.02 | 18 |
| Rimsulfuron | 7 | 1.0 | 0.01 | 0.01 | 11 |
| **Insecticides** | | | | | |
| Lambda-cyhalothrin | 20 | 1.0 | 0.03 | 0.03 | 72 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Acetochlor, Dicamba, Dicamba, Pot. Salt, Dimethenamid-P, Flumioxazin, Imazethapyr, Mesotrione, Pendimethalin, Primisulfuron, and S-Metolachlor.
**Insecticides applied but not published included the following:** Bifenthrin, Carbofuran, Chlorpyrifos, Esfenvalerate, Fipronil and Terbufos.

Nicollet County

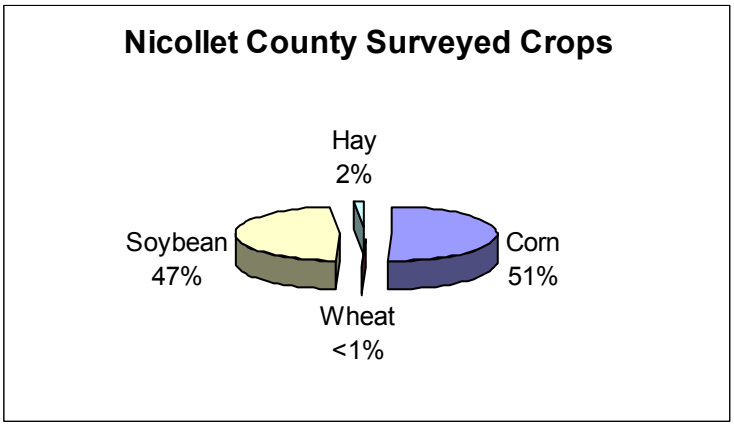



**Table 101.** Nicollet County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 4 | 1.0 | 1.98 | 1.98 | 1,470 |
| Atrazine | 22 | 1.0 | 0.70 | 0.72 | 3,061 |
| Dicamba | 2 | 1.0 | 0.40 | 0.40 | 167 |
| Glufosinate-ammonium | 10 | 1.0 | 0.29 | 0.29 | 537 |
| Glyphosate | 30 | 1.4 | 0.65 | 0.92 | 5,258 |
| Glyphosate diam salt | 21 | 1.2 | 0.64 | 0.77 | 3,112 |
| Mesotrione | 29 | 1.0 | 0.13 | 0.13 | 697 |
| Nicosulfuron | 3 | 1.0 | 0.02 | 0.02 | 11 |
| Rimsulfuron | 2 | 1.0 | 0.01 | 0.01 | 4 |
| S-Metolachlor | 18 | 1.0 | 1.86 | 1.91 | 6,673 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 2 | 1.0 | 0.78 | 0.78 | 240 |
| Lambda-cyhalothrin | 12 | 1.0 | 0.02 | 0.02 | 52 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Bromoxynil, Clopyralid, Dicamba, Pot. Salt, Dicamba, Sodium salt, Diflufenzopyr-sodium, Dimethenamid, Fenoxaprop, Fluazifop-P-butyl, Flumetsulam, Fomesafen, Imazamox, Lactofen, MCPA and Sulfentrazone.
**Insecticides applied but not published included the following:** Bifenthrin, Cyfluthrin, Esfenvalerate, Tebupirimphos and Terbufos.
**Fungicides applied but not published included the following**: Propiconazole.

Redwood County

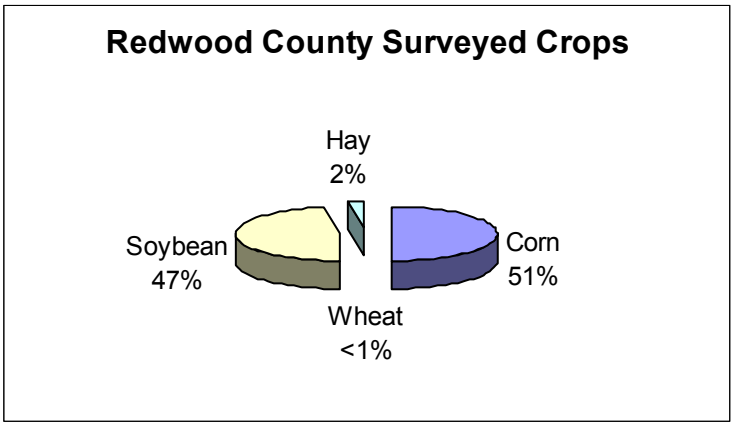



**Table 102.** Redwood County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 16 | 1.0 | 1.29 | 1.29 | 4,069 |
| Atrazine | 12 | 1.1 | 0.44 | 0.47 | 1,102 |
| Dicamba | 8 | 1.0 | 0.37 | 0.37 | 529 |
| Glyphosate | 59 | 1.3 | 0.81 | 1.09 | 12,386 |
| Mesotrione | 8 | 1.0 | 0.09 | 0.09 | 136 |
| Nicosulfuron | 7 | 1.0 | 0.02 | 0.02 | 26 |
| Rimsulfuron | 6 | 1.0 | 0.01 | 0.01 | 14 |
| **Insecticides** | | | | | |
| Esfenvalerate | 11 | 1.0 | 0.03 | 0.03 | 69 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Bromoxynil, Clopyralid, Dicamba, Dimet. Salt, Dicamba, Sodium salt, Diflufenzopyr-sodium, Dimethenamid-P, EPTC, Flumetsulam, Fomesafen, Glufosinate-ammonium, Glyphosate diam salt, Imazamox, Imazethapyr, Pendimethalin, Quizalofop-P-ethyl, S-Metolachlor, Thifensulfuron and Trifluralin.
**Insecticides applied but not published included the following:** Bifenthrin, Chlorpyrifos, Cyfluthrin, Lambda-cyhalothrin, Permethrin, Tebupirimphos and Terbufos.

Renville County

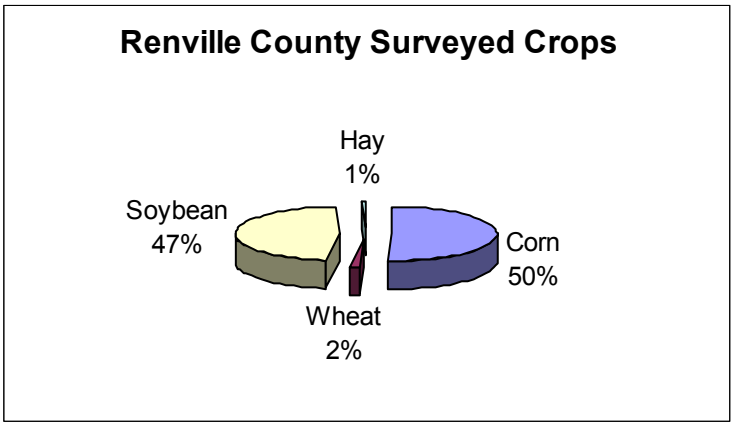



**Table 103.** Renville County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| 2,4-D | 2 | 1.0 | 0.67 | 0.67 | 195 |
| Acetochlor | 13 | 1.0 | 1.87 | 1.87 | 4,233 |
| Dicamba | 14 | 1.0 | 0.36 | 0.36 | 904 |
| Glyphosate | 55 | 1.5 | 0.70 | 1.06 | 10,123 |
| Nicosulfuron | 10 | 1.0 | 0.02 | 0.02 | 40 |
| Rimsulfuron | 10 | 1.0 | 0.01 | 0.01 | 20 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 12 | 1.0 | 0.61 | 0.62 | 1,304 |
| Cyfluthrin | 8 | 1.0 | 0.01 | 0.01 | 10 |
| Esfenvalerate | 11 | 1.0 | 0.03 | 0.03 | 63 |
| Tebupirimphos | 8 | 1.0 | 0.14 | 0.14 | 203 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Atrazine, Bromoxynil, Clethodim, Clopyralid, Dicamba, Dimet. Salt, Diflufenzopyr-sodium, Dimethenamid, Dimethenamid-P, EPTC, Ethalfluralin, Flumetsulam, Glufosinate-ammonium, Glyphosate diam salt, Imazamox, Mesotrione and S-Metolachlor.
**Insecticides applied but not published included the following:** Carbofuran, Lambda-cyhalothrin, Permethrin and Terbufos.

Rice County

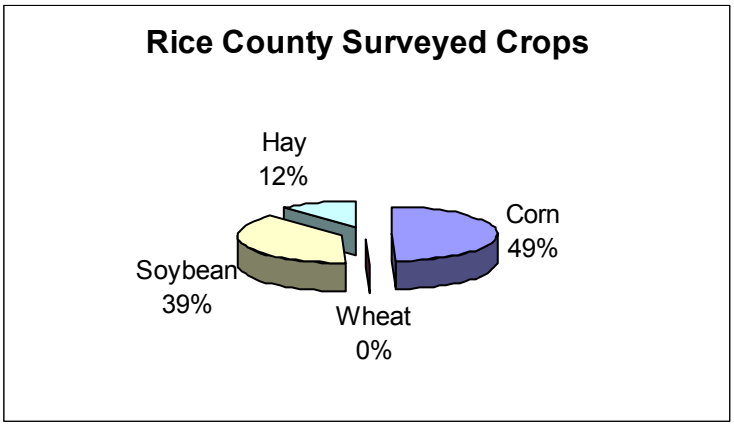



**Table 104.** Rice County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Atrazine | 15 | 1.0 | 0.78 | 0.78 | 980 |
| Clopyralid | 8 | 1.0 | 0.09 | 0.09 | 53 |
| Flumetsulam | 8 | 1.0 | 0.03 | 0.03 | 18 |
| Glufosinate-ammonium | 9 | 1.0 | 0.30 | 0.31 | 223 |
| Glyphosate | 45 | 1.3 | 0.68 | 0.87 | 3,204 |
| Glyphosate diam salt | 8 | 1.1 | 0.59 | 0.64 | 411 |
| Nicosulfuron | 13 | 1.2 | 0.01 | 0.01 | 15 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 4 | 1.0 | 0.93 | 0.93 | 332 |
| Lambda-cyhalothrin | 9 | 1.2 | 0.02 | 0.03 | 19 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Acetochlor, Bromoxynil, Dicamba, Dicamba, Sodium salt, Diflufenzopyr-sodium, Imazapyr, Imazethapyr, Mesotrione, Metribuzin, Primisulfuron, Rimsulfuron and S-Metolachlor.
**Insecticides applied but not published included the following:**
Sethoxydim, Permethrin and Zeta-cypermethrin.

Sibely County

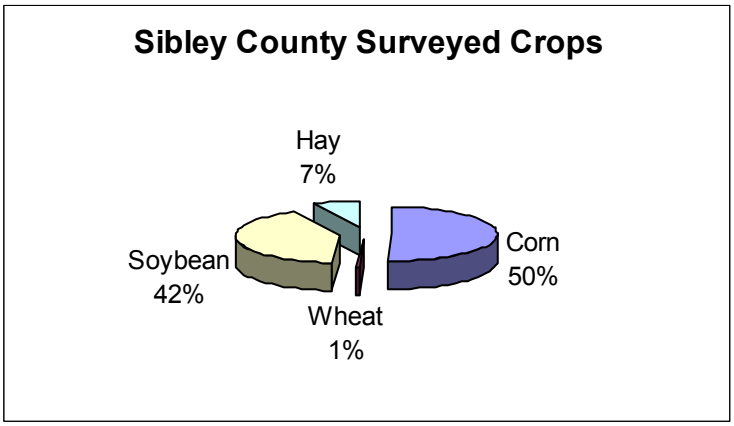



**Table 105.** Sibley County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Atrazine | 12 | 1.0 | 0.42 | 0.42 | 420 |
| Flumetsulam | 10 | 1.0 | 0.04 | 0.04 | 29 |
| Glyphosate | 53 | 1.5 | 0.72 | 1.09 | 4,650 |
| Mesotrione | 14 | 1.0 | 0.10 | 0.10 | 112 |
| Nicosulfuron | 15 | 1.0 | 0.02 | 0.02 | 20 |
| Rimsulfuron | 14 | 1.0 | 0.01 | 0.01 | 12 |
| S-Metolachlor | 12 | 1.0 | 1.59 | 1.59 | 1,532 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 14 | 1.0 | 0.65 | 0.65 | 726 |
| Lambda-cyhalothrin | 9 | 1.0 | 0.02 | 0.02 | 16 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Acetochlor, Alachlor, Bromoxynil, Clopyralid, Dicamba, Dicamba, Sodium salt, Fomesafen, Glufosinate-ammonium, Glyphosate diam salt, Halosulfuron, Primisulfuron and Trifluralin.
**Insecticides applied but not published included the following:**
Esfenvalerate and Terbufos.

Steele County

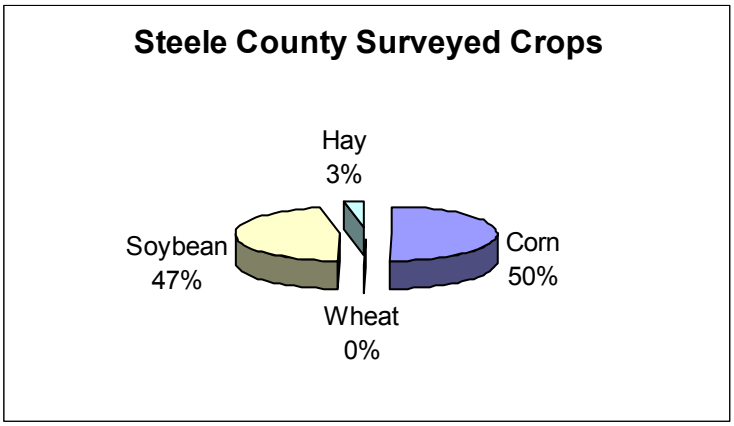



**Table 106.** Steele County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 12 | 1.0 | 1.31 | 1.31 | 1,820 |
| Atrazine | 25 | 1.0 | 0.60 | 0.60 | 1,669 |
| Cloransulam-methyl | 5 | 1.0 | 0.13 | 0.13 | 71 |
| Dicamba | 15 | 1.0 | 0.24 | 0.25 | 425 |
| Glyphosate | 52 | 1.5 | 0.75 | 1.13 | 6,552 |
| Mesotrione | 9 | 1.0 | 0.16 | 0.16 | 158 |
| Nicosulfuron | 11 | 1.0 | 0.02 | 0.02 | 29 |
| Primisulfuron | 11 | 1.0 | 0.02 | 0.02 | 25 |
| Rimsulfuron | 10 | 1.0 | 0.01 | 0.01 | 13 |
| S-Metolachlor | 28 | 1.0 | 1.74 | 1.74 | 5,371 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Bromoxynil, Clethodim, Clopyralid, Dimethenamid-P, Flumetsulam, Flumioxazin, Fomesafen, Glufosinate-ammonium, Glyphosate diam salt, Imazamox, Lactofen, Metribuzin, Sulfentrazone and Thifensulfuron.
**Insecticides applied but not published included the following:** Chlorpyrifos, Esfenvalerate, Fipronil, Lambda-cyhalothrin and Permethrin.

Waseca County

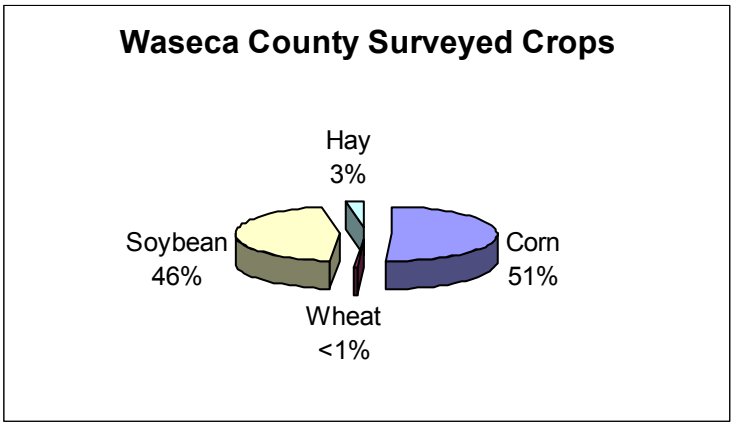



**Table 107.** Waseca County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 17 | 1.0 | 1.48 | 1.48 | 2,712 |
| Atrazine | 29 | 1.0 | 0.48 | 0.48 | 1,508 |
| Clethodim | 6 | 1.2 | 0.05 | 0.07 | 42 |
| Clopyralid | 13 | 1.0 | 0.12 | 0.12 | 166 |
| Flumetsulam | 13 | 1.0 | 0.04 | 0.04 | 57 |
| Glyphosate | 45 | 1.6 | 0.70 | 1.09 | 5,317 |
| Mesotrione | 9 | 1.0 | 0.07 | 0.07 | 68 |
| Nicosulfuron | 9 | 1.0 | 0.02 | 0.02 | 19 |
| Rimsulfuron | 7 | 1.0 | 0.01 | 0.01 | 8 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 6 | 1.0 | 0.58 | 0.58 | 352 |
| Lambda-cyhalothrin | 11 | 1.0 | 0.02 | 0.02 | 25 |
| Permethrin | 4 | 1.1 | 0.09 | 0.11 | 41 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Acetochlor, Atrazine, Bentazon, Bromoxynil, Cloransulam-methyl, Dicamba, Dicamba, Dimet. Salt, Dicamba, Pot. Salt, Diflufenzopyr-sodium, Dimethenamid, Dimethenamid-P, Flumioxazin, Fomesafen, Foramsulfuron, Glufosinate-ammonium, Imazethapyr, Lactofen, Pendimethalin, Primisulfuron, S-Metolachlor, Sulfentrazone, Thifensulfuron and Trifluralin.
**Insecticides applied but not published included the following:** Esfenvalerate, Fipronil and Malathion.

Watonwan County

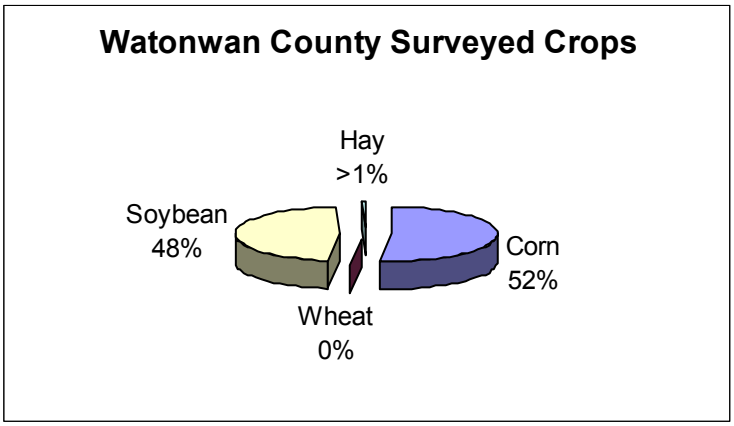



**Table 108.** Watonwan County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 12 | 1.0 | 1.53 | 1.53 | 4,470 |
| Atrazine | 8 | 1.0 | 0.72 | 0.72 | 1,437 |
| Flumioxazin | 2 | 1.3 | 0.06 | 0.08 | 31 |
| Glyphosate | 42 | 1.7 | 0.72 | 1.20 | 12,232 |
| Mesotrione | 5 | 1.0 | 0.12 | 0.12 | 134 |
| Nicosulfuron | 4 | 1.0 | 0.02 | 0.02 | 14 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 13 | 1.0 | 0.52 | 0.52 | 1,643 |
| Lambda-cyhalothrin | 6 | 1.0 | 0.02 | 0.02 | 26 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Chlorimuron-ethyl, Clethodim, Clopyralid, Cloransulam-methyl, Dicamba, Dicamba, Dimet. Salt, Diflufenzopyr-sodium, Dimethenamid, Dimethenamid-P, Flumetsulam, Fomesafen, Glufosinate-ammonium, Imazethapyr, Lactofen, Pendimethalin, Rimsulfuron, S-Metolachlor, Thifensulfuron and Trifluralin.
**Insecticides applied but not published included the following:** Fipronil.

Wright County

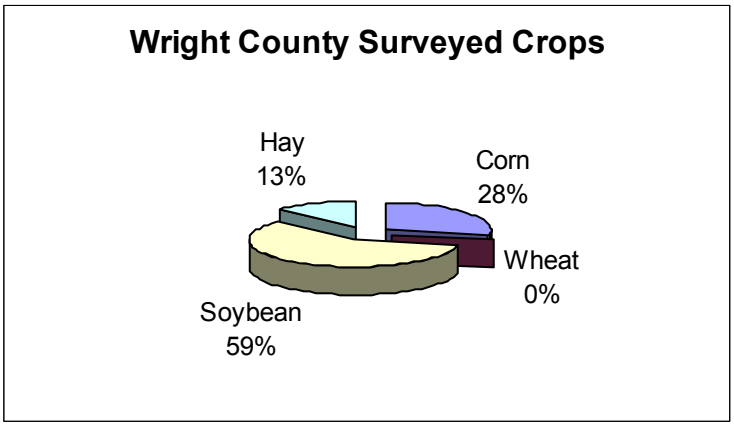



**Table 109.** Wright County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Clopyralid | 12 | 1.0 | 0.10 | 0.10 | 54 |
| Flumetsulam | 12 | 1.0 | 0.04 | 0.04 | 19 |
| Glyphosate | 65 | 1.5 | 0.65 | 1.00 | 2,845 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Acetochlor, Atrazine. Dicamba, Dimethenamid-P, Imazamox, Imazethapyr, Nicosulfuron, Pendimethalin and Rimsulfuron.
**Insecticides applied but not published included the following:** Esfenvalerate, Lambda-cyhalothrin and Terbufos.

# Region 9 County Data

## Dodge County

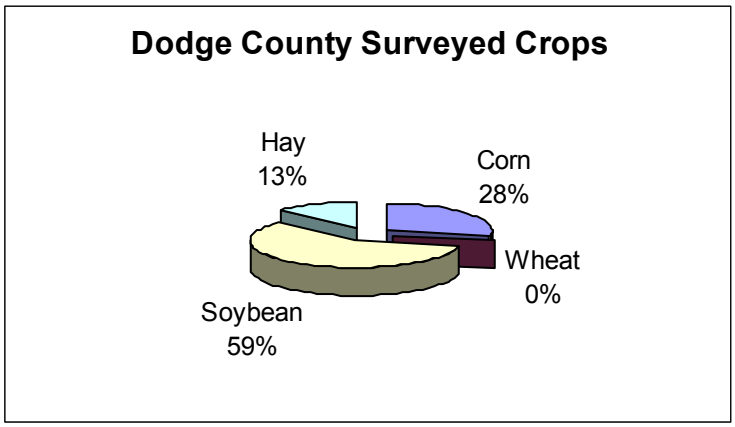



**Table 110.** Dodge County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 14 | 1.0 | 1.58 | 1.58 | 2,904 |
| Atrazine | 34 | 1.0 | 0.57 | 0.57 | 2,536 |
| Clopyralid | 3 | 1.0 | 0.11 | 0.11 | 50 |
| Flumetsulam | 3 | 1.0 | 0.04 | 0.04 | 16 |
| Glyphosate | 35 | 1.9 | 0.80 | 1.52 | 7,011 |
| Mesotrione | 18 | 1.0 | 0.12 | 0.12 | 273 |
| Nicosulfuron | 12 | 1.0 | 0.02 | 0.02 | 24 |
| S-Metolachlor | 15 | 1.0 | 1.38 | 1.38 | 2,753 |
| **Insecticides** | | | | | |
| Lambda-cyhalothrin | 9 | 1.0 | 0.03 | 0.03 | 34 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Bentazon, Bromoxynil, Clethodim, Cloransulam-methyl, Dicamba, Dicamba, Pot. Salt, Dicamba, Sodium salt, Diflufenzopyr-sodium, Flumiclorac-pentyl, Fomesafen, Foramsulfuron, Glufosinate-ammonium, Imazamox, Imazapyr, Imazethapyr, Primisulfuron, Rimsulfuron, Sethoxydim and Sulfentrazone.
**Insecticides applied but not published included the following:** Carbofuran, Chlorpyrifos, Esfenvalerate, Fipronil, Permethrin and Tefluthrin.

Fillmore County

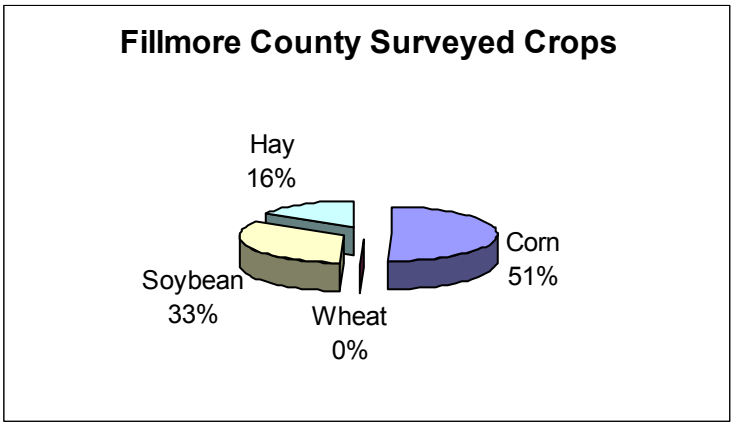



**Table 111.** Fillmore County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| 2,4-D | 3 | 1.0 | 0.29 | 0.29 | 89 |
| Acetochlor | 19 | 1.0 | 2.14 | 2.14 | 3,831 |
| Atrazine | 34 | 1.0 | 0.72 | 0.72 | 2,274 |
| Clopyralid | 14 | 1.0 | 0.11 | 0.11 | 143 |
| Dicamba | 5 | 1.0 | 0.11 | 0.11 | 52 |
| Flumetsulam | 14 | 1.0 | 0.04 | 0.04 | 49 |
| Glyphosate | 59 | 1.1 | 0.75 | 0.82 | 4,505 |
| Imazethapyr | 6 | 1.0 | 0.06 | 0.06 | 34 |
| Mesotrione | 9 | 1.0 | 0.17 | 0.17 | 137 |
| Nicosulfuron | 7 | 1.0 | 0.02 | 0.02 | 13 |
| Rimsulfuron | 6 | 1.0 | 0.01 | 0.01 | 6 |
| S-Metolachlor | 11 | 1.0 | 1.77 | 1.77 | 1,872 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 17 | 1.0 | 0.56 | 0.56 | 863 |
| Lambda-cyhalothrin | 10 | 1.0 | 0.02 | 0.02 | 16 |
| Tefluthrin | 6 | 1.0 | 0.11 | 0.11 | 65 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Alachlor, Clethodim, Glufosinate-ammonium, Halosulfuron, Imazamox, Primisulfuron, Sethoxydim and Thifensulfuron.
**Insecticides applied but not published included the following:** Cyfluthrin, Fipronil, Terbufos and Zeta-cypermethrin.

Goodhue County

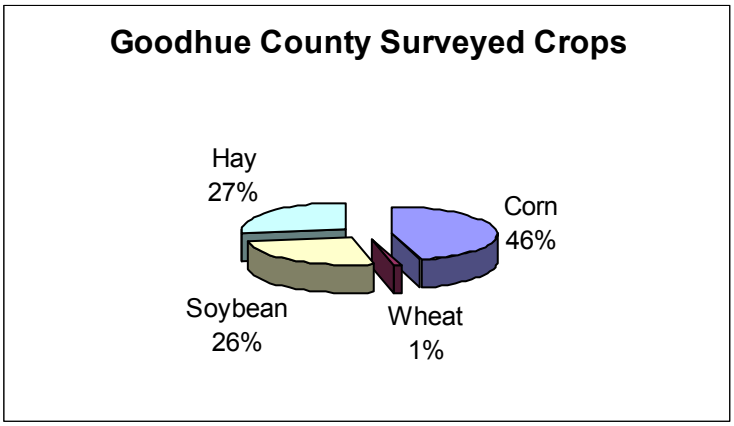



**Table 112.** Goodhue County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 5 | 1.0 | 2.29 | 2.29 | 552 |
| Atrazine | 22 | 1.0 | 0.89 | 0.89 | 942 |
| Clopyralid | 10 | 1.0 | 0.12 | 0.12 | 59 |
| Flumetsulam | 10 | 1.0 | 0.05 | 0.05 | 22 |
| Glyphosate | 33 | 1.1 | 0.76 | 0.86 | 1,416 |
| Nicosulfuron | 9 | 1.0 | 0.02 | 0.02 | 9 |
| Rimsulfuron | 8 | 1.0 | 0.01 | 0.01 | 4 |
| **Insecticides** | | | | | |
| Lambda-cyhalothrin | 5 | 1.2 | 0.01 | 0.02 | 4 |
| Permethrin | 3 | 1.5 | 0.14 | 0.20 | 26 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Alachlor, Cloransulam-methyl, Dicamba, Pot. Salt, Dimethenamid-P, Glufosinate-ammonium, Glyphosate diam salt, Imazamox, Mesotrione, Pendimethalin, S-Metolachlor and Sulfentrazone.
**Insecticides applied but not published included the following:** Chlorpyrifos, Cyfluthrin, Esfenvalerate, Phorate, Tebupirimphos, Tefluthrin and Terbufos.

Houston County

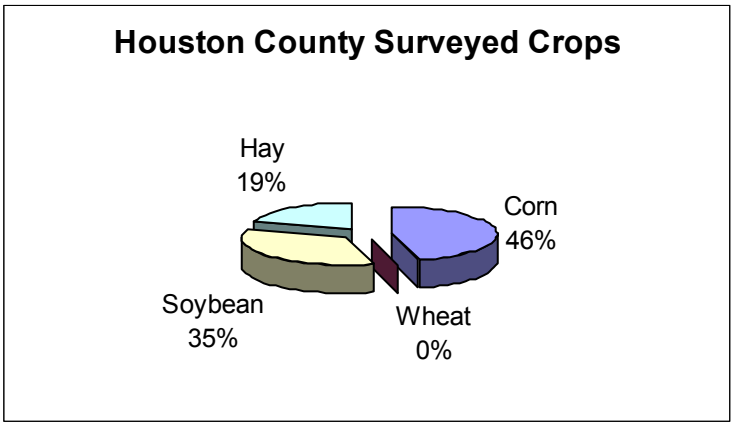



**Table 113.** Houston County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 5 | 1.0 | 1.93 | 1.93 | 650 |
| Atrazine | 19 | 1.0 | 0.88 | 0.88 | 1,129 |
| Clopyralid | 8 | 1.0 | 0.11 | 0.11 | 63 |
| Dicamba, Pot. salt | 9 | 1.0 | 0.46 | 0.46 | 272 |
| Flumetsulam | 8 | 1.0 | 0.04 | 0.04 | 20 |
| Glyphosate | 48 | 1.0 | 0.78 | 0.81 | 2,646 |
| Nicosulfuron | 15 | 1.0 | 0.02 | 0.02 | 21 |
| Rimsulfuron | 15 | 1.0 | 0.01 | 0.01 | 11 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Alachlor, Chlorimuron-ethyl, Dicamba, Dimet. Salt, Dicamba, Sodium salt, Diflufenzopyr-sodium, Dimethenamid-P, Imazamox, Imazethapyr, Mesotrione, Pendimethalin and S-Metolachlor.
**Insecticides applied but not published included the following:** Chlorpyrifos, Cyfluthrin, Dimethoate, Permethrin, Tebupirimphos, Tefluthrin and Terbufos.

Mower County

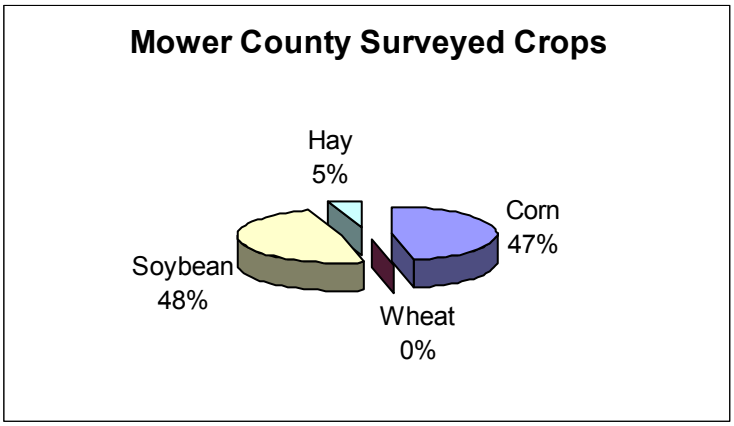



**Table 114.** Mower County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 7 | 1.0 | 1.95 | 1.99 | 5,347 |
| Atrazine | 30 | 1.1 | 0.75 | 0.81 | 3,983 |
| Clethodim | 2 | 1.0 | 0.07 | 0.07 | 28 |
| Clopyralid | 4 | 1.0 | 0.15 | 0.15 | 95 |
| Flumetsulam | 4 | 1.0 | 0.05 | 0.05 | 34 |
| Glufosinate-ammonium | 8 | 1.0 | 0.31 | 0.31 | 411 |
| Glyphosate | 48 | 1.2 | 0.75 | 0.93 | 7,233 |
| Mesotrione | 11 | 1.0 | 0.13 | 0.13 | 223 |
| Nicosulfuron | 9 | 1.0 | 0.02 | 0.02 | 34 |
| Rimsulfuron | 8 | 1.0 | 0.01 | 0.01 | 16 |
| S-Metolachlor | 14 | 1.0 | 1.66 | 1.66 | 3,867 |
| **Insecticides** | | | | | |
| Lambda-cyhalothrin | 12 | 1.0 | 0.02 | 0.02 | 40 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Bentazon, Bromoxynil, Chlorimuron-ethyl, Cloransulam-methyl, Dicamba, Dicamba, Dimet. Salt, Dicamba, Pot. Salt, Diflufenzopyr-sodium, Fenoxaprop, Fluazifop-P-butyl, Flumiclorac-pentyl, Fomesafen, Imazapyr, Imazethapyr, Lactofen, Metribuzin, Metsulfuron-methyl, Pendimethalin, Primisulfuron, Sulfentrazone, Thifensulfuron and Trifluralin.
**Insecticides applied but not published included the following:** Bifenthrin, Esfenvalerate and Tefluthrin.

Olmsted County

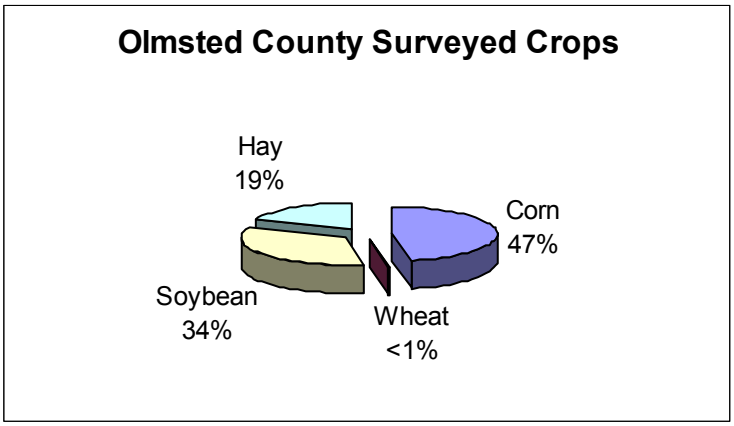



**Table 115.** Olmsted County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Atrazine | 25 | 1.0 | 0.69 | 0.69 | 919 |
| Glyphosate | 38 | 1.5 | 0.75 | 1.12 | 2,276 |
| Mesotrione | 5 | 1.0 | 0.15 | 0.15 | 43 |
| Nicosulfuron | 10 | 1.0 | 0.02 | 0.02 | 10 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 4 | 1.0 | 0.55 | 0.55 | 114 |
| Lambda-cyhalothrin | 4 | 1.6 | 0.02 | 0.02 | 5 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Acetochlor, Alachlor, Clomazone, Clopyralid, Dicamba, Dicamba, Dimet. Salt, Dicamba, Sodium salt, Diflufenzopyr-sodium, Fenoxaprop, Flumetsulam, Foramsulfuron, Glufosinate-ammonium, Imazamox, Imazethapyr, Primisulfuron, Rimsulfuron and S-Metolachlor.
**Insecticides applied but not published included the following:** Cyfluthrin, Permethrin and Tebupirimphos.

Wabasha County

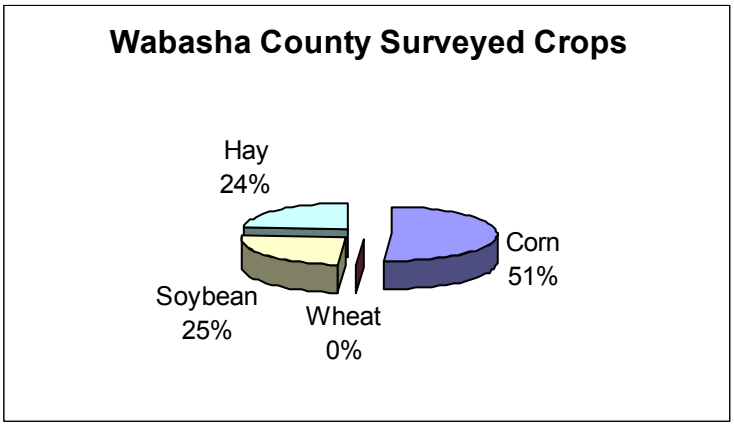



**Table 116.** Wabasha County pesticide applications and rates

**Pesticide Applications And Rates By Active Ingredient**
**Wabasha County**

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 25 | 1.0 | 2.03 | 2.03 | 5,264 |
| Atrazine | 33 | 1.0 | 0.86 | 0.86 | 2,859 |
| Clopyralid | 18 | 1.0 | 0.13 | 0.13 | 232 |
| Flumetsulam | 18 | 1.0 | 0.04 | 0.04 | 81 |
| Glyphosate | 31 | 1.0 | 0.79 | 0.79 | 2,507 |
| Nicosulfuron | 13 | 1.0 | 0.02 | 0.02 | 30 |
| Rimsulfuron | 12 | 1.0 | 0.01 | 0.01 | 14 |
| Lambda-cyhalothrin | 7 | 1.0 | 0.02 | 0.02 | 13 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Clethodim, Clomazone, Dicamba, Dicamba, Pot. Salt, Foramsulfuron, Imazethapyr, Mesotrione, Pendimethalin, S-Metolachlor and Sulfentrazone.
**Insecticides applied but not published included the following:** Bifenthrin, Chlorpyrifos, Cyfluthrin, Esfenvalerate, Fipronil, Tebupirimphos, Tefluthrin and Zeta-cypermethrin.

Winona County

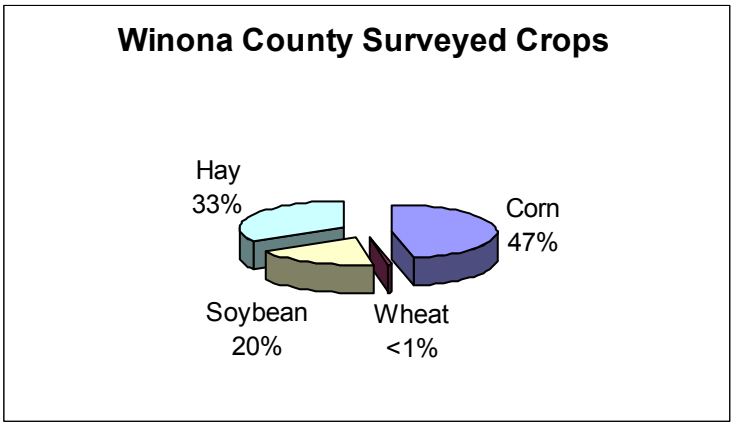



**Table 117.** Winona County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 22 | 1.0 | 1.44 | 1.44 | 2,576 |
| Atrazine | 18 | 1.0 | 0.67 | 0.67 | 1,018 |
| Clopyralid | 19 | 1.0 | 0.09 | 0.09 | 141 |
| Flumetsulam | 19 | 1.0 | 0.03 | 0.03 | 52 |
| Glyphosate | 27 | 1.0 | 0.89 | 0.91 | 2,015 |
| Nicosulfuron | 17 | 1.0 | 0.01 | 0.01 | 17 |
| Rimsulfuron | 15 | 1.0 | 0.01 | 0.01 | 9 |
| **Insecticides** | | | | | |
| Lambda-cyhalothrin | 9 | 1.0 | 0.02 | 0.02 | 12 |
| Tefluthrin | 8 | 1.0 | 0.13 | 0.13 | 88 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Dicamba, Dimet. Salt, Dicamba, Pot. Salt, Dicamba, Sodium salt, Diflufenzopyr-sodium, Dimethenamid-P, Glufosinate-ammonium, Imazapyr, Imazethapyr, Mesotrione and S-Metolachlor.
**Insecticides applied but not published included the following:** Chlorpyrifos, Cyfluthrin, Permethrin, Tebupirimphos and Terbufos.

# Region 10 County Data

## Anoka County

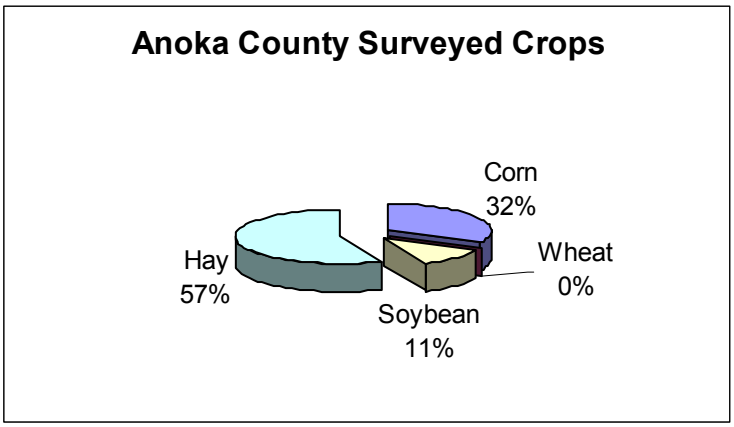



**Table 118.** Anoka County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Glyphosate | 24 | 1.0 | 0.61 | 0.61 | 338 |

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Acetochlor, Alachlor, Atrazine, Clopyralid, Flumetsulam, Nicosulfuron, Pendimethalin and Rimsulfuron.
**Insecticides applied but not published included the following:** Lambda-cyhalothrin.

Carver County

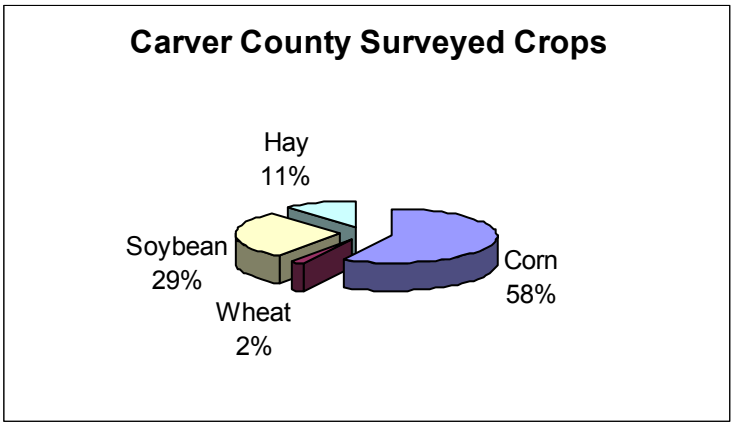



**Table 119.** Carver County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 30 | 1.0 | 1.47 | 1.47 | 3,274 |
| Atrazine | 42 | 1.0 | 0.53 | 0.53 | 1,678 |
| Clopyralid | 19 | 1.0 | 0.11 | 0.11 | 149 |
| Dicamba | 4 | 1.0 | 0.29 | 0.29 | 94 |
| Flumetsulam | 19 | 1.0 | 0.04 | 0.04 | 55 |
| Glyphosate | 34 | 1.2 | 0.76 | 0.92 | 2,391 |
| Mesotrione | 21 | 1.0 | 0.09 | 0.09 | 149 |
| Nicosulfuron | 12 | 1.2 | 0.02 | 0.02 | 19 |
| Pendimethalin | 5 | 1.0 | 0.88 | 0.88 | 339 |
| Rimsulfuron | 12 | 1.2 | 0.01 | 0.01 | 12 |
| Lambda-cyhalothrin | 13 | 1.2 | 0.01 | 0.02 | 17 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D,Dicamba, Pot. Salt, Dicamba, Sodium salt, Diflufenzopyr-sodium, Dimethenamid-P, Fenoxaprop, Fluazifop-P-butyl, Fomesafen, Foramsulfuron, Glufosinate-ammonium, Imazethapyr, Primisulfuron, S-Metolachlor and Sulfentrazone.
**Insecticides applied but not published included the following:** Chlorpyrifos, Cyfluthrin, Phorate and Tefluthrin.

DakotaCounty

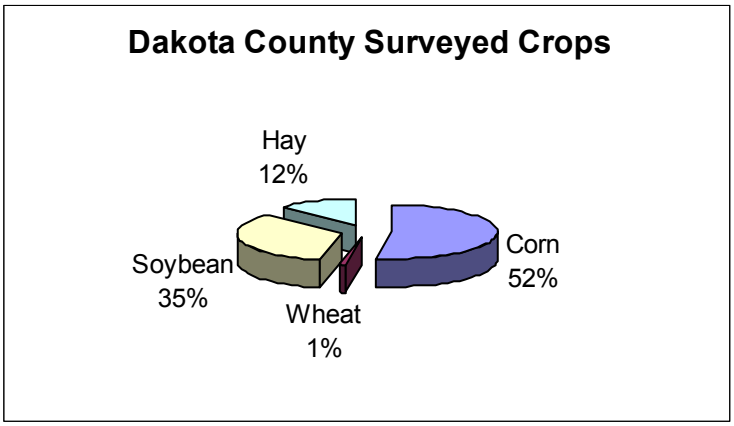



**Table 120.** Dakota County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Acetochlor | 8 | 1.0 | 1.37 | 1.37 | 1,768 |
| Atrazine | 15 | 1.0 | 0.59 | 0.59 | 1,374 |
| Clopyralid | 11 | 1.0 | 0.10 | 0.10 | 163 |
| Flumetsulam | 11 | 1.0 | 0.04 | 0.04 | 60 |
| Glufosinate-ammonium | 4 | 1.0 | 0.34 | 0.34 | 204 |
| Glyphosate | 39 | 1.1 | 0.77 | 0.87 | 5,358 |
| Mesotrione | 13 | 1.0 | 0.12 | 0.12 | 250 |
| Nicosulfuron | 17 | 1.0 | 0.02 | 0.02 | 57 |
| Rimsulfuron | 17 | 1.0 | 0.01 | 0.01 | 28 |
| S-Metolachlor | 14 | 1.0 | 1.50 | 1.50 | 3,215 |
| **Insecticides** | | | | | |
| Chlorpyrifos | 6 | 1.1 | 0.60 | 0.64 | 609 |
| Cyfluthrin | 7 | 1.0 | 0.01 | 0.01 | 9 |
| Lambda-cyhalothrin | 8 | 1.0 | 0.02 | 0.02 | 24 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Alachlor, Bentazon, Bromoxynil octanoate, Clethodim, Cyanazine, Dicamba, Dicamba, Pot. Salt, Fenoxaprop, Fluazifop-P-butyl, Fomesafen, Imazapyr, Imazethapyr, MCPA, Pendimethalin, Primisulfuron, Quizalofop-P-ethyl and Thifensulfuron.
**Insecticides applied but not published included the following:** Bifenthrin, Chlorethoxyfos, Esfenvalerate, Fipronil, Malathion, Tebupirimphos, Tefluthrin and Terbufos.

Scott County

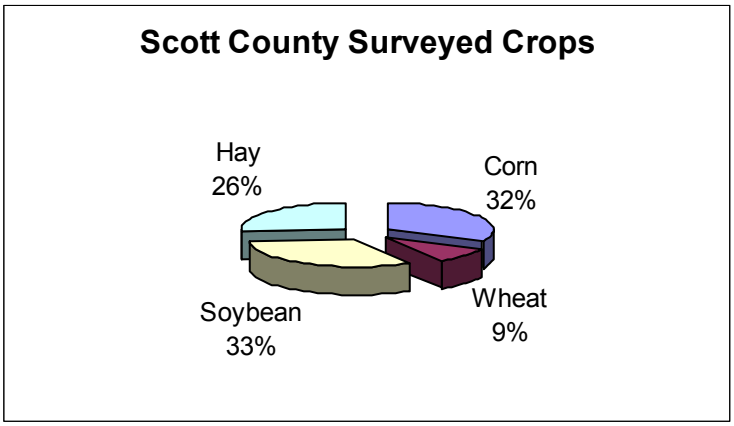



**Table 121.** Scott County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Atrazine | 13 | 1.0 | 0.70 | 0.70 | 344 |
| Glyphosate | 34 | 1.2 | 0.66 | 0.78 | 1,056 |
| Mesotrione | 7 | 1.0 | 0.17 | 0.17 | 49 |
| Nicosulfuron | 7 | 1.0 | 0.02 | 0.02 | 5 |
| Rimsulfuron | 7 | 1.0 | 0.01 | 0.01 | 3 |
| **Insecticides** | | | | | |
| Lambda-cyhalothrin | 12 | 1.0 | 0.02 | 0.02 | 9 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: 2,4-D, Acetochlor, Clethodim, Clopyralid, Dicamba, Dicamba, Dimet. Salt, Dicamba, Pot. Salt, Flumetsulam, Foramsulfuron, Glufosinate-ammonium, Glyphosate diam salt, Imazethapyr, S-Metolachlor, Sulfentrazone and Trifluralin.
**Insecticides applied but not published included the following:** Chlorpyrifos, Cyfluthrin, Permethrin and Tebupirimphos.

Washington County

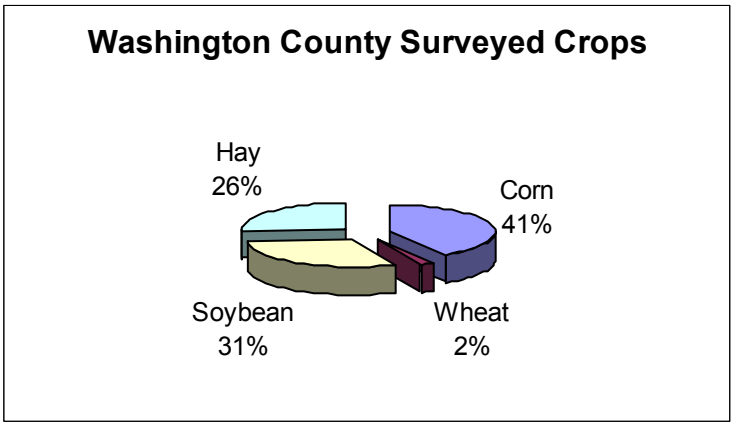



**Table 122.** Washington County pesticide applications and rates

| Agricultural Chemical (A.I.) | Surveyed Area Applied | Average Appli-cations | Average Rate Per Application | Average Rate Per Crop Year | Total Applied Crop Year[1] |
|---|---|---|---|---|---|
| | *Percent* | *Number* | *Pounds per Acre* (A.I.) | *Pounds per Acre* (A.I.) | *Total Pounds* (A.I.) |
| **Herbicides** | | | | | |
| Atrazine | 29 | 1 | 0.68 | 0.68 | 848 |
| Glyphosate | 35 | 1 | 1.03 | 1.03 | 1,547 |

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2003 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of A.I. used at the state, regional or county levels.

**Herbicides applied but not published included the following**: Acetochlor, Alachlor, Clopyralid, Flumetsulam, Glufosinate-ammonium, Mesotrione, Nicosulfuron, Pendimethalin, Quizalofop-ethyl and Rimsulfuron and S-Metolachlor.
**Insecticides applied but not published included the following:** Chlorpyrifos, Cyfluthrin, Lambda-cyhalothrin, Tebupirimphos and Terbufos.

# Appendices

# Appendix 1. MASS Data Sheet

*Minnesota Agricultural Statistics Service*

U.S. Department of Agriculture - National Agricultural Statistics Service

P.O. Box 7068, St. Paul, MN 55107-7068
Telephone: 651-296-2230 FAX: 651-296-3192
E-mail: nass-mn@nass.usda.gov

Project 487

## Minnesota Pesticide Use Survey Instrument for 2003 Cropping Year

### 1. ACREAGE

| **REPORT FOR THE FARM YOU OPERATE** *(Include Land Rented From Others, Exclude Land Rented Out)* | | | | |
|---|---|---|---|---|
| **2003 Crop** | **Total Acres Planted** | **Total Acres Treated With Fungicide** | **Total Acres Treated With Herbicide** | **Total Acres Treated With Insecticide** |
| **CORN** | 201 | 202 | 203 | 204 |
| **WHEAT** ***(Durum, other Spring, Winter)*** | 206 | 207 | 208 | 209 |
| **SOYBEANS** | 211 | 212 | 213 | 214 |
| **ALL HAY** | 216 | 217 | 218 | 219 |

### 2. USAGE OF INDIVIDUAL PESTICIDES ON 2003 CROPS - Include applications after September 1, 2002 on crops for 2003 harvest. *(Please report below the acres treated with each individual chemical during 2003 by crop and/or land use. If pesticides were applied in combination, report each separately. Exclude seed treatment and inoculants.)*

| **NAME OF PESTICIDE USED** *(Please list chemicals used. If necessary, refer to the enclosed list)* | **Office Use** | **Acres Treated** | **No. of Applications** | **Rate** | | **Unit Code:** 1 Pounds 12 Gallons 13 Quarts 14 Pints 15 Ounces 30 Grams |
|---|---|---|---|---|---|---|
| **CORN** | | | | | | |
| | 301 | 302 | 303 | 304 | . | 305 |
| | 306 | 307 | 308 | 309 | . | 310 |
| | 311 | 312 | 313 | 314 | . | 315 |
| | 316 | 317 | 318 | 319 | . | 320 |
| | 321 | 322 | 323 | 324 | . | 325 |
| | 326 | 327 | 328 | 329 | . | 330 |
| | 331 | 332 | 333 | 334 | . | 335 |
| | 336 | 337 | 338 | 339 | . | 340 |
| | 341 | 342 | 343 | 344 | . | 345 |

| NAME OF PESTICIDE USED *(Please list chemicals used. If necessary, refer to the enclosed list)* | Office Use | Acres Treated | No. of Applications | Rate | | Unit Code: 1 Pounds 12 Gallons 13 Quarts 14 Pints 15 Ounces 30 Grams |
|---|---|---|---|---|---|---|
| **CORN (cont.)** | | | | | | |
| | 346 | 347 | 348 | 349 | . | 350 |
| | 351 | 352 | 353 | 354 | . | 355 |
| | 356 | 357 | 358 | 359 | . | 360 |
| | 361 | 362 | 363 | 364 | . | 365 |
| | 366 | 367 | 368 | 369 | . | 370 |
| | 371 | 372 | 373 | 374 | . | 375 |
| | 376 | 377 | 378 | 379 | . | 380 |
| | 381 | 382 | 383 | 384 | . | 385 |
| | 386 | 387 | 388 | 389 | . | 390 |
| | | | | | | |
| NAME OF PESTICIDE USED *(Please list chemicals used. If necessary, refer to the enclosed list)* | Office Use | Acres Treated | No. of Applications | Rate | | Unit Code: 1 Pounds 12 Gallons 13 Quarts 14 Pints 15 Ounces 30 Grams |
| **WHEAT (Durum, other Spring, Winter)** | | | | | | |
| | 401 | 402 | 403 | 404 | . | 405 |
| | 406 | 407 | 408 | 409 | . | 410 |
| | 411 | 412 | 413 | 414 | . | 415 |
| | 416 | 417 | 418 | 419 | . | 420 |
| | 421 | 422 | 423 | 424 | . | 425 |
| | 426 | 427 | 428 | 429 | . | 430 |
| | 431 | 432 | 433 | 344 | . | 345 |
| | 436 | 437 | 438 | 439 | . | 440 |
| | 441 | 442 | 443 | 444 | . | 445 |
| | 446 | 447 | 448 | 449 | . | 450 |
| | 451 | 452 | 453 | 454 | . | 455 |
| | 456 | 457 | 458 | 459 | . | 460 |
| | | | | | | |
| NAME OF PESTICIDE USED *(Please list chemicals used. If necessary, refer to the enclosed list)* | Office Use | Acres Treated | No. of Applications | Rate | | Unit Code: 1 Pounds 12 Gallons 13 Quarts 14 Pints 15 Ounces 30 Grams |
| **SOYBEANS** | | | | | | |
| | 501 | 502 | 503 | 504 | . | 505 |
| | 506 | 507 | 508 | 509 | . | 510 |
| | 511 | 512 | 513 | 514 | . | 515 |

| NAME OF PESTICIDE USED *(Please list chemicals used. If necessary, refer to the enclosed list)* | Office Use | Acres Treated | No. of Applications | Rate | | Unit Code: 1 Pounds 12 Gallons 13 Quarts 14 Pints 15 Ounces 30 Grams |
|---|---|---|---|---|---|---|
| **SOYBEANS (cont.)** | | | | | | |
| | 516 | 517 | 518 | 519 | . | 520 |
| | 521 | 522 | 523 | 524 | . | 525 |
| | 526 | 527 | 528 | 529 | . | 530 |
| | 531 | 532 | 533 | 534 | . | 535 |
| | 536 | 537 | 538 | 539 | . | 540 |
| | 541 | 542 | 543 | 544 | . | 545 |
| | 546 | 547 | 548 | 549 | . | 550 |
| | 551 | 552 | 553 | 554 | . | 555 |
| | 556 | 557 | 558 | 559 | . | 560 |
| | 561 | 562 | 563 | 564 | . | 565 |
| | 566 | 567 | 568 | 569 | . | 570 |
| | | | | | | |
| **NAME OF PESTICIDE USED** *(Please list chemicals used. If necessary, refer to the enclosed list)* | **Office Use** | **Acres Treated** | **No. of Applications** | **Rate** | | **Unit Code:** 1 Pounds 12 Gallons 13 Quarts 14 Pints 15 Ounces 30 Grams |
| **ALL HAY** | | | | | | |
| | 601 | 602 | 603 | 604 | . | 605 |
| | 606 | 607 | 608 | 609 | . | 610 |
| | 611 | 612 | 613 | 614 | . | 615 |
| | 616 | 617 | 618 | 619 | . | 620 |
| | 621 | 622 | 623 | 624 | . | 625 |
| | 626 | 627 | 628 | 629 | . | 630 |

**If rates are not known, may we call your pesticide applicator? Yes _____ No _____**

**If yes, Company _____ Contact _____ City _____ Phone # _____-_____-_____**

| | | Response Code | | Enum. | Eval. | Julian Date |
|---|---|---|---|---|---|---|
| 1-Op/Mgr<br>2-Spouse<br>3-Acct/Bkpr<br>4-Oth<br>5-Est R<br>6-Est NR<br>8-Office Hold<br>9-Partner | 101 | 2-Tel<br>3-Int<br>7-TR<br>8-IR<br>9-Inac | 910 | 098 | 100 | 987 |

# Appendix 2. Pesticide Product Reference for Corn

***Maximum rates are those used under many MN cropping conditions***

| CORN/HERBICIDE/ Product Name | Fm | Ave Rate | Max Rate | Common Units |
|---|---|---|---|---|
| 2,4-D AMINE 4 (LV4) | L | 1 | 4 | PT |
| 2,4-D LV6 | L | .67 (2/3) | 1.67 (1 2/3) | PT |
| AATREX 4L | L | 1 | 4 | PT |
| AATREX NINE-0 | S | .5 | 2.2 | # |
| ACCENT | S | .67 | 1.33 | OZ |
| ACCENT GOLD | S | 2.9 | 3.9 | OZ |
| AIM | S | .33 | 1.24 | OZ |
| AIM EW | L | .5 | 1.9 | OZ |
| ALACHLOR 4EC | L | 2 | 4 | PT |
| ARCTIC 3.2EC | L | 4 | 8 | OZ |
| ATRAZINE 4L (OR 4F) | L | 1 | 4 | PT |
| ATRAZINE 90 WDG (OR 90DF) | S | .5 | 2.2 | # |
| AVALANCHE BULK PAK | L | .5 | 1.9 | OZ |
| BANVEL | L | 1 | 1 | PT |
| BANVEL-K + ATRAZINE | L | 3.5 | 5.25 | PT |
| BARRAGE HF | L | 13 | 26 | OZ |
| BASAGRAN | L | 1 | 2 | PT |
| BASIS | S | .5 | 1 | OZ |
| BASIS GOLD | S | 14 | 14 | OZ |
| BEACON | S | .38 | .76 | OZ |
| BICEP II MAGNUM | L | 2.1 | 2.6 | QT |
| BICEP LITE II MAGNUM | L | 1.5 | 2.2 | QT |
| BROMAZINE | L | 1.5 | 3 | PT |
| BROMOX + ATRAZINE | L | 1.5 | 3 | PT |
| BUCTRIL | L | 1 | 2 | PT |
| BUCTRIL + ATRAZINE | L | 1.5 | 3 | PT |
| BUCTRIL 4 EC | L | .5 | 1 | PT |
| BULLET | L | 3 | 5 | QT |
| CALLISTO | L | 3 | 7.7 | OZ |
| CELEBRITY PLUS | S | 4.7 | 4.7 | OZ |
| CINCH ATZ LITE | L | 1.5 | 2.2 | QT |
| CLARITY | L | 16 | 16 | OZ |
| DEFINE | S | 14 | 21 | OZ |
| DEGREE | L | 3.25 | 5 | PT |
| DEGREE XTRA | L | 3 | 4.4 | PT |
| DICAMBA DMA SALT | L | 1 | 1.5 | PT |
| DICAMBAZINE | L | 3.5 | 3.5 | PT |
| DIREX 80DF | S | .75 | .75 | # |
| DISTINCT | S | 4 | 6 | OZ |
| DOUBLEPLAY | L | 5 | 8 | PT |
| DPX-79406 75 DF | S | .5 | .5 | OZ |
| DPX-H1D19 (CINCH) | L | 1.67 | 2.5 | PT |
| DUAL II G MAGNUM | S | 8 | 12 | # |
| DUAL II MAGNUM | L | 1.67 | 2.5 | PT |
| DUAL II MAGNUM SI | L | 2 | 2.4 | PT |
| DUAL MAGNUM | L | 1.67 | 2.6 | PT |
| FIELDMASTER | L | 4 | 5 | QT |
| FRONTIER 6.0 | L | 28 | 32 | OZ |
| GLY STAR ORIG (ROUNDUP) | L | 32 | 48 | OZ |
| GLY STAR PLUS (ROUNDUP) | L | 32 | 48 | OZ |
| GLYFOS (ROUNDUP) | L | 32 | 48 | OZ |
| GLYFOS X-TRA (ROUNDUP) | L | 32 | 48 | OZ |
| GLYPHOMAX PLUS | L | 32 | 48 | OZ |

| CORN/HERBICIDE<br>Product Name | Fm | Ave<br>Rate | Max<br>Rate | Unt<br>Max |
|---|---|---|---|---|
| GUARDSMAN MAX | L | 4 | 5 | PT |
| HARNESS | L | 2 | 2.75 | PT |
| HARNESS 20G | S | 10 | 14 | # |
| HARNESS XTRA | L | 2 | 2.3 | QT |
| HARNESS XTRA 5.6L | L | 2.3 | 3 | QT |
| HONCHO (ROUNDUP) | L | 32 | 48 | OZ |
| HORNET | S | 4 | 4.8 | OZ |
| HORNET WDG | S | 4 | 5 | OZ |
| LADDOK S-12 | L | 1.67 | 2.33 | OZ |
| LARIAT FLOWABLE | L | 3 | 4.5 | QT |
| LASSO | L | 2 | 3.5 | QT |
| LIBERTY | L | 20 | 28 | OZ |
| LIBERTY ATZ | L | 40 | 48 | OZ |
| LIGHTNING | S | 1.28 | 1.28 | OZ |
| LINEX 4L | L | 2 | 3 | PT |
| LOROX DF | S | 1.5 | 1.5 | # |
| LUMAX | L | 3 | 3 | QT |
| MAD DOG GLYPHOSATE | L | 32 | 48 | OZ |
| MARKSMAN | L | 3.5 | 3.5 | PT |
| MEDAL | L | 2 | 2 | PT |
| MICRO-TECH | L | 3 | 3 | QT |
| MOXY + ATRAZINE | L | 2 | 3 | PT |
| MOXY 2E | L | 1 | 2 | PT |
| NORTHSTAR CUSTOM PAK | S | 5 | 5 | OZ |
| OPTILL | L | 30 | 38 | OZ |
| OPTION | S | 1.5 | 1.5 | OZ |
| OUTLOOK | L | 18 | 21 | OZ |
| PARTNER CUSTOM BLEND | S | 4 | 5.3 | # |
| PENDIMAX 3.3 | L | 4 | 4.8 | PT |
| PERMIT | S | .66 | .66 | OZ |
| POAST | L | 1.5 | 1.5 | PT |
| POAST PLUS | L | 2.25 | 2.25 | PT |
| PROWL 3.3 EC | L | 3.6 | 4.8 | PT |
| PURSUIT | L | 4 | 4 | OZ |
| PURSUIT DG | S | 1.08 | 1.08 | OZ |
| PURSUIT PLUS EC | L | 2.5 | 2.5 | PT |
| PURSUIT WDG | S | 1.44 | 1.44 | OZ |
| PYTHON WDG | S | 1.33 | 1.33 | OZ |
| RESOURCE | L | 4 | 8 | OZ |
| REZULT | L | 3.2 | 3.2 | PT |
| ROUNDUP ORIGINAL | L | 32 | 32 | OZ |
| ROUNDUP ULTRA | L | 32 | 48 | OZ |
| ROUNDUP ULTRADRY | S | 28 | 32 | OZ |
| ROUNDUP ULTRAMAX | L | 26 | 32 | OZ |
| ROUNDUP WEATHERMAX | L | 22 | 44 | OZ |
| RT MASTER | L | 32 | 32 | OZ |
| SABER | L | 1 | 1.5 | PT |
| SALVO (2,4-D) | L | 4 | 26 | OZ |
| SENCOR DF 75% | S | 2 | 5.33 | OZ |
| SHOTGUN FLOWABLE | L | 2 | 3 | PT |
| STEADFAST | S | .75 | .75 | OZ |
| STERLING | L | 1 | 1 | PT |
| STERLING PLUS | L | 3.5 | 3.5 | PT |
| STINGER | L | .33 | .67 | PT |
| SURPASS 20G | S | 10 | 15 | # |
| SURPASS EC | L | 2 | 3.75 | PT |

| CORN/HERBICIDE<br>Product Name | Fm | Ave<br>Rate | Max<br>Rate | Unt<br>Max |
|---|---|---|---|---|
| TOUCHDOWN | L | 1 | 2 | PT |
| TOUGH 5EC | L | 12 | 24 | OZ |
| TREFLAN HFP | L | 1.5 | 2 | PT |
| TREFLAN TR-10 GRANULAR | S | 7.5 | 10 | # |
| TRI-4 HF | L | 1.5 | 2 | PT |
| TRIFLURALIN 4EC | L | 1.5 | 2 | PT |
| TRIFLURALIN HF | L | 1.5 | 2 | PT |
| TRILIN 10G | S | 7.5 | 10 | # |
| TRUST | L | 1.5 | 2 | PT |
| TRUST 10G | S | 7.5 | 10 | # |
| TRUST 4EC | L | 1.5 | 2 | PT |
| YUKON | S | 4 | 8 | OZ |
| **CORN/INSECTICIDE** | | | | |
| ASANA XL | L | 6 | 9.6 | OZ |
| AZTEC 2.1% GRANULAR | S | 7.3 | 7.3 | # |
| CAPTURE 2EC | L | 3 | 6.4 | OZ |
| CHLORPYRIFOS 4E AG | L | 2 | 6 | PT |
| COUNTER 15-G | S | 6 | 8.7 | # |
| COUNTER CR LOCK/LOAD | S | 6.5 | 6.5 | # |
| DIMATE 4EC | L | 1 | 1 | PT |
| DIMETHOATE 400 | L | .67 | 1 | PT |
| DIMETHOATE 4E | L | 1 | 1 | PT |
| EMPOWER | S | 7 | 8.7 | # |
| FORCE 3G | S | 3.3 | 3.3 | # |
| FURADAN 4F | L | 1 | 2 | PT |
| LORSBAN 15G | S | 8.7 | 13.5 | # |
| LORSBAN-4E | L | 2 | 6 | PT |
| MALATHION 5 | L | 1.5 | 2 | PT |
| MALATHION 57 EC | L | 1.5 | 2 | PT |
| MUSTANG 1.5 EW | L | 3 | 4.3 | OZ |
| NUFOS 15G GRANULAR | S | 6.5 | 13.5 | # |
| PENNCAP-M MICROENCA-PULATED | L | 2 | 4 | PT |
| PERMETHRIN 3.2 AG | S | 4 | 8 | OZ |
| PHORATE 20G | S | 5 | 13 | # |
| POZ 3.2 EC | S | 4 | 8 | OZ |
| REGENT 4SC | L | 4.16 | 4.16 | OZ |
| THIMET 20-G | S | 6.5 | 6.5 | # |
| WARRIOR | L | 3 | 3.84 | OZ |
| **CORN/FUNGICIDE** | **Fm** | **Ave** | **Max** | **Unt** |
| BRAVO ULTREX | S | .7 | 1.8 | # |
| ECHO ZN AGRICULTURAL | L | 2 | 2.75 | PT |
| HERITAGE | S | 3.5 | 5.2 | OZ |
| MANZATE 75DF | S | 1.5 | 1.5 | # |
| MANZATE FLOWABLE | L | 1.2 | 1.2 | QT |
| QUADRIS FLOWABLE | L | 7 | 10.5 | OZ |

To obtain a list of active ingredients associated with the listed product names registered in Minnesota, visit http://state.ceris.purdue.edu/doc/mn/statemn.html, enter the database, submit "product name" as the search option, enter the name of the product, click "submit," check the appropriate boxes, and "submit" to obtain a list of matching product names. Finally, click "Display Active Ingredient Information."

# Appendix 3. Pesticide Product Reference for Soybean

***Maximum rates are those used under many MN cropping conditions***

| SOYBEAN/FUNGICIDE | | Ave | Max | Unit |
|---|---|---|---|---|
| **Product Name** | **Fm** | **Rate** | **Rate** | **Max** |
| BRAVO ULTREX | S | 1.4 | 2.2 | # |
| ECHO ZN AGRICULTURAL | L | 1.5 | 3.5 | PT |
| FARMSAVER.COM THIO-PHANATE METHYL 85 WDG | S | .4 | .8 | OZ |
| HERITAGE | S | 3.5 | 5.2 | OZ |
| QUADRIS FLOWABLE | L | 7 | 10.5 | OZ |
| TOPSIN M WSB | S | .5 | 1 | # |

| SOYBEAN/HERBICIDE | | Ave | Max | Unit |
|---|---|---|---|---|
| **Product Name** | **Form** | **Rate** | **Rate** | **Max** |
| 2,4-D AMINE 4 (LV4) | L | 1 | 2 | PT |
| 2,4-D LV6 | L | .67 (2/3/) | 1.67 (1 2/3) | PT |
| AIM | S | .33 | 1 | OZ |
| AIM EW | L | .5 | 1.6 | OZ |
| ALACHLOR 4EC | L | 2 | 3 | PT |
| AMPLIFY | S | .3 | .3 | OZ |
| ARCTIC 3.2EC | L | 4 | 8 | OZ |
| ASSURE II | L | 8 | 12 | OZ |
| AUTHORITY | S | 4 | 5.3 | OZ |
| AVALANCHE BULK PAK | L | .5 | 1.6 | OZ |
| BASAGRAN | L | 1 | 2 | PT |
| BLAZER | L | .5 | 1.5 | PT |
| BOUNDARY | L | 2 | 2.5 | PT |
| GLYFOS (ROUNDUP) | L | 3 | 2 2.5 | PT |
| BROADSTRIKE + TREFLAN | L | 2.25 | 2.25 | PT |
| BRONATE | L | .8 | 2.8 | OZ |
| CLARITY | L | 8 | 16 | OZ |
| CLASSIC | S | .5 | .75 | OZ |
| COBRA | L | 12.5 | 12.5 | OZ |
| COMMAND 3ME | L | 2 | 2.67 | PT |
| COMMAND 4EC | L | 1 | 2 | PT |
| COMMAND XTRA | L | 40 | 40 | OZ |
| DEFINE | S | 7 | 14 | OZ |
| DOMAIN | S | 9 | 16 | OZ |
| DPX-H1D19 (CINCH) | L | 1.67 | 2.5 | PT |
| DUAL II G MAGNUM | S | 8 | 12 | # |
| DUAL II MAGNUM | L | 1.67 | 2.5 | PT |
| DUAL II MAGNUM SI | L | 2 | 3 | PT |
| DUAL MAGNUM | L | 1.67 | 2.6 | PT |
| EXTREME | L | 3 | 3 | PT |
| FIRSTRATE | S | .75 | .75 | OZ |
| FLEXSTAR | L | 1 | 1 | PT |
| FRONTIER 6.0 | L | 28 | 32 | OZ |
| FUSILADE DX | L | 12 | 24 | OZ |
| FUSION | L | 8 | 12 | OZ |
| GALAXY | L | 2 | 2 | PT |
| GAUNTLET | S | 7.5 | 7.5 | OZ |
| GLY STAR ORIGINAL (ROUNDUP) | L | 32 | 48 | OZ |
| GLY STAR PLUS (ROUNDUP) | L | 32 | 48 | OZ |
| GLYFOS X-TRA (ROUNDUP) | L | 32 | 48 | OZ |
| GLYPHOMAX PLUS (ROUNDUP) | L | 32 | 48 | OZ |
| HARMONY GT | S | .08 (1/12) | .08 (1/12) | OZ |
| HONCHO (ROUNDUP) | L | 32 | 48 | OZ |
| LASSO | L | 2 | 3 | QT |
| LIBERTY | L | 20 | 28 | OZ |
| LIBERTY ATZ | L | 40 | 48 | OZ |
| LINEX 4L | L | 2 | 5 | PT |
| LOROX DF | S | 1.5 | 2 | # |
| MAD DOG GLYPHOSATE | L | 32 | 48 | OZ |
| MEDAL | L | 2 | 2 | PT |

| | | | | |
|---|---|---|---|---|
| MICRO-TECH | L | 3 | 3.5 | QT |
| OUTLOOK | L | 18 | 21 | OZ |
| PARTNER CUSTOM BLEND | S | 4 | 4.5 | # |
| PENDIMAX 3.3 | L | 3 | 3.6 | PT |
| PHOENIX | L | 8 | 12.5 | OZ |
| POAST | L | 1.5 | 2.5 | PT |
| POAST PLUS | L | 2.25 | 3.75 | PT |
| PROWL 3.3 EC | L | 3 | 3.6 | PT |
| PURSUIT | L | 3 | 3 | OZ |
| PURSUIT DG | S | 1.44 | 1.44 | OZ |
| PURSUIT PLUS EC | L | 2.5 | 2.5 | PT |
| PURSUIT WDG | S | 1.44 | 1.44 | OZ |
| PYTHON WDG | S | 1.33 | 1.33 | OZ |
| RAPTOR | L | 4 | 5 | OZ |
| REFLEX | L | 1 | 1 | PT |
| RESOURCE | L | 4 | 8 | OZ |
| REZULT | L | 3.2 | 3.2 | PT |
| ROUNDUP ORIGINAL | L | 32 | 32 | OZ |
| ROUNDUP ULTRA | L | 32 | 48 | OZ |
| ROUNDUP ULTRADRY | S | 28 | 32 | OZ |
| ROUNDUP ULTRAMAX | L | 26 | 32 | OZ |
| ROUNDUP WEATHERMAX | L | 22 | 44 | OZ |
| RT MASTER | L | 32 | 32 | OZ |
| SABER | L | 1 | 1.5 | PT |
| SALVO (2,4-D) | L | 12.8 | 25.6 | OZ |
| SCEPTER 70-DG | S | 1.4 | 2.8 | OZ |
| SELECT 2EC | L | 6 | 16 | OZ |
| SENCOR DF 75% DRY FLOWABLE | S | 4 | 10 | OZ |
| SONALAN 10G | S | 10 | 13 | # |
| SONALAN HFP | L | 3 | 3.5 | PT |
| SQUADRON | L | 3 | 3 | PT |
| SYNCHRONY STS | S | .5 | .5 | OZ |
| TOUCHDOWN | L | 1 | 3 | PT |
| TREFLAN HFP | L | 2 | 3 | PT |
| TREFLAN TR-10 GRANULAR | S | 10 | 15 | # |
| TRI-4 HF | L | 2 | 3 | PT |
| TRIFLURALIN 4EC | L | 2 | 3 | PT |
| TRIFLURALIN HF | L | 2 | 3 | PT |
| TRILIN 10G | S | 10 | 15 | # |
| TRUST | L | 2 | 3 | PT |
| TRUST 10G | S | 10 | 15 | # |
| TRUST 4EC | L | 2 | 3 | PT |
| VALOR | S | 2 | 3 | OZ |

| **SOYBEAN/INSECTICIDE** | | **Ave** | **Max** | **Unit** |
|---|---|---|---|---|
| **Product Name** | **Form** | **Rate** | **Rate** | **Max** |
| ASANA XL | L | 6 | 9.6 | OZ |
| CHLORPYRIFOS 4E AG | L | 2 | 6 | PT |
| DIMATE 4EC | L | 1 | 1 | PT |
| DIMETHOATE 400 | L | 1 | 1 | PT |
| DIMETHOATE 4E | L | 1 | 1 | PT |
| FURADAN 4F | L | .25 | .5 | PT |
| LORSBAN 15G | S | 8.7 | 8.7 | # |
| LORSBAN-4E | L | 1 | 2 | PT |
| NUFOS 15G GRANULAR | S | 8.7 | 13.5 | # |
| PENNCAP-M MICROENCAPULATED | L | 2 | 3 | PT |
| PERMETHRIN 3.2 AG | S | 4 | 8 | OZ |
| PHORATE 20G | S | 5 | 13 | # |
| POZ 3.2 EC | S | 4 | 8 | OZ |
| TEMIK 15G ALDICARB | S | 10 | 20 | # |
| THIMET 20-G | S | 9.8 | 9.8 | # |
| WARRIOR | L | 3 | 3.84 | OZ |

To obtain a list of active ingredients associated with the listed product names registered in Minnesota, visit http://state.ceris.purdue.edu/doc/mn/statemn.html, enter the database, submit "product name" as the search option, enter the name of the product, click "submit," check the appropriate boxes, and "submit" to obtain a list of matching product names. Finally, click "Display Active Ingredient Information."

# Appendix 4. Pesticide Product Reference for Wheat

***Maximum rates are those used under many MN cropping conditions***

| WHEAT/FUNGICIDE | | Ave | Max | Unit |
|---|---|---|---|---|
| **Product Name** | **Form** | **Rate** | **Rate** | **Max** |
| DIVIDEND XL | L | 1 | 2 | OUNCE |
| FOLICUR 3.6 F FOLIAR | L | 4 | 4 | OUNCE |
| HERITAGE | S | 3.5 | 5.2 | OUNCE |
| MANZATE 75DF | S | 2 | 2 | POUND |
| MANZATE FLOWABLE | L | 1.6 | 1.6 | QUART |
| QUADRIS FLOWABLE | L | 7 | 10.5 | OUNCE |
| STRATEGO | L | 10 | 10 | OUNCE |
| TILT FUNGICIDE | L | 4 | 4 | OUNCE |
| TOPSIN M WSB | S | .5 | 1 | OUNCE |
| **WHEAT/HERBICIDE** | | **Ave** | **Max** | **Unit** |
| **Product Name** | **Form** | **Rate** | **Rate** | **Max** |
| 2,4-D AMINE 4 (LV4) | L | 1 | 3 | PINT |
| 2,4-D LV6 | L | .67 (2/3) | 1.67 (1 2/3) | PINT |
| AGSCO B-4 | L | 1.5 | 1.5 | PINT |
| AGSCO MXL (2-4D) | L | 1 | 3 | PINT |
| AIM | S | .33 | 1.24 | OUNCE |
| AIM EW | L | .5 | 1.9 | OUNCE |
| ALLY XP | S | .1 | .1 | OUNCE |
| AVALANCHE BULK PAK | L | .5 | 1.9 | OUNCE |
| BANVEL | L | 2 | 4 | OUNCE |
| BANVEL SGF | L | 4 | 8 | OUNCE |
| BARRAGE HF | L | 6 | 26 | OUNCE |
| BISON | L | 1 | 2 | PINT |
| BROMOX 2E | L | 1 | 2 | PINT |
| BROMOX-MCPA 2-2 | L | 1 | 2 | PINT |
| BRONATE ADVANCED | L | 12 | 25 | OUNCE |
| BUCKLE GRANULAR | S | 10 | 12.5 | POUND |
| BUCTRIL | L | 1 | 2 | PINT |
| BUCTRIL 4 EC | L | .5 | 1 | PINT |
| CHEYENNE FM | L | 23 | 23 | OUNCE |
| CLARITY | L | 2 | 4 | OUNCE |
| CURTAIL | L | 2 | 2.75 | PINT |
| CURTAIL M | L | 1.75 | 2.33 | PINT |
| DICAMBA DMA SALT | L | 3 | 4 | OUNCE |
| DIREX 80DF | S | 1 | 1.5 | POUND |
| DISCOVER | L | 3.2 | 4 | OUNCE |
| EVEREST 70% | S | .61 | .61 | OUNCE |
| EXPRESS | S | .17 | .33 | OUNCE |
| FAR-GO GRANULAR | S | 10 | 15 | POUND |
| FAR-GO LIQUID | L | 1 | 1 | QUART |
| GLY STAR ORIGINAL | L | 32 | 48 | OUNCE |
| GLY STAR PLUS | L | 32 | 48 | OUNCE |
| GLYFOS | L | 32 | 48 | OUNCE |
| GLYFOS X-TRA | L | 32 | 48 | OUNCE |
| GLYPHOMAX PLUS | L | 32 | 48 | OUNCE |
| HARMONY EXTRA | S | .5 | .6 | OUNCE |
| HARMONY GT | S | .08 (1/12) | .08 (1/12) | OUNCE |
| MCP 4 ESTER | L | .5 | 1 | PINT |
| MCPA AMINE | L | .5 | 2 | PINT |
| MCPE PHENOXY | L | .5 | 3 | PINT |
| PUMA 1EC | L | 5.3 | 10.6 | OUNCE |
| RANGE STAR | L | .75 | 1 | PINT |
| ROUNDUP ORIGINAL | L | 32 | 32 | OUNCE |
| ROUNDUP ULTRA | L | 32 | 32 | OUNCE |
| ROUNDUP ULTRADRY | S | 28 | 28 | OUNCE |
| ROUNDUP ULTRAMAX | L | 26 | 32 | OUNCE |
| ROUNDUP WEATHERMAX | L | 22 | 44 | OUNCE |
| RT MASTER | L | 32 | 32 | OUNCE |
| SABER | L | 1 | 3 | PINT |

| | | | | |
|---|---|---|---|---|
| SALVO (2,4-D) | L | 6.4 | 25.6 | OUNCE |
| SENCOR DF 75% DRY FLOWABLE | S | 4 | 10 | OUNCE |
| STERLING | L | 2 | 4 | OUNCE |
| STINGER | L | .25 | .33 | PINT |
| TOUCHDOWN | L | 1 | 2 | PINT |
| TREFLAN HFP | L | 1.5 | 2 | PINT |
| TREFLAN TR-10 GRANULAR | S | 7.5 | 10 | POUND |
| TRI-4 HF | L | 1.5 | 2 | PINT |
| TRIFLURALIN 4EC | L | 1.5 | 2 | PINT |
| TRIFLURALIN HF | L | 1.5 | 2 | PINT |
| TRILIN 10G | S | 7.5 | 10 | POUND |
| TRUST | L | 1.5 | 2 | PINT |
| TRUST 10G | S | 7.5 | 10 | POUND |
| TRUST 4EC | L | 1.5 | 2 | PINT |
| **WHEAT/INSECTICIDE** | | **Ave** | **Max** | **Unit** |
| **Product Name** | **Form** | **Rate** | **Rate** | **Max** |
| CHLORPYRIFOS 4E AG | L | 1 | 1 | PINT |
| DI-SYSTON 8 | L | 4 | 12 | OUNCE |
| DIMATE 4EC | L | .5 | .75 | PINT |
| DIMETHOATE 400 | L | .5 | .75 | PINT |
| DIMETHOATE 4E | L | 1 | 1 | PINT |
| FURADAN 4F | L | .25 | .5 | PINT |
| LORSBAN-4E | L | 1 | 1 | PINT |
| MALATHION 5 | L | 1.5 | 2 | PINT |
| MALATHION 57 EC | L | 1.5 | 2 | PINT |
| PENNCAP-M MICROENCAPULATED | L | 2 | 3 | PINT |
| PHORATE 20G | S | 5 | 13 | POUND |
| WARRIOR | L | 3 | 3.84 | OUNCE |

To obtain a list of active ingredients associated with the listed product names registered in Minnesota, visit http://state.ceris.purdue.edu/doc/mn/statemn.html, enter the database, submit "product name" as the search option, enter the name of the product, click "submit," check the appropriate boxes, and "submit" to obtain a list of matching product names. Finally, click "Display Active Ingredient Information."

# Appendix 5. Pesticide Product Reference for Hay

***Maximum rates are those used under many MN cropping conditions***

| HAY/FUNGICIDE Product Name | Fm | Ave Rate | Max Rate | Unit Max |
|---|---|---|---|---|
| TILT FUNGICIDE | L | 4 | 8 | OUNCE |

| HAY/HERBICIDE Product Name | Fm | Ave Rate | Max Rate | Unit Max |
|---|---|---|---|---|
| 2,4-D AMINE 4 (LV4) | L | 1 | 4 | PINT |
| 2,4-D LV6 | L | .67 (2/3) | 1.67 (1 2/3) | PINT |
| ALLY XP | S | .1 | .4 | OUNCE |
| ARCTIC 3.2EC | L | 4 | 8 | OUNCE |
| BANVEL | L | 1 | 4 | PINT |
| BARRAGE HF | L | 6 | 26 | OUNCE |
| BROMOX 2E | L | 1 | 2 | PINT |
| BROMOX-MCPA 2-2 | L | 1 | 2 | PINT |
| BRONATE | L | .8 | 2.8 | PINT |
| BUCTRIL | L | 1 | 2 | PINT |
| BUCTRIL 4 EC | L | .5 | 1 | PINT |
| CLARITY | L | 32 | 64 | OUNCE |
| CURTAIL | L | 2 | 4 | PINT |
| CURTAIL M | L | 1 | 3.5 | PINT |
| DICAMBA DMA SALT | L | 1 | 4 | PINT |
| DIREX 80DF | S | 1.5 | 3 | POUND |
| EPTAM 7-E | L | 2.25 | 3.5 | PINT |
| GLY STAR PLUS | L | 32 | 48 | OUNCE |
| GRAZON P + D | L | 2 | 4 | PINT |
| MCP 4 ESTER | L | 1 | 4 | PINT |
| MCPA AMINE | L | 1 | 1 | PINT |
| OUTLOOK | L | 18 | 21 | OUNCE |
| POAST | L | 1.5 | 2.5 | PINT |
| POAST PLUS | L | 2.25 | 3.75 | PINT |
| PURSUIT | L | 3 | 6 | OUNCE |
| PURSUIT DG | S | 1.44 | 1.44 | OUNCE |
| PURSUIT WDG | S | 1.44 | 1.44 | OUNCE |
| RANGE STAR | L | 1 | 4 | PINT |
| RT MASTER | L | 32 | 32 | OUNCE |
| SALVO (2,4-D) | L | 6.4 | 19.2 | OUNCE |
| STINGER | L | .5 | 1.25 | PINT |
| TOUCHDOWN | L | 2 | 2 | PINT |
| TREFLAN HFP | L | 2 | 4 | PINT |
| VELPAR L | L | 4 | 6 | PINT |

| HAY/INSECTICIDE Product Name | Fm | Ave Rate | Max Rate | Unit Max |
|---|---|---|---|---|
| BAYTHROID 2 | S | 2 | 2.8 | OUNCE |
| CHLORPYRIFOS 4E | L | 1 | 2 | PINT |
| DIMATE 4EC | L | .5 | 1 | PINT |
| DIMETHOATE 400 | L | .5 | 1 | PINT |
| DIMETHOATE 4E | L | 1 | 1 | PINT |
| FURADAN 4F | L | 1 | 2 | PINT |
| LORSBAN-4E | L | 2 | 6 | PINT |
| MALATHION 5 | L | 1.5 | 2 | PINT |
| MALATHION 57 EC | L | 1.5 | 2 | PINT |
| MUSTANG 1.5 EW | L | 3 | 4.3 | OUNCE |
| PERMETHRIN 3.2 AG | S | 4 | 8 | OUNCE |
| POUNCE 3.2 EC | S | 4 | 8 | OUNCE |

To obtain a list of active ingredients associated with the listed product names registered in Minnesota, visit http://state.ceris.purdue.edu/doc/mn/statemn.html, enter the database, submit "product name" as the search option, enter the name of the product, click "submit," check the appropriate boxes, and "submit" to obtain a list of matching product names. Finally, click "Display Active Ingredient Information."

# Appendix 6. Additional Project Background Information

The Minnesota Department of Agriculture (MDA) is required by state law to monitor pesticide use. In pursuit of fulfilling that responsibility, the MDA began exploring the possibility of using the existing framework of the Minnesota Agricultural Statistics Service (MASS) to enhance and broaden pesticide use monitoring efforts. MASS has a long history of providing statewide crop and production statistics. Over the last decade MASS has also become an important information source for pesticide and fertilizer use. Several joint pilot projects evolved with the financial assistance from Environmental Protection Agency (EPA) and were conducted from 2001-2003. These pilots were essential to the final methodology used in this report.

The first pilot[4] was conducted in 2001 by expanding the existing ARMS (Agricultural Resource Management Study) developed by USDA's National Agriculture Statistics Service (NASS). The normal number of participating farms in an ARMS survey is about 150. The pilot increased the number of personal interviews to approximately 600 and most of the enhancements were focused on the southern third of the state. The pilot provided reliable, regionally-enhanced data on pesticide product choices and application rates. Additionally, useful information on primary sources of pesticide management information, scouting, timing, and other pesticide management related information was obtained.

In neighboring North Dakota, the North Dakota Agricultural Statistics Service (NDASS) and North Dakota State University Extension had already established a strong tradition in collecting statewide pesticide use by using NDASS telephone enumerators. **"*Pesticide Use and Pest Management Practices for Major Crops in North Dakota*"** is published on a four-year cycle. With the goal of expanding to a statewide scale while reducing costs, a second pilot[5] was developed. MDA and MASS used many techniques from the North Dakota program but decided to expand the level of detail by including pesticide application rates. Historically, most mail out or telephone style surveys have been unsuccessful at quantifying pesticide rates. Due to the numerous formulations, different application rates and units of measure (i.e., Active Ingredient (AI) can be expressed in pounds, ounces, pints or quarts), complications can quickly develop. Another major complicating factor may result due to the farmer using the services of a commercial pesticide applicator. If the farmer did not apply the product, the likelihood that the farmer would be familiar with the product and rate decreases significantly.

In recognition of some of the obstacles in collecting pesticide rate information, two methods for collecting pesticide rates were tested in the second pilot. "Method One" was conducted in Douglas County with 150 randomly selected farm operators. Operators were interviewed over the phone by the NDASS enumerators. If the operator did not know the pesticides and/or rates, no additional follow-up work was conducted and the data was limited to any information that was provided. In neighboring Grant County, another 150 farm operators were contacted. In this county using "Method Two", if the farm records were incomplete, follow-up calls were made the pesticide dealer to complete the survey. The number of surveys with complete data sets was significantly increased with the additional assistance from the dealerships. Eighty-three (83) percent of the surveys were complete in Grant County compared to forty-six (46%) in Douglas County. Equally impressive was the overall support by the local dealerships.

---

[4] "*Expanded Minnesota Agricultural Statistics Pesticide Use Data*", 2003, by MASS and MDA.
[5] Unpublished data. From the September 20, 2003 EPA Report.