



2011 Pesticide Usage on Four Major Crops in Minnesota

Minnesota Department of Agriculture

**USDA: NASS, Minnesota & North Dakota
Field Offices**

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Table of Contents	Page No.
Introduction.....	7
Acknowledgements	7
Survey Design and Implementation	8
Data Collection Process.....	11
Data Reporting and Limitations	13
Statewide Pesticide Applications – Corn.....	15
Corn herbicide county-level estimated use maps.....	20
Pesticide Applications on Corn by Pesticide Management Areas	25
Statewide Pesticide Applications – Soybean	34
Area Pesticide Applications – Soybean	38
Statewide Pesticide Applications – Wheat	48
Area Pesticide Applications – Wheat	52
Statewide Pesticide Applications – Hay	60
Area Pesticide Applications – Hay	62
County Pesticide Applications.....	66
PMA 1 County Data.....	66
Clay County.....	66
Grant County	68
Kittson County.....	69
Mahnomen County	71
Norman County	75
Roseau County.....	79
Wilkin County	83
PMA 4 County Data.....	84
Benton County.....	85
Crow Wing County.....	87
Douglas County	88
Hubbard County	89
Kandiyohi County.....	90
Morrison County.....	91
Otter Tail County.....	92
Pope County	93
Sherburne County.....	94
Stearns County.....	95
Todd County	96

	Introduction
Wadena County	97
PMA 5 County Data.....	98
Aitkin County	98
Chisago County	99
Isanti County.....	100
Kanabec County	101
Mille Lacs County	102
Pine County	103
PMA 6 County Data.....	104
Big Stone County.....	104
Chippewa County	105
Lac Qui Parle County	106
Stevens County	107
Swift County.....	109
Yellow Medicine County.....	110
PMA 7 County Data.....	111
Lincoln County	111
Murray County	113
Nobles County	114
Pipestone County.....	115
Rock County	116
PMA 8 County Data.....	117
Blue Earth County	117
Brown County.....	118
Freeborn County	121
Le Sueur County	123
Martin County.....	124
McLeod County	125
Meeker County	126
Redwood County	128
Renville County.....	129
Sibley County	131
Steele County.....	132
Watonwan County	134
Wright County	135
PMA 9 County Data.....	136
Dodge County.....	136
Fillmore County.....	137
Goodhue County.....	138
Houston County.....	139
Mower County.....	140
Olmsted County.....	141
Wabasha County.....	142
Winona County.....	143
PMA 10 County Data.....	144
Anoka County.....	144
Carver County.....	145

	Introduction
Dakota County	146
Scott County	147
Washington County	148
Appendix 1. MASS Data Sheet	149
Appendix 2. Additional Project Background Information.....	152

List of Tables

Page No.

Table 1. Summary of acres and corresponding percentage of each major crop receiving pesticide applications for the 2011 crop year.	11
Table 2. Farms and crop acreage by county and PMA	12
Table 3. Publication status for corn pesticide active ingredients.....	16
Table 4. Pesticide applications and rates by active ingredient (a.i.) for corn statewide. .	17
Table 5. Summary (by PMA) of surveyed corn acreage to which pesticides were applied.	25
Table 6. Pesticide applications and rates for corn – PMA 1	26
Table 7. Pesticide applications and rates for corn – PMA 4.....	27
Table 8. Pesticide applications and rates for corn – PMA 5.....	28
Table 9. Pesticide applications and rates for corn – PMA 6.....	29
Table 10. Pesticide applications and rates for corn – PMA 7.....	30
Table 11. Pesticide applications and rates for corn – PMA 8.....	31
Table 12. Pesticide applications and rates for corn – PMA 9.....	32
Table 13. Pesticide applications and rates for corn – PMA 10.....	33
Table 14. Publication status for soybean pesticide active ingredients.....	35
Table 15. Pesticide applications and rates by active ingredient (a.i.) for soybean statewide.	36
Table 16. Summary (by PMA) of surveyed soybean acreage to which pesticides were applied.....	38
Table 17. Pesticide applications and rates for soybean – PMA 1	39
Table 18. Pesticide applications and rates for soybean – PMA 4.....	40
Table 19. Pesticide applications and rates for soybean – PMA 5.....	41
Table 20. Pesticide applications and rates for soybean – PMA 6.....	42
Table 21. Pesticide applications and rates for soybean – PMA 7.....	43
Table 22. Pesticide applications and rates for soybean – PMA 8.....	44
Table 23. Pesticide applications and rates for soybean – PMA 9.....	46
Table 24. Pesticide applications and rates for soybean – PMA 10.....	47
Table 25. Publication status for wheat pesticide active ingredients	49
Table 26. Pesticide applications and rates by active ingredient (a.i.) for wheat statewide	50
Table 27. Summary (by PMA) of surveyed wheat acreage to which pesticides were applied.....	52
Table 28. Pesticide applications and rates for wheat – PMA 1	53
Table 29. Pesticide applications and rates for wheat – PMA 4	54
Table 30. Pesticide applications and rates for wheat – PMA 5	54
Table 31. Pesticide applications and rates for wheat – PMA 6	56
Table 32. Pesticide applications and rates for wheat – PMA 7	57
Table 33. Pesticide applications and rates for wheat – PMA 8	58
Table 34. Pesticide applications and rates for wheat – PMA 9	59

Table 35. Pesticide applications and rates for wheat – PMA 10	59
Table 36. Publication status for hay pesticide active ingredients	60
Table 37. Pesticide applications and rates by active ingredient (a.i.) for hay statewide.	61
Table 38. Summary (by PMA) of surveyed hay acreage to which pesticides were applied	62
Table 39. Pesticide applications and rates for hay – PMA 1	63
Table 40. Pesticide applications and rates for hay – PMA 4	63
Table 41. Pesticide applications and rates for hay – PMA 5	63
Table 42. Pesticide applications and rates for hay – PMA 6	63
Table 43. Pesticide applications and rates for hay – PMA 7	64
Table 44. Pesticide applications and rates for hay – PMA 8	65
Table 45. Pesticide applications and rates for hay – PMA 9	65
Table 46. Pesticide applications and rates for hay – PMA 10	65
Table 47. Clay County pesticide applications and rates	66
Table 48. Grant County pesticide applications and rates.....	68
Table 49. Kittson County pesticide applications and rates	69
Table 50. Mahnomen County pesticide applications and rates.....	71
Table 51. Marshall County pesticide applications and rates.....	73
Table 52. Norman County pesticide applications and rates.....	75
Table 53. Pennington County pesticide applications and rates.....	76
Table 54. Polk County pesticide applications and rates	77
Table 55. Red Lake County pesticide applications and rates	78
Table 56. Roseau County pesticide applications and rates	79
Table 57. Traverse County pesticide applications and rates.....	81
Table 58. Wilkin County pesticide applications and rates.....	83
Table 59. Becker County pesticide applications and rates	84
Table 60. Benton County pesticide applications and rates	85
Table 61. Crow Wing County pesticide applications and rates	87
Table 62. Douglas County pesticide applications and rates	88
Table 63. Hubbard County pesticide applications and rates.....	89
Table 64. Kandiyohi County pesticide applications and rates.....	90
Table 65. Morrison County pesticide applications and rates.....	91
Table 66. Otter Tail County pesticide applications and rates	92
Table 67. Pope County pesticide applications and rates.....	93
Table 68. Sherburne County pesticide applications and rates	94
Table 69. Stearns County pesticide applications and rates	95
Table 70. Todd County pesticide applications and rates	96
Table 71. Wadena County pesticide applications and rates.....	97
Table 72. Chisago County pesticide applications and rates.....	99
Table 73. Isanti County pesticide applications and rates.....	100
Table 74. Kanabec County pesticide applications and rates.....	101
Table 75. Mille Lacs pesticide applications and rates	102
Table 76. Pine County pesticide applications and rates.....	103
Table 77. Big Stone County pesticide applications and rates.....	104
Table 78. Chippewa County pesticide applications and rates.....	105
Table 79. Lac Qui Parle County pesticide applications and rates.....	106
Table 80. Stevens County pesticide applications and rates	107
Table 81. Swift County pesticide applications and rates	109
Table 82. Yellow Medicine County pesticide applications and rates	110
Table 83. Lincoln County pesticide applications and rates	111

Table 84. Lyon County pesticide applications and rates	112
Table 85. Murray County pesticide applications and rates.....	113
Table 86. Nobles County pesticide applications and rates	114
Table 87. Pipestone County pesticide applications and rates	115
Table 88. Rock County pesticide applications and rates	116
Table 89. Blue Earth County pesticide applications and rates.....	117
Table 90. Brown County pesticide applications and rates.....	118
Table 91. Cottonwood County pesticide applications and rates	119
Table 92. Faribault County pesticide applications and rates	120
Table 93. Freeborn County pesticide applications and rates	121
Table 94. Jackson County pesticide applications and rates	122
Table 95. Le Sueur County pesticide applications and rates	123
Table 96. Martin County pesticide applications and rates.....	124
Table 97. McLeod County pesticide applications and rates	125
Table 98. Meeker County pesticide applications and rates.....	126
Table 99. Nicollet County pesticide applications and rates.....	127
Table 100. Redwood County pesticide applications and rates	128
Table 101. Renville County pesticide applications and rates	129
Table 102. Rice County pesticide applications and rates	130
Table 103. Sibley County pesticide applications and rates.....	131
Table 104. Steele County pesticide applications and rates	132
Table 105. Waseca County pesticide applications and rates	133
Table 106. Watonwan County pesticide applications and rates	134
Table 107. Wright County pesticide applications and rates	135
Table 108. Dodge County pesticide applications and rates	136
Table 109. Fillmore County pesticide applications and rates	137
Table 110. Goodhue County pesticide applications and rates	138
Table 111. Houston County pesticide applications and rates	139
Table 112. Mower County pesticide applications and rates	140
Table 113. Olmsted County pesticide applications and rates	141
Table 114. Wabasha County pesticide applications and rates.....	142
Table 115. Winona County pesticide applications and rates	143
Table 116. Anoka County pesticide applications and rates	144
Table 117. Carver County pesticide applications and rates.....	145
Table 118. Dakota County pesticide applications and rates	146
Table 119. Scott County pesticide applications and rates.....	147
Table 120. Washington County pesticide applications and rates	148

List of Figures

Page No.

Figure 1. MDA Pesticide Management Areas (PMA).....	9
Figure 2. Atrazine (active ingredient) rate per acre distribution across surveyed corn acres for the 2003, 2005, 2007, 2009 and 2011 crop years.	18
Figure 3. Acetochlor (active ingredient) rate per acre distribution across surveyed corn acres for the 2003, 2005, 2007, 2009 and 2011 crop years.	19
Figure 4. S-metolachlor (active ingredient) rate distribution across surveyed corn acres for the 2003, 2005, 2007, 2009 and 2011 crop years.....	20
Figure 5. Estimated percent of land acres applied with atrazine on a county basis for the 2011 crop year.....	22

Figure 6. Estimated percent of land acres applied with acetochlor on a county basis for the 2011 crop year..... 23

Figure 7. Estimated percent of land acres applied with s-metolachor on a county basis for the 2011 crop year..... 24

Introduction

Acknowledgements

This survey was a cooperative effort between the Minnesota Department of Agriculture (MDA), the United States Department of Agriculture: National Agricultural Statistics Service (NASS), Minnesota field office and the North Dakota field office. The detailed pesticide use information could not have been collected without the cooperation of 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 goes to Dan Lofthus, Director of NASS within the USDA at the Minnesota field office, Darin Jantzi and Greg Kimmet, Director and Deputy Director of the North Dakota field office, 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.

2011 Pesticide Use Summary and Highlights

This report summarizes herbicide, insecticide and fungicide use information reported by approximately 3,500 farmers for the 2011 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 four major crops in Minnesota: corn, soybean, wheat, and hay. Collectively these crops account for more than 90% of Minnesota's cropland. This survey collected pesticide information from one million acres of cropland in 76 of the state's most intensively agricultural counties. The survey covered nearly 10% of the state's corn, soybeans, and hay acres and 12% of the wheat acres.

The report represents the fifth survey conducted on pesticide use in Minnesota by the MDA. The first surveys collected information for the 2003, 2005, 2007, and 2009 crop years and also included corn, soybean, hay and wheat. Those surveys can be found at:

<http://www.mda.state.mn.us/protecting/cleanwaterfund/gwdwprotection/nutrientmgmtsurvey.aspx>

Corn Highlights: Herbicides, insecticides, and fungicides were applied to 99%, 10%, and 9%, respectively, of the surveyed corn acres. For the 2,100+ farms that reported corn information on approximately 675,000 acres, the top three herbicide products (based on percent acres covered) were glyphosate¹ (90%), acetochlor (32%), and mesotrione (20%).

¹ Including the diammonium salt

Soybean Highlights: Herbicides, insecticides, and fungicides were applied to 99%, 64%, and 17%, respectively, on the 635,000 surveyed acres of soybeans. Over 1,900 farms provided pesticide information on this crop.

Glyphosate¹ was applied to 97% of the acres. Clethodim was applied on 5% of all soybean acres and fenoxaprop was applied on 3% of all soybean acres. Lambda-cyhalothrin and chlorpyrifos were the major soybean insecticides used in the survey and were applied on 38% and 20%, respectively, of all soybean acres. Pyraclostrobin and Azoxystrobin were the major soybean fungicides used in the survey and were applied on 11% and 3% of all soybean acres.

Wheat Highlights: Herbicides, insecticides, and fungicides were applied to 98%, 32%, and 73%, respectively, on 165,000 wheat acres. Approximately 500 farms provided information for wheat. The top three herbicide products (based on percent of total acres covered) were bromoxynil (47%), fluroxypyr (34%) and MCPA (33%). Lambda-cyhalothrin and chlorpyrifos were the major wheat insecticides used in the survey and were applied to approximately 21% and 8% of all wheat acres. The three major fungicide products were tebuconazole, propiconazole, and pyraclostrobin, applied on 30%, 27%, and 17% of all wheat acres respectively.

Hay Highlights: Herbicides, Insecticides, and fungicides were applied to 1%, 9%, and <1%, respectively, on 130,000 acres of hay. Approximately 2,000 farms provided information on this crop. The three major pesticide products applied were the insecticides lambda-cyhalothrin, chlorpyrifos, and zeta-cypermethrin which were applied on 5%, 3%, and 1%, of all hay acres respectively.

Survey Design and Implementation

Figure 1 details ten Pesticide Management Areas as defined by MDA. Counties are clustered based on similarities in geology, soils, and crops. The areas also define the general boundaries of the monitoring areas used by the MDA water resource monitoring program. Pesticide Management Area 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, Area 2 (Clearwater, Beltrami, Lake of the Woods, Koochiching, and Itasca), Area 3 (St. Louis, Lake, Carlton, and Cook), and portions of Area 10 (Hennepin and Ramsey) were not included in the survey. In Area 10, Hennepin and Ramsey counties were not included in any analysis in this report.

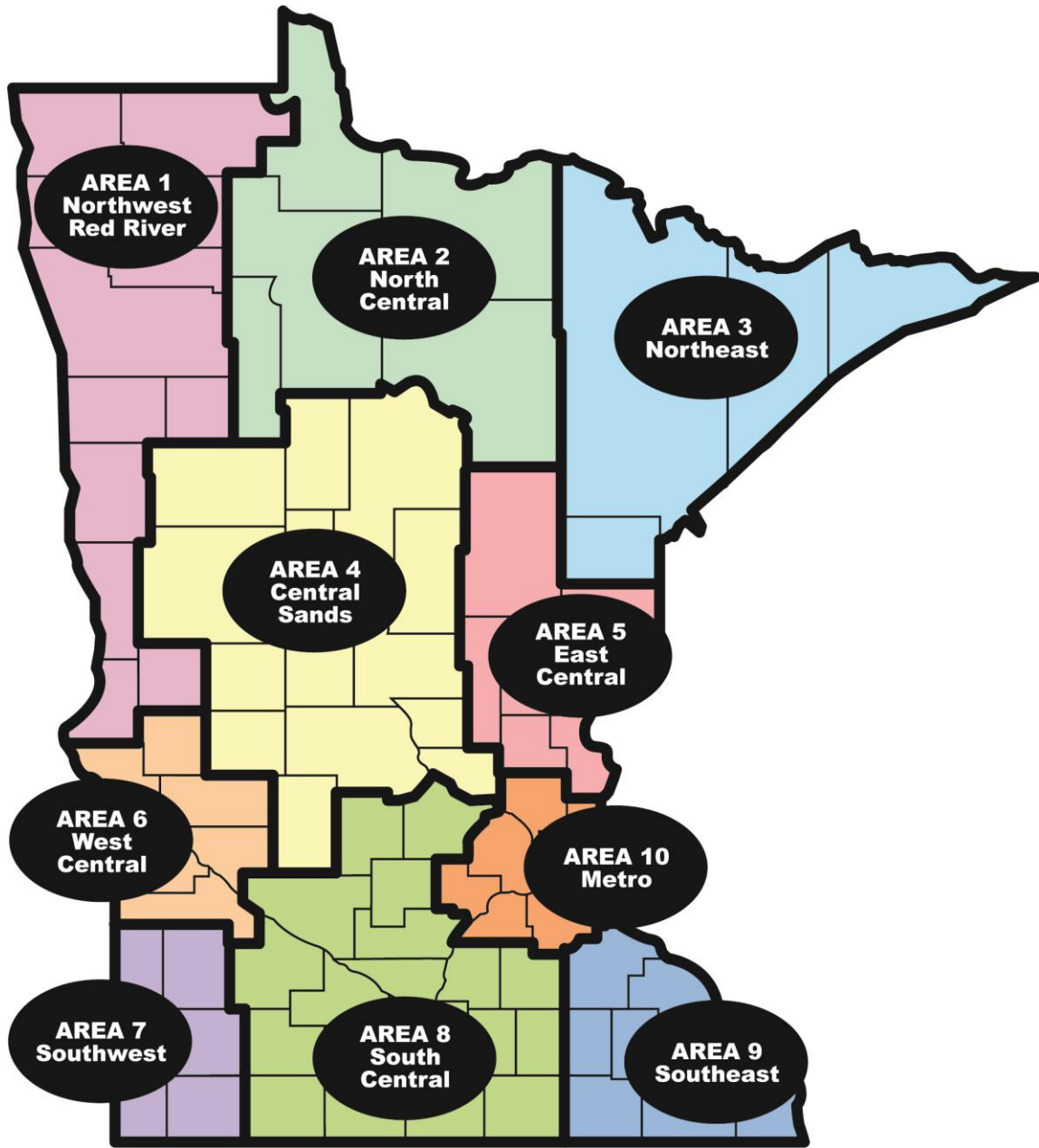


Figure 1. MDA Pesticide Management Areas (PMA)

Some of the challenges of collecting pesticide use data are:

- Unlike fertilizer formulations, which remain constant, new pesticide products and formulations are released every year;
- Currently, there are approximately 700 different pesticide products available for use in Minnesota for corn, soybeans, wheat and hay;
- There are multiple product names that use the same active ingredients but frequently have different label rates and use restrictions. For example, Monsanto marketed glyphosate for many years under numerous trade names. 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.

NASS developed the sample population of 7,700 farms. This was done by selecting 100 farms from each of 76 agricultural counties. All farmers from each county who grew one or more of the target crops (corn, soybean, wheat and hay) were eligible to be selected. The selection of 100 farms per county was based upon NASS's extensive expertise with telephone surveys. This number provided a large enough pool to reach the desired goal of obtaining approximately 40 farms per county 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. The average number of participating farms per county was 40.

Approximately 3,350 interviews were completed. 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 soybean acres but could not find the records for the insecticides 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 local cooperative (co-op) or custom pesticide applicators to complete any missing information not provided by the respondent. Surveys requiring such a follow-up call were later sorted by co-op name. NASS then called the co-ops and obtained information for all the incomplete farms associated with that crop. This streamlined the number of calls made to the co-ops.

Farmers were interviewed over the phone from February to May 2012. These were “cold calls,” meaning the farmers did not get any type of notification about the survey prior to the contact. The interviews typically would last 5 to 10 minutes.

Data Collection Process

- 1) Farmers were first asked to identify the number of acres of corn, soybean, wheat and hay grown in the 2011 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, 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 for the 2011 crop year.

Crop Acres Surveyed

Crop	Number of Respondents	Total Surveyed Acres	Herbicide Applied		Insecticide Applied		Fungicide Applied	
			Acres	(%)	Acres	(%)	Acres	(%)
Corn	2,125	677,469	670,532	(99%)	67,379	(10%)	61,398	(9%)
Soybeans	1,932	639,075	631,284	(99%)	407,974	(64%)	110,477	(17%)
Wheat	500	167,935	164,993	(98%)	53,911	(32%)	122,559	(73%)
Hay	2,004	133,725	1,695	(1%)	12,455	(9%)	0	(0%)
Totals	3,356²	1,618,204	1,468,504	(90%)	541,719	(33%)	294,434	(18%)

² The total sum of respondents across all crops was 6,561. However since most farmers grew more than one type of major crop, the actual number of participating farms was 3,356.

Table 2. Farms and crop acreage by county and PMA

County	PMA	# of Surveyd Farms	Corn Acres	Soybean Acres	Wheat Acres	Hay Acres	Total Acres
Clay	1	51	19,142	22,252	12,010	2,036	55,440
Grant	1	47	16,057	16,218	4,424	643	37,342
Kittson	1	51	1,500	24,862	30,129	3,487	59,978
Mahnomen	1	36	4,790	9,402	3,153	2,295	19,640
Marshall	1	49	3,452	19,345	22,940	2,273	48,010
Norman	1	51	15,025	26,362	11,993	1,489	54,869
Pennington	1	40	250	13,245	9,523	5,245	28,263
Polk	1	46	7,045	16,649	12,779	2,497	38,970
Red Lake	1	45	2,233	13,061	10,652	2,636	28,582
Roseau	1	48	1,960	16,216	12,183	4,106	34,465
Traverse	1	47	26,013	29,251	2,229	521	58,014
Wilkin	1	44	15,597	26,432	13,509	440	55,978
Becker	4	47	10,210	11,700	6,303	4,105	32,318
Benton	4	53	5,307	3,321	180	2,421	11,229
Cass	4	50	179	600	0	7,134	7,913
Crow Wing	4	56	1,894	380	81	4,868	7,223
Douglas	4	39	2,939	3,017	1,116	1,533	8,605
Hubbard	4	54	1,485	182	1,352	3,665	6,684
Kandiyohi	4	40	10,656	7,020	252	1,112	19,040
Morrison	4	50	5,262	1,791	35	3,813	10,901
Otter Tail	4	50	13,442	5,849	1,364	3,312	23,967
Pope	4	42	8,069	7,646	860	1,291	17,866
Sherburne	4	47	4,659	2,255	249	876	8,039
Stearns	4	47	4,801	1,337	78	2,593	8,809
Todd	4	48	3,228	1,260	528	2,557	7,573
Wadena	4	53	3,168	986	293	4,603	9,050
Aitkin	5	41	4	0	0	4,098	4,102
Chisago	5	39	1,390	1,769	65	1,463	4,687
Isanti	5	44	3,429	2,925	100	1,164	7,618
Kanabec	5	40	952	364	56	3,700	5,072
Mille Lacs	5	57	2,745	1,803	58	2,766	7,372
Pine	5	56	1,392	827	87	5,273	7,579
Big Stone	6	35	8,308	10,583	1,740	240	20,871
Chippewa	6	44	12,548	9,640	338	506	23,032
Lac qui Parle	6	34	12,365	9,021	315	189	21,890
Stevens	6	43	23,646	16,844	2,207	4,439	47,136
Swift	6	44	17,881	8,184	816	1,101	27,982
Yellow Medicine	6	33	11,593	9,005	221	326	21,145
Lincoln	7	45	9,274	8,816	496	881	19,467
Lyon	7	29	10,602	9,067	75	551	20,295
Murray	7	36	11,110	10,384	3	293	21,790
Nobles	7	40	10,795	8,314	43	168	19,320
Pipestone	7	39	11,219	8,585	720	1,274	21,798
Rock	7	39	12,489	8,819	40	844	22,192
Blue Earth	8	43	16,220	10,123	20	204	26,567
Brown	8	49	9,186	6,475	244	577	16,482
Cottonwood	8	45	13,371	11,590	0	370	25,331

County	PMA	# of Surveyd Farms	Corn Acres	Soybean Acres	Wheat Acres	Hay Acres	Total Acres
Faribault	8	46	15,705	13,278	3	310	29,296
Freeborn	8	48	14,961	10,060	0	505	25,526
Jackson	8	37	15,484	17,270	29	418	33,201
Le Sueur	8	42	8,817	5,919	50	658	15,444
Martin	8	41	19,080	14,085	0	126	33,291
McLeod	8	33	6,516	3,905	58	559	11,038
Meeker	8	50	11,156	10,722	313	1,186	23,377
Nicollet	8	50	11,874	7,775	117	271	20,037
Redwood	8	45	13,834	12,466	193	159	26,652
Renville	8	43	19,234	16,522	427	84	36,267
Rice	8	38	3,103	2,329	4	1,120	6,556
Sibley	8	48	10,570	7,228	106	477	18,381
Steele	8	33	12,022	7,303	100	620	20,045
Waseca	8	40	9,986	6,539	127	274	16,926
Watonwan	8	38	16,026	13,959	0	220	30,205
Wright	8	45	3,372	3,358	0	1,716	8,446
Dodge	9	49	23,349	13,189	0	605	37,143
Fillmore	9	45	8,032	2,860	0	1,752	12,644
Goodhue	9	42	6,661	4,031	56	1,161	11,909
Houston	9	42	3,601	721	40	2,331	6,693
Mower	9	40	12,733	8,953	0	793	22,479
Olmsted	9	41	7,927	3,169	0	3,393	14,489
Wabasha	9	41	5,760	1,624	0	2,314	9,698
Winona	9	52	4,950	2,174	0	2,730	9,854
Anoka	10	52	2,500	1,102	15	3,024	6,641
Carver	10	45	5,623	3,316	135	1,723	10,797
Dakota	10	37	6,148	4,447	118	1,070	11,783
Scott	10	47	4,564	4,049	155	1,212	9,980
Washington	10	40	4,999	2,945	30	936	8,910

Data Reporting and Limitations

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

Data sets are not “Weighted”

Traditional surveys conducted by NASS employ advanced sampling strategies and are designed to statistically represent a non-homogenous population, thus data is “weighted” 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

³ For an explanation of NASS survey methods and data quality, visit the NASS website at http://www.nass.usda.gov/Education_and_Outreach/Understanding_Statistics/index.asp “Statistical Aspects of Surveys” for more specific facts about agricultural chemical use surveys. Click on “Survey and

As previously mentioned, approximately 40 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- selection, 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 area, or statewide.

Therefore, attempts to extrapolate data for purposes of estimating total pounds of a product or active ingredient used in a county, area, or statewide must consider an 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 that was used for pesticide data collection, 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 (Area 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 area on 38% of the corn acres and mesotrione (Callisto) was reported on 24% of acres. Because the acres are not identical, it is not possible to capture acres with both products applied on a total number 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 an 80 acre field, with Surestart 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 application per year. Glyphosate is one of the exceptions for both corn and soybean. In this survey, there were 1.2 applications of glyphosate per year on corn (90)% of all surveyed corn acres at a rate of 0.86 pounds/acre.

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 five 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://npirspublic.ceris.purdue.edu/state/state_menu.aspx?state=MN, 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

Active Ingredient	Published	Active Ingredient	Published
Herbicide		Insecticide	
2,4-D	P	Bifenthrin	P
Acetochlor	P	Chlorethoxyfos	P
Atrazine	P	Chlorpyrifos	P
Bromoxynil	*	Cyfluthrin	P
Clethodim	*	Lambda-cyhalothrin	P
Clopyralid	P	Phorate	*
Cloransulam	*	Phostebupirim	P
Dicamba	P	Tefluthrin	P
Diflufenzopyr	P	Terbufos	P
Dimethenamid-p	P	Zeta-cypermethrin	*
Flumetsulam	P		
Flumiclorac	*	Fungicide	
Flumioxazin	*	Azoxystrobin	P
Fluroxypyr	*	Fluoxastrobin	*
Fluthiacet-methyl	P	Metconazole	P
Fomesafen	*	Propiconazole	P
Foramsulfuron	*	Prothioconazole	*
Glufosinate-ammonium	P	Pyraclostrobin	P
Glyphosate	P	Tebuconazole	*
Halosulfuron	*	Trifloxystrobin	P
Imazapyr	*		
Imazethapyr	*		
Mesotrione	P		
Metolachlor	*		
Nicosulfuron	P		
Pendimethalin	P		
Primisulfuron	P		
Propionic acid	*		
Quizalofop	*		
Rimsulfuron	P		
S-metolachlor	P		
Saflufenacil	P		
Tembotrione	P		
Thifensulfuron	*		
Topramezone	P		
Tribenuron	*		
Triencarbazone-methyl	P		

An “*” denotes data is not publishable due to limited use (less than 5 respondents)

A statewide summary of corn pesticide applications is provided in Table 4. Ten percent (10%) of all Minnesota corn acres were surveyed for the 2011 season. Herbicides were applied to 99% of all surveyed corn acres. Insecticides were applied to 10% of all acres and 9% of surveyed acres received fungicides.

Table 4. Pesticide applications and rates by active ingredient (a.i.) for corn statewide⁴.

Agricultural Chemical	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicide					
2,4-D	<1	1.0	0.55	0.55	419
Acetochlor	32	1.0	1.06	1.07	233,315
Atrazine	7	1.0	0.48	0.48	23,390
Clopyralid	18	1.0	0.07	0.07	8,154
Dicamba	8	1.0	0.10	0.10	5,727
Diflufenzopyr	6	1.0	0.03	0.03	1,159
Dimethenamid-p	4	1.0	0.61	0.61	17,581
Flumetsulam	18	1.0	0.03	0.03	3,219
Fluthiacet-methyl	<1	1.0	0.00	0.00	5
Glufosinate-ammonium	1	1.0	0.42	0.43	1,479
Glyphosate	90	1.2	0.86	1.01	616,992
Mesotrione	20	1.0	0.09	0.09	12,036
Nicosulfuron	<1	1.0	0.02	0.02	44
Pendimethalin	<1	1.0	0.88	0.88	743
Primisulfuron	<1	1.0	0.02	0.02	24
Rimsulfuron	1	1.0	0.01	0.01	80
S-metolachlor	13	1.0	1.01	1.04	94,768
Saflufenacil	2	1.0	0.06	0.06	996
Tembotrione	3	1.0	0.07	0.07	1,422
Thifensulfuron	<1	1.0	0.00	0.00	6
Topramezone	1	1.0	0.01	0.01	72
Triencarbazone-methyl	<1	1.0	0.01	0.01	19
Insecticide					
Bifenthrin	2	1.0	0.06	0.06	859
Chlorethoxyfos	1	1.0	0.20	0.20	741
Chlorpyrifos	1	1.0	1.08	1.09	6,993
Cyfluthrin	3	1.0	0.01	0.01	116
Lambda-cyhalothrin	<1	1.0	0.04	0.04	94
Phostebupirim	3	1.0	0.12	0.12	2,326
Tefluthrin	3	1.0	0.11	0.11	2,328
Terbufos	<1	1.0	0.64	0.64	1,013
Fungicides					
Azoxystrobin	2	1.1	0.09	0.11	1,506
Metconazole	1	1.0	0.03	0.03	266

⁴ Excludes any products with less than five responses.

Agricultural Chemical	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year
Propiconazole	2	1.1	0.06	0.07	1,131
Pyraclostrobin	6	1.0	0.10	0.10	3,842
Trifloxystrobin	1	1.0	0.02	0.02	92

Herbicides applied but not published included the following: Bromoxynil, Clethodim, Cloransulam, Flumiclorac, Flumioxazin, Fluroxpyr, Fomesafen, Foramsulfuron, Halosulfuron, Imazapyr, Imazethapyr, Metolachlor, Propionic acid, Quizalofop, and Tribenuron.

Insecticides applied but not published included the following: Phorate and Zeta-cypermethrin.

Fungicides applied but not published included the following: Fluoxastrobin, Prothioconazole, and Tebuconazole.

Acetochlor, atrazine and s-metolachlor are three commonly used herbicides for which the Minnesota Department of Agriculture has developed specific voluntary Best Management Practices to protect groundwater and surface water resources. Because of the additional concerns regarding the use of these products, their use frequencies are compared below. Figure 2 illustrates the range of rates reported for atrazine use on corn for 2003, 2005, 2007, 2009 and 2011.

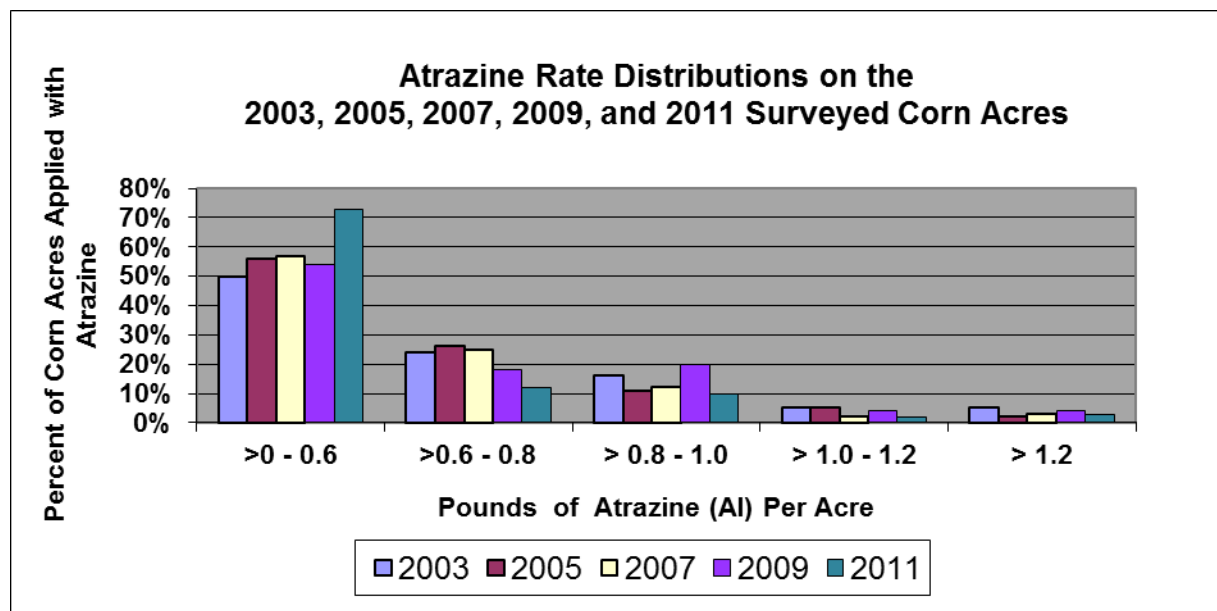


Figure 2. Atrazine (active ingredient) rate per acre distribution across surveyed corn acres for the 2003, 2005, 2007, 2009 and 2011 crop years.

Atrazine use in Minnesota has fallen from 30% in 2003 to 7% in 2011. The application rate has fallen from 0.67 pounds a.i. per acre in 2003 to 0.48 pounds a.i. per acre in 2011. One possible explanation for the reductions may be an increase in Roundup-ready acres where glyphosate was often the only product applied.

Acetochlor use in Minnesota is detailed in Figure 3, which illustrates the range of acetochlor rates reported for use in the 2003, 2005, 2007, 2009, and 2011 crop years.

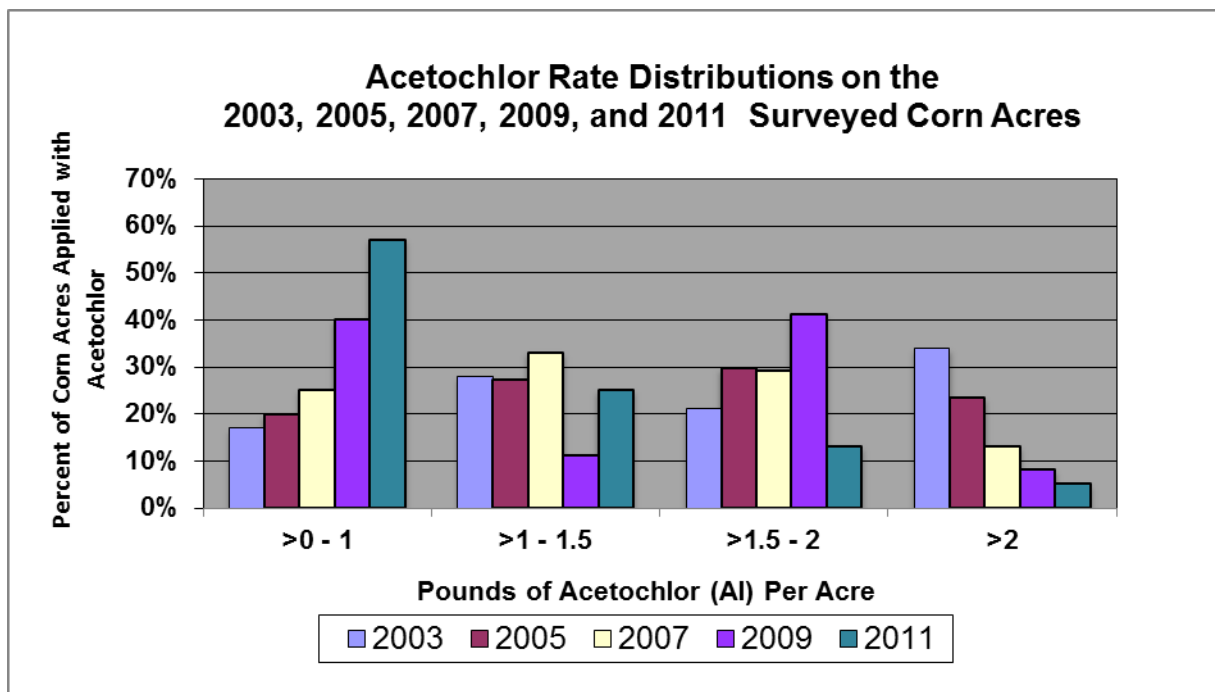


Figure 3. Acetochlor (active ingredient) rate per acre distribution across surveyed corn acres for the 2003, 2005, 2007, 2009 and 2011 crop years.

Acetochlor use in Minnesota has risen from 25% in 2003 to 32% in 2011. The application rate of acetochlor dropped from 1.63 pounds a.i. per acre in 2003 to 1.07 pounds a.i. per acre in 2011.

S-metolachlor use in Minnesota is detailed in Figure 4, which illustrates the range of rates reported for use of s-metolachlor in the 2003, 2005, 2007, 2009 and 2011 crop years.

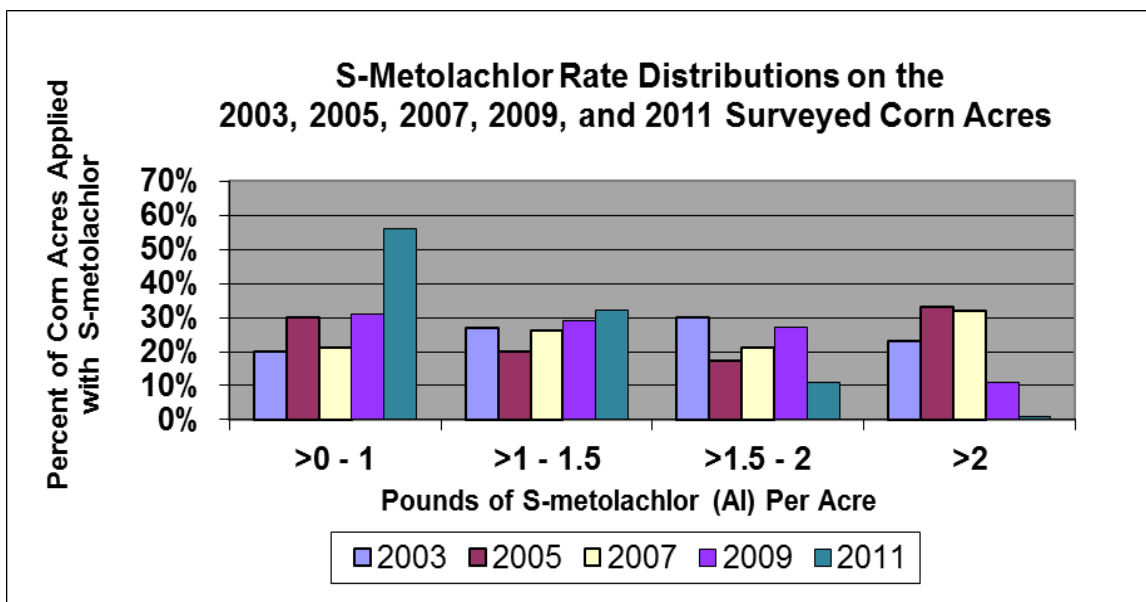


Figure 4. S-metolachlor (active ingredient) rate distribution across surveyed corn acres for the 2003, 2005, 2007, 2009 and 2011 crop years.

S-metolachlor use in Minnesota has increased from 2003 to 2011 with use on 13% of all corn acres in 2011. The application rate fell significantly from 1.67 pounds a.i. per acre in 2003 to 1.04 pounds a.i. per acre in 2011.

Corn herbicide county-level estimated use maps

Atrazine, acetochlor and s-metolachlor use in Minnesota varies among counties. Some reasons for the variation in use include different weed species, soils, crop rotations and the pesticide packages that individual pesticide dealers promote in geographic areas of the state. As the vast majority of these herbicides are used in corn production, corn acres within each county will also have a direct influence on any county-based comparisons. Maps of the estimated land area in each county receiving atrazine, acetochlor or s-metolachlor can be constructed using data from the 2011 MDA survey.

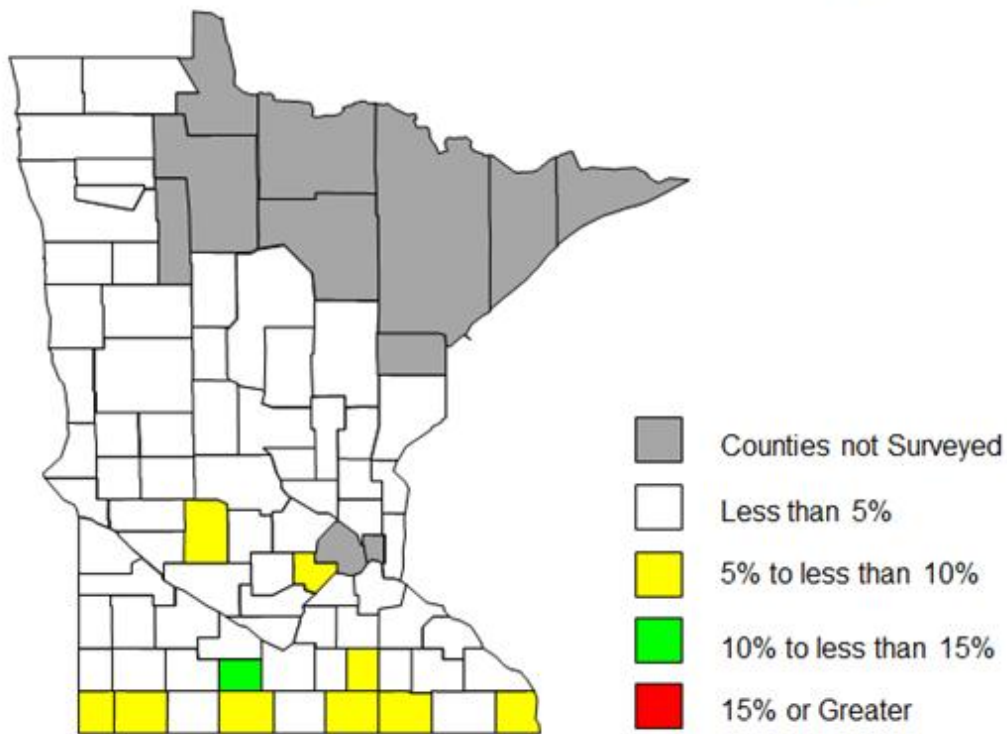
Figure 5 is constructed as follows: The percentage of surveyed crop acres receiving atrazine was multiplied by the number of crop acres in each county (a summation of corn, soybean, wheat and hay acres) as reported by NASS. This value was then divided by the county's total land area (excluding lakes) expressed in acres and as reported by the U.S. Census. The same calculation was made for acetochlor and s-metolachlor in Figures 6 & 7, respectively.

Tables of statewide and regional MDA survey results are reported strictly as percentages of survey respondents. By multiplying the percentage of surveyed county crop acres receiving a specific pesticide by the number of NASS acres for those crops assumes that all crop acres in a county receive herbicide applications at the same rate as those acres included in the survey.

Although this assumption results in an extrapolation whose accuracy cannot be verified statistically, the exercise provides a helpful means of utilizing available data to compare the ways in which counties use certain herbicides relative to the amount of land in the county farmed for corn, soybean, wheat and hay.

Additionally, the maps help to correct a potential misinterpretation of statewide use data. Because the survey draws nearly equally from each county (approximately 40 farms per county), when an active ingredient's use data is presented as a statewide average of all counties, it is not adjusted for differing farm sizes or the amount of county land in corn, soybeans, wheat or hay production. Instead, statewide averages are simply a reporting of data collected from all survey respondents. This averaging process can lead to inappropriate conclusions and may under-represent an active ingredient's use in smaller geographical areas. Similarly, the county-level data tables are only a report of data from survey respondents, and provide no means of identifying a county's relative use of an active ingredient. The extrapolation conducted to create the county-level estimated use maps in an attempt to adjust the survey's raw data using the assumption that the approximately 40 producers surveyed in a county are representative of county-level farm sizes and practices associated with corn, soybeans, wheat and hay production. This produces a potentially more realistic, regional estimate of active ingredient use based on factors that statewide averaging or simple county-level survey results can't approximate.

Percent of All Land Within Each County Applied with Atrazine

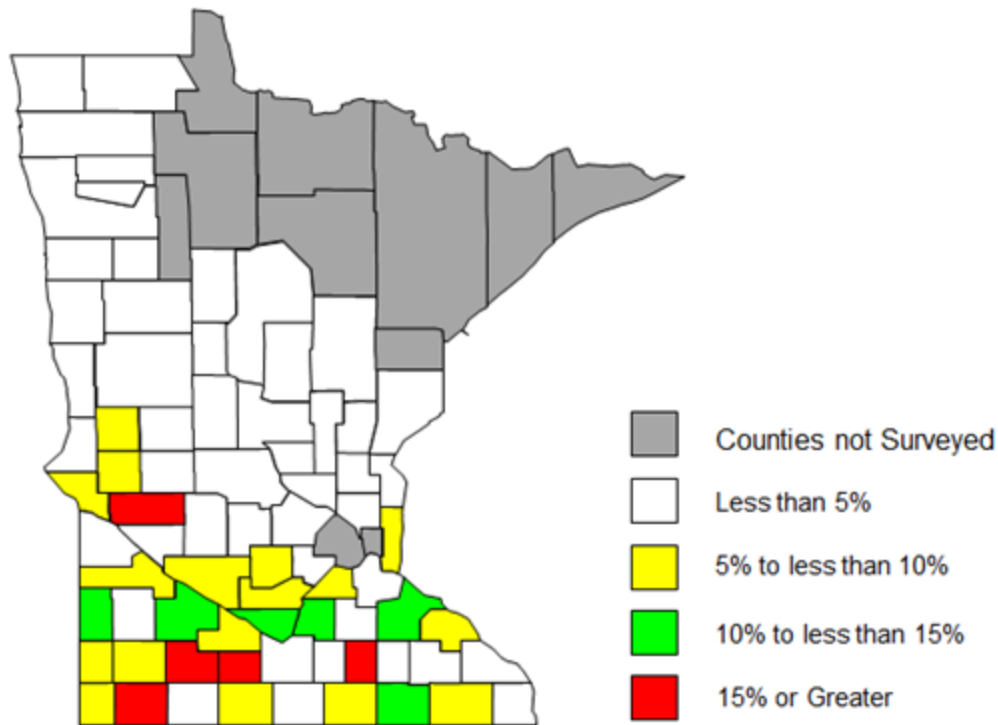


Percent of atrazine acres applied by county was calculated by:

MDA Survey: Percent of crop acres applied with atrazine, multiplied by total cropland acres (NASS crop acres), divided by total county size (US Census).

Figure 5. Estimated percent of land acres applied with atrazine on a county basis for the 2011 crop year.

Percent of All Land Within Each County Applied with Acetochlor

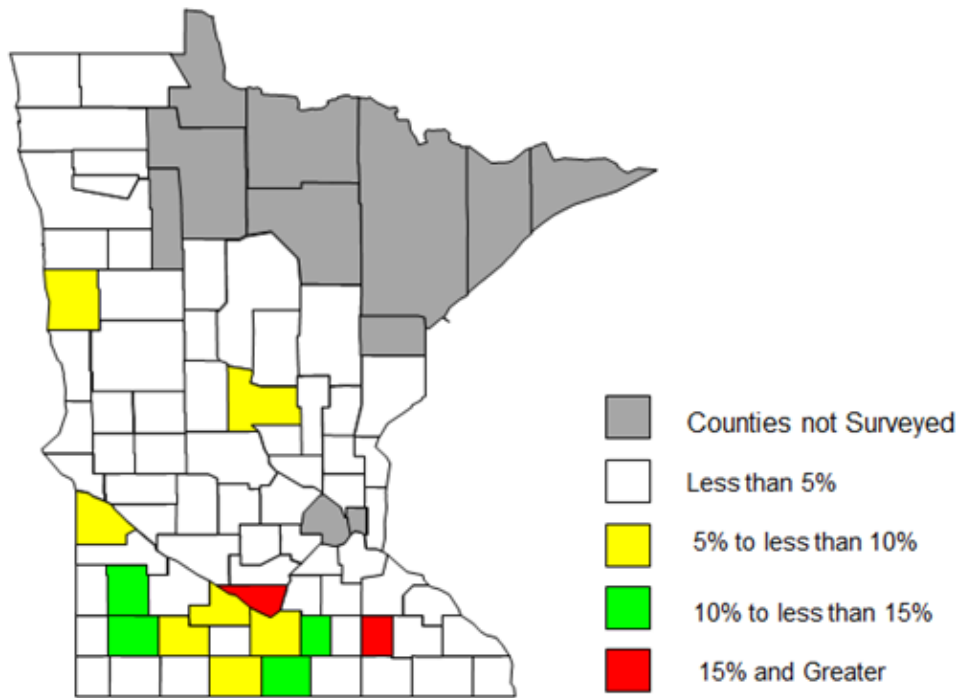


Percent of acetochlor acres applied by county was calculated by:

MDA Survey: Percent of crop acres applied with acetochlor, multiplied by total cropland acres (NASS crop acres), divided by total county size (US Census).

Figure 6. Estimated percent of land acres applied with acetochlor on a county basis for the 2011 crop year.

Percent of All Land Within Each County Applied with S-metolachlor



Percent of S-metolachlor acres applied by county was calculated by:

MDA Survey: Percent of crop acres applied with S-metolachlor, multiplied by total cropland acres (NASS crop acres), divided by total county size (US Census).

Figure 7. Estimated percent of land acres applied with s-metolachlor on a county basis for the 2011 crop year.

Pesticide Applications on Corn by Pesticide Management Areas

Table 5 details the number of 2011 respondents with usable reports in each Pesticide Management Area (PMA), the number of corn acres in each area and the number of corn acres receiving herbicides, insecticides and fungicides. Tables 6 – 13 provide corn pesticide applications and rates by individual PMAs.

Table 5. Summary (by PMA) of surveyed corn acreage to which pesticides were applied.

PMA	Number of Respondents	Corn Acres	Herbicide Acres	Insecticide Acres	Fungicide Acres
1	229	113,064	112,617	1,276	8,531
4	334	75,299	74,264	2,256	1,855
5	95	9,912	9,709	917	0
6	195	86,341	83,724	4,088	5,926
7	202	65,489	65,213	6,521	2,579
8	678	230,517	229,058	40,266	32,993
9	274	73,013	72,442	11,398	9,284
10	118	23,834	23,505	657	230
Totals	2,125	677,469	670,532	67,379	61,398

Table 6. Pesticide applications and rates for corn – PMA 1

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Acetochlor	13	1.0	1.07	1.07	15,423
Atrazine	4	1.0	0.37	0.37	1,765
Clopyralid	9	1.0	0.06	0.06	598
Dicamba	13	1.0	0.06	0.06	910
Diflufenzopyr	13	1.0	0.02	0.02	364
Dimethenamid-p	2	1.0	0.60	0.60	1,659
Flumetsulam	8	1.0	0.02	0.02	236
Glyphosate	93	1.2	0.86	1.05	109,538
Mesotrione	15	1.0	0.09	0.09	1,444
S-metolachlor	12	1.0	0.87	0.87	11,686
Saflufenacil	2	1.0	0.06	0.06	131
Tembotrione	2	1.0	0.08	0.08	157
Fungicide					
Propiconazole	1	1.0	0.02	0.02	23
Pyraclostrobin	6	1.0	0.11	0.11	809
Trifloxystrobin	1	1.0	0.02	0.02	23

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 2011 by survey participants in this area. 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, area or sub-area levels.

Herbicides applied but not published included the following: 2,4-D, Flumioxazin, Fluthiacet-methyl, Foramsulfuron, Nicosulfuron, Rimsulfuron, and Thifensulfon.

Insecticides applied but not published included the following: Chlorpyrifos, Cyfluthrin, Phostebupirim, and Tefluthrin.

Fungicides applied but not published included the following: Metconazole.

Table 7. Pesticide applications and rates for corn – PMA 4

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Acetochlor	29	1.0	0.93	0.95	20,972
Atrazine	10	1.0	0.51	0.51	3,807
Clopyralid	23	1.0	0.06	0.06	1,118
Dicamba	10	1.0	0.12	0.12	919
Diflufenzopyr	5	1.0	0.03	0.03	108
Dimethenamid-p	4	1.0	0.51	0.51	1,665
Flumetsulam	23	1.0	0.03	0.03	463
Glyphosate	88	1.1	0.86	0.97	63,795
Mesotrione	17	1.0	0.09	0.09	1,226
Nicosulfuron	<1	1.0	0.02	0.02	7
Primisulfuron	<1	1.0	0.02	0.02	3
Rimsulfuron	3	1.0	0.01	0.01	33
S-metolachlor	10	1.0	1.11	1.14	8,922
Saflufenacil	3	1.0	0.06	0.06	125

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 2011 by survey participants in this area. 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, area or sub-area levels.

Herbicides applied but not published included the following: 2,4-D, Foramsulfuron, Glufosinate-ammonium, Metolachlor, Pendimethalin, Tembotrione, Topramezone, and Triencarbazone-methyl.

Insecticides applied but not published included the following: Bifenthrin, Chlorethoxyfos, Chlorpyrifos, Cyfluthrin, Lambda-cyhalothrin, and Phostebupirim.

Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Prothioconazole, Pyraclostrobin, Tebuconazole, and Trifloxystrobin.

Table 8. Pesticide applications and rates for corn – PMA 5

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Acetochlor	20	1.0	1.57	1.57	3,178
Atrazine	18	1.0	0.66	0.66	1,169
Glyphosate	85	1.1	0.82	0.90	7,618
Mesotrione	11	1.0	0.09	0.09	105
S-metolachlor	10	1.0	0.94	0.94	950

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 2011 by survey participants in this area. 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, area or sub-area levels.

Herbicides applied but not published included the following: Bromoxynil, Clopyralid, Dicamba, Diflufenzopyr, Dimethenamid-p, Flumetsulam, Glufosinate-ammonium, Nicosulfuron, Pendimethalin, Rimsulfuron, Saflufenacil, Thifensulfuron, and Topramezone.

Insecticides applied but not published included the following: Tefluthrin.

Table 9. Pesticide applications and rates for corn – PMA 6

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
			<i>(a.i.)</i>	<i>(a.i.)</i>	<i>(a.i.)</i>
Herbicides					
Acetochlor	37	1.0	1.00	1.01	32,077
Atrazine	3	1.0	0.32	0.32	873
Clopyralid	25	1.0	0.06	0.06	1,216
Dicamba	11	1.0	0.14	0.14	1,337
Diflufenzopyr	8	1.0	0.03	0.03	219
Dimethenamid-p	7	1.0	0.50	0.50	2,839
Flumetsulam	25	1.0	0.02	0.02	503
Glyphosate	86	1.3	0.91	1.14	84,690
Mesotrione	14	1.0	0.08	0.08	987
S-metolachlor	6	1.0	1.10	1.10	6,110
Saflufenacil	6	1.0	0.06	0.06	308
Insecticides					
Tembotrione	5	1.0	0.07	0.07	332
Bifenthrin	1	1.0	0.05	0.05	49
Cyfluthrin	2	1.0	0.01	0.01	9
Phostebupirim	2	1.0	0.13	0.13	176
Fungicides					
Pyraclostrobin	2	1.0	0.12	0.12	208

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 2011 by survey participants in this area. 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, area or sub-area levels.

Herbicides applied but not published included the following: 2,4-D, Clethodim, Fluthiacet-methyl, Fomesafen, Glufosinate-ammonium, Imazapyr, Imazethapyr, Nicosulfuron, Rimsulfuron, Topramezone, and Triencarbazone-methyl.

Insecticides applied but not published included the following: Chlorethoxyfos, Chlorpyrifos, and Tefluthrin.

Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, and Trifloxystrobin.

Table 10. Pesticide applications and rates for corn – PMA 7

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Acetochlor	48	1.0	1.00	1.02	31,958
Atrazine	10	1.0	0.47	0.47	2,955
Clopyralid	31	1.0	0.07	0.07	1,454
Dicamba	3	1.0	0.15	0.15	337
Diflufenzopyr	3	1.0	0.03	0.03	45
Flumetsulam	31	1.0	0.03	0.03	602
Glyphosate	92	1.1	0.89	1.02	62,031
Mesotrione	22	1.0	0.09	0.09	1,242
S-metolachlor	14	1.0	1.07	1.07	9,741
Insecticides					
Bifenthrin	3	1.0	0.05	0.05	100
Chlorpyrifos	1	1.0	1.22	1.22	866
Cyfluthrin	1	1.0	0.01	0.01	5
Phostebupirim	1	1.0	0.13	0.13	101
Tefluthrin	4	1.0	0.11	0.11	279
Fungicides					
Pyraclostrobin	3	1.0	0.09	0.09	188

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 2011 by survey participants in this area. 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, area or sub-area levels.

Herbicides applied but not published included the following: 2,4-D, Dimethenamid-p, Fomesafen, Metolachlor, Pendimethalin, Saflufenacil, Tembotrione, and Topramezone.

Insecticides applied but not published included the following: Chlorethoxyfos, Phorate, and Terbufos.

Fungicides applied but not published included the following: Azoxystrobin, Metconazole, Propiconazole, and Trifloxystrobin.

Table 11. Pesticide applications and rates for corn – PMA 8

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Acetochlor	38	1.0	1.11	1.11	97,132
Atrazine	7	1.0	0.51	0.51	8,471
Clopyralid	17	1.0	0.07	0.07	2,604
Dicamba	5	1.0	0.11	0.11	1,169
Diflufenzopyr	3	1.0	0.03	0.03	215
Dimethenamid-p	5	1.0	0.67	0.67	7,497
Flumetsulam	16	1.0	0.03	0.03	938
Fluthiacet-methyl	<1	1.0	0.00	0.00	3
Glufosinate-ammonium	1	1.0	0.44	0.46	1,036
Glyphosate	90	1.2	0.85	0.98	202,593
Mesotrione	24	1.0	0.08	0.09	4,782
Nicosulfuron	<1	1.0	0.03	0.03	13
Rimsulfuron	1	1.0	0.01	0.01	24
S-metolachlor	14	1.0	1.02	1.06	34,947
Saflufenacil	2	1.0	0.06	0.06	208
Tembotrione	5	1.0	0.07	0.07	793
Topramezone	1	1.0	0.01	0.01	45
Insecticides					
Bifenthrin	3	1.0	0.06	0.06	461
Chlorethoxyfos	1	1.0	0.19	0.19	244
Chlorpyrifos	1	1.0	1.12	1.12	3,356
Cyfluthrin	6	1.0	0.01	0.01	86
Lambda-cyhalothrin	1	1.0	0.04	0.04	84
Phostebupirim	6	1.0	0.13	0.13	1,740
Tefluthrin	5	1.0	0.12	0.12	1,387
Terbufos	1	1.0	0.62	0.62	824
Fungicides					
Azoxystrobin	4	1.2	0.10	0.11	936
Metconazole	2	1.0	0.03	0.03	100
Propiconazole	4	1.2	0.07	0.08	638
Pyraclostrobin	8	1.0	0.09	0.09	1,802
Trifloxystrobin	1	1.0	0.02	0.02	47

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 2011 by survey participants in this area. 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, area or sub-area levels.

Herbicides applied but not published included the following: 2,4-D, Bromoxynil, Cloransulam, Flumiclorac, Fomesafen, Halosulfuron, Pendimethalin, Primisulfuron, Propionic acid, Quizalofop, Thifensulfuron, Tribenuronm, and Triencarbazone-methyl.

Insecticides applied but not published included the following: Phorate and Zeta-cypermethrin.

Fungicides applied but not published included the following: Fluoxastrobin, Prothioconazole, and Tebuconazole.

Table 12. Pesticide applications and rates for corn – PMA 9

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli- cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Acetochlor	26	1.0	1.15	1.19	22,553
Atrazine	7	1.0	0.46	0.46	2,439
Clopyralid	17	1.0	0.07	0.07	912
Dicamba	9	1.0	0.09	0.09	569
Diflufenzopyr	7	1.0	0.03	0.03	159
Dimethenamid-p	5	1.0	0.57	0.57	1,935
Flumetsulam	17	1.0	0.03	0.03	373
Glyphosate	91	1.2	0.85	0.99	65,708
Mesotrione	25	1.0	0.09	0.09	1,735
Nicosulfuron	<1	1.0	0.02	0.02	2
Primisulfuron	1	1.0	0.01	0.01	9
Rimsulfuron	<1	1.0	0.01	0.01	4
S-Metolachlor	25	1.1	1.00	1.05	18,781
Saflufenacil	3	1.0	0.06	0.06	157
Tembotrione	1	1.0	0.07	0.07	57
Insecticides					
Bifenthrin	4	1.0	0.08	0.08	223
Chlorpyrifos	2	1.0	1.09	1.09	1,201
Cyfluthrin	4	1.0	0.00	0.00	11
Phostebupirim	4	1.0	0.07	0.07	228
Tefluthrin	4	1.0	0.11	0.11	366
Fungicides					
Azoxystrobin	2	1.0	0.07	0.07	93
Propiconazole	2	1.0	0.06	0.06	79
Pyraclostrobin	11	1.0	0.08	0.08	667

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 2011 by survey participants in this area. 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, area or sub-area levels.

Herbicides applied but not published included the following: 2,4-D, Bromoxynil, Fluthiacet-methyl, Glufosinate-ammonium, Halosulfuron, Thifensulfuron, Topramezone, Tribenuron, and Triencarbazone-methyl.
Insecticides applied but not published included the following: Chlorethoxyfos, Lambda-cyhalothrin, and Terbufos.

Fungicides applied but not published included the following: Metconazole and Trifloxystrobin.

Table 13. Pesticide applications and rates for corn – PMA 10

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Acetochlor	37	1.0	1.13	1.13	10,022
Atrazine	16	1.0	0.50	0.50	1,911
Clopyralid	15	1.0	0.07	0.07	239
Dicamba	11	1.0	0.17	0.17	443
Diflufenzopyr	5	1.0	0.03	0.03	33
Dimethenamid-p	5	1.0	0.78	0.78	906
Flumetsulam	15	1.0	0.03	0.03	99
Glyphosate	83	1.1	0.86	0.94	18,531
Mesotrione	23	1.0	0.10	0.10	516
S-metolachlor	14	1.0	1.07	1.12	3,631
Insecticides					
Tefluthrin	2	1.0	0.12	0.12	59

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 2011 by survey participants in this area. 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, area or sub-area levels.

Herbicides applied but not published included the following: 2,4-D, Fluthiacet-methyl, Glufosinate-ammonium, Imazethapyr, Nicosulfuron, Pendimethalin, Primisulfuron, Rimsulfuron, Saflufenacil, Tembotrione, Topramezone, and Triencarbazone-methyl.

Insecticides applied but not published included the following: Bifenthrin, Chlorethoxyfos, Chlorpyrifos, Cyfluthrin, and Phostebupirim.

Fungicides applied but not published included the following: Pyraclostrobin.

Statewide Pesticide Applications – Soybean

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

Active Ingredient	Published	Active Ingredient	Published
Herbicides		Insecticides	
2,4-D	*	Beta-cyfluthrin	P
Acetochlor	P	Bifenthrin	P
Bentazon	*	Chlorpyrifos	P
Chlorimuron	P	Cyfluthrin	*
Clethodim	P	Deltamethrin	*
Cloransulam	P	Dimethoate	*
Dimethenamid-p	P	Esfenvalerate	P
Ethalfuralin	*	Gamma-cyhalothrin	P
Fenoxaprop	*	Imidacloprid	P
Fluazifop	P	Lambda-cyhalothrin	P
Flumetsulam	*	Thiamethoxam	P
Flumiclorac pentyl ester	P	Zeta-cypermethrin	P
Flumioxazin	P	Fungicide	
Fluthiacet-methyl	P	Azoxystrobin	P
Fomesafen	P	Chlorothalonil	*
Glufosinate-ammonium	P	Fluoxastrobin	*
Glyphosate	P	Mefenoxam	P
Imazamox	P	Propiconazole	P
Imazethapyr	P	Pyraclostrobin	P
Lactofen	*	Streptomyces lydicus wyec	*
Metribuzin	*	Tebuconazole	*
Pendimethalin	P	Tetraconazole	P
Phenmedipham	*	Trifloxystrobin	P
Quizalofop	P		
S-metolachlor	P		
Saflufenacil	P		
Sulfentrazone	P		
Thifensulfuron	P		
Trifluralin	P		

An "*" denotes data is not publishable due to use by less than 5 respondents.

A statewide summary of soybean pesticide applications is provided in Table 15. Ten percent (10%) of all Minnesota soybean acres were surveyed for the 2011 season. Herbicides were applied to 99% of all surveyed soybean acres. Insecticides were applied to 64% of all acres and 17% of surveyed acres received fungicides.

Table 15. Pesticide applications and rates by active ingredient (a.i.) for soybean statewide⁵.

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Acetochlor	1	1.0	1.09	1.09	3,976
Chlorimuron	<1	1.0	0.01	0.01	16
Clethodim	5	1.0	0.08	0.08	2,584
Cloransulam	2	1.0	0.02	0.02	278
Dimethenamid-p	1	1.0	0.29	0.29	913
Fluazifop	3	1.0	0.06	0.06	1,234
Flumiclorac pentyl ester	<1	1.0	0.01	0.01	13
Flumioxazin	1	1.0	0.07	0.07	549
Fluthiacet-methyl	2	1.0	0.00	0.00	41
Fomesafen	2	1.0	0.23	0.23	2,485
Glufosinate-ammonium	1	1.5	0.42	0.64	2,505
Glyphosate	97	1.7	0.84	1.40	857,007
Imazamox	1	1.1	0.02	0.02	99
Imazethapyr	2	1.0	0.05	0.05	805
Pendimethalin	1	1.0	0.98	0.98	5,546
Quizalofop	1	1.1	0.03	0.04	186
S-metolachlor	1	1.0	1.06	1.06	3,675
Saflufenacil	2	1.0	0.02	0.02	230
Sulfentrazone	2	1.0	0.15	0.15	1,896
Thifensulfuron	1	1.0	0.01	0.01	50
Trifluralin	2	1.0	0.64	0.64	9,081
Insecticides					
Beta-cyfluthrin	1	1.0	0.02	0.02	115
Bifenthrin	4	1.0	0.06	0.06	1,603
Chlorpyrifos	20	1.0	0.42	0.42	54,532
Esfenvalerate	4	1.0	0.03	0.03	932
Gamma-cyhalothrin	3	1.1	0.01	0.01	118
Imidacloprid	1	1.0	0.05	0.05	234
Lambda-cyhalothrin	38	1.0	0.02	0.02	5,643
Thiamethoxam	3	1.0	0.03	0.03	640
Zeta-cypermethrin	1	1.0	0.01	0.01	119

⁵ Excludes any products with less than 5 responses.

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Fungicides					
Azoxystrobin	3	1.0	0.10	0.10	2,086
Mefenoxam	<1	1.0	0.21	0.21	434
Propiconazole	3	1.0	0.04	0.04	614
Pyraclostrobin	11	1.0	0.09	0.09	6,140
Tetraconazole	1	1.0	0.07	0.07	274
Trifloxystrobin	2	1.0	0.03	0.03	492

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 2011 by survey participants in this area. 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, area or sub-area levels.

Herbicides applied but not published included the following: 2,4-D, Bentazon, Ethalfuralin, Fenoxaprop, Flumetsulam, Lactofen, Metribuzin, and Phenmedipham.

Insecticides applied but not published included the following: Cyfluthrin, Deltamethrin, and Dimethoate

Fungicides applied but not published included the following: Chlorothalonil, Fluoxastrobin, Streptomyces lydicus wyec, and Tebuconazole.

⁷ Excludes any products with less than 5 responses.

Area Pesticide Applications – Soybean

Table 16 details the number of respondents with usable reports in each area, the number of soybean acres in each area and the number of soybean acres receiving herbicides, insecticides and fungicides. Tables 17 – 24 provide soybean pesticide applications and rates by individual area.

Table 16. Summary (by PMA) of surveyed soybean acreage to which pesticides were applied

PMA	Number of Respondents	Soybean Acres	Herbicide Acres	Insecticide Acres	Fungicide Acres
1	408	233,295	231,856	146,882	25,172
4	206	47,344	47,172	32,717	7,467
5	62	7,688	7,458	850	1,379
6	196	63,277	62,004	45,053	3,246
7	183	53,985	53,495	38,940	9,173
8	643	180,906	179,655	126,628	44,900
9	190	36,721	36,568	15,444	17,705
10	94	15,859	15,753	3,059	1,435
Totals	1,982	639,075	633,961	409,573	110,477

Table 17. Pesticide applications and rates for soybean – PMA 1

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Clethodim	4	1.0	0.08	0.08	699
Fluazifop	1	1.0	0.04	0.04	91
Fluthiacet	1	1.0	0.00	0.00	7
Fomesafen	1	1.0	0.21	0.21	355
Glyphosate	96	1.7	0.82	1.36	303,913
Imazethapyr	1	1.0	0.05	0.05	78
Insecticides					
Bifenthrin	2	1.1	0.06	0.07	369
Chlorpyrifos	20	1.0	0.35	0.37	16,708
Esfenvalerate	3	1.0	0.03	0.03	206
Gamma-cyhalothrin	3	1.1	0.01	0.01	50
Lambda-cyhalothrin	42	1.0	0.02	0.02	2,261
Fungicides					
Propiconazole	2	1.0	0.03	0.03	138
Pyraclostrobin	8	1.0	0.09	0.09	1,738
Trifloxystrobin	2	1.0	0.03	0.03	129

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 2011 by survey participants in this area. 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 underestimate the total pounds of a.i. used at the state, area or sub-area levels.

Herbicides applied but not published included the following: Acetochlor, Bentazon, Chlorimuron, Cloransulam, Dimethenamid-p, Ethalfluralin, Flumiclorac, Glufosinate-ammonium, Imazamox, Metribuzin, Pendimethalin, Quizalofop, S-metolachlor, Saflufenacil, and Thifensulfuron.

Insecticides applied but not published included the following: Beta-cyfluthrin, Deltamethrin, Dimethoate, Imidacloprid, Thiamethoxam, and Zeta-cypermethrin.

Fungicides applied but not published included the following: Azoxystrobin, Tebuconazole, and Tetraconazole.

Table 18. Pesticide applications and rates for soybean – PMA 4

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Clethodim	7	1.0	0.07	0.07	229
Flumioxazin	6	1.0	0.07	0.07	194
Fluthiacet	2	1.0	0.00	0.00	1
Fomesafen	1	1.0	0.19	0.19	84
Glyphosate	98	1.6	0.82	1.32	61,218
Thifensulfuron	7	1.0	0.01	0.01	29
Insecticides					
Bifenthrin	4	1.0	0.06	0.06	121
Chlorpyrifos	17	1.0	0.40	0.41	3,231
Esfenvalerate	5	1.0	0.04	0.04	94
Imidacloprid	1	1.0	0.04	0.04	14
Lambda-cyhalothrin	43	1.0	0.02	0.02	496
Thiamethoxam	3	1.0	0.03	0.03	37
Fungicide					
Pyraclostrobin	7	1.0	0.10	0.10	309
Tetraconazole	4	1.0	0.07	0.07	143

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 2011 by survey participants in this area. 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 underestimate the total pounds of a.i. used at the state, area or sub-area levels.

Herbicides applied but not published included the following: Chlorimuron, Fluazifop, Flumiclorac, Imazamox, Imazethapyr, Metribuzin, Quizalofop, S-metolachlor, and Trifluralin.

Insecticides applied but not published included the following: Beta-cyfluthrin, Gamma-cyhalothrin, and Zeta-cypermethrin.

Fungicides applied but not published included the following: Azoxystrobin, Mefenoxam, Propiconazole, and Trifloxystrobin.

Table 19. Pesticide applications and rates for soybean – PMA 5

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Glyphosate	94	1.4	0.8	1.1	8,068
Imazethapyr	17	1.1	0.0	0.0	58

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 2011 by survey participants in this area. 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 underestimate the total pounds of a.i. used at the state, area or sub-area levels.

Herbicides applied but not published included the following: Chlorimuron, Clethodim, Cloransulam, Glufosinate-ammonium, Quizalofop, Saflufenacil, Sulfentrazone, and Thifensulfuron.

Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, and Gamma-cyhalothrin.

Fungicides applied but not published included the following: Fluoxastrobin, Propiconazole, Pyraclostrobin, Tebuconazole, and Trifloxystrobin.

Table 20. Pesticide applications and rates for soybean – PMA 6

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
			<i>(a.i.)</i>	<i>(a.i.)</i>	<i>(a.i.)</i>
Herbicides					
Clethodim	10	1.1	0.07	0.08	499
Cloransulam	4	1.0	0.02	0.02	49
Flumioxazin	4	1.0	0.07	0.07	180
Glyphosate	95	1.8	0.92	1.62	96,877
Quizalofop	3	1.0	0.03	0.03	53
Sulfentrazone	4	1.0	0.14	0.14	337
Trifluralin	2	1.0	0.85	0.85	1,019
Insecticides					
Bifenthrin	6	1.1	0.05	0.05	197
Chlorpyrifos	27	1.0	0.44	0.44	7,474
Esfenvalerate	4	1.0	0.04	0.04	83
Gamma-cyhalothrin	6	1.0	0.01	0.01	19
Lambda-cyhalothrin	34	1.0	0.02	0.02	467
Thiamethoxam	4	1.0	0.03	0.03	77
Zeta-cypermethrin	4	1.1	0.01	0.01	26
Fungicides					
Pyraclostrobin	2	1.0	0.09	0.09	129

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 2011 by survey participants in this area. 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 underestimate the total pounds of a.i. used at the state, area or sub-area levels.

Herbicides applied but not published included the following: Acetochlor, Dimethenamid-p, Fluazifop, Fluthiacet, Fomesafen, Glufosinate-ammonium, Pendimethalin, Phenmedipham, S-metolachlor, Saflufenacil, and Thifensulfuron.

Insecticides applied but not published included the following: Beta-cyfluthrin and Imidacloprid.

Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Tetraconazole, and Trifloxystrobin.

Table 21. Pesticide applications and rates for soybean – PMA 7

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
			<i>(a.i.)</i>	<i>(a.i.)</i>	<i>(a.i.)</i>
Herbicides					
Clethodim	3	1.0	0.06	0.06	107
Cloransulam	9	1.0	0.02	0.02	103
Fluazifop	4	1.0	0.05	0.05	117
Fomesafen	2	1.0	0.23	0.23	305
Glyphosate	95	1.6	0.86	1.37	70,827
Imazethapyr	6	1.0	0.05	0.05	153
Pendimethalin	2	1.0	1.02	1.02	1,130
Sulfentrazone	9	1.0	0.17	0.17	801
Trifluralin	5	1.0	0.58	0.58	1,531
Insecticides					
Bifenthrin	9	1.0	0.07	0.07	328
Chlorpyrifos	32	1.0	0.45	0.45	7,702
Esfenvalerate	4	1.0	0.04	0.04	85
Gamma-cyhalothrin	5	1.0	0.01	0.01	14
Lambda-cyhalothrin	30	1.0	0.02	0.02	377
Fungicides					
Propiconazole	4	1.0	0.03	0.03	70
Pyraclostrobin	8	1.0	0.09	0.09	417
Trifloxystrobin	3	1.0	0.03	0.03	54

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 2011 by survey participants in this area. 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 underestimate the total pounds of a.i. used at the state, area or sub-area levels.

Herbicides applied but not published included the following: Acetochlor, Fenoxaprop, Flumiclorac, Flumioxazin, Glufosinate-ammonium, Quizalofop, S-metolachlor, Saflufenacil, and Thifensulfuron.

Insecticides applied but not published included the following: Beta-cyfluthrin, Dimethoate, Imidacloprid, Thiamethoxam, and Zeta-cypermethrin.

Fungicides applied but not published included the following: Azoxystrobin, Mefenoxam, and Tetraconazole.

Table 22. Pesticide applications and rates for soybean – PMA 8

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Acetochlor	1	1.0	0.99	0.99	1,045
Clethodim	6	1.0	0.08	0.08	907
Cloransulam	3	1.0	0.02	0.02	92
Dimethenamid-p	1	1.0	0.36	0.36	768
Fluazifop	5	1.0	0.06	0.06	609
Flumioxazin	1	1.0	0.07	0.07	84
Fluthiacet-methyl	4	1.0	0.00	0.00	24
Fomesafen	3	1.0	0.25	0.25	1,134
Glufosinate-ammonium	<1	1.1	0.38	0.42	302
Glyphosate	97	1.7	0.85	1.44	250,289
Imazethapyr	3	1.0	0.05	0.05	256
Pendimethalin	2	1.0	0.87	0.87	2,869
S-metolachlor	0	1.0	1.07	1.07	936
Saflufenacil	2	1.0	0.03	0.03	110
Sulfentrazone	2	1.0	0.14	0.14	553
Thifensulfuron	1	1.0	0.00	0.00	8
Trifluralin	5	1.0	0.63	0.63	6,143
Insecticides					
Beta-cyfluthrin	2	1.0	0.02	0.02	80
Bifenthrin	5	1.0	0.07	0.07	552
Chlorpyrifos	22	1.0	0.47	0.47	18,387
Esfenvalerate	7	1.0	0.04	0.04	421
Gamma-cyhalothrin	1	1.0	0.01	0.01	14
Imidacloprid	2	1.0	0.05	0.05	160
Lambda-cyhalothrin	37	1.0	0.02	0.02	1,651
Thiamethoxam	8	1.0	0.03	0.03	464
Zeta-cypermethrin	2	1.0	0.02	0.02	45
Fungicides					
Azoxystrobin	5	1.0	0.10	0.10	830
Propiconazole	5	1.0	0.04	0.04	311
Pyraclostrobin	16	1.0	0.09	0.09	2,544
Trifloxystrobin	4	1.0	0.03	0.03	239

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 2011 by survey participants in this area. 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 underestimate the total pounds of a.i. used at the state, area or sub-area levels.

Herbicides applied but not published included the following: 2,4-D, Chlorimuron, Flumetsulam, Flumiclorac, Imazamox, Lactofen, Metribuzin, Phenmedipham, and Quizalofop.

Insecticides applied but not published included the following: Cyfluthrin.

Fungicides applied but not published included the following: Chlorothalonil, Mefenoxam, Streptomyces lydicus wyc, Tebuconazole, and Tetraconazole.

Table 23. Pesticide applications and rates for soybean – PMA 9

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Clethodim	2	1.0	0.08	0.08	57
Fluazifop	10	1.0	0.05	0.05	205
Fomesafen	4	1.0	0.24	0.24	357
Glyphosate	94	1.7	0.82	1.39	47,882
Imazethapyr	9	1.0	0.06	0.06	196
Saflufenacil	5	1.0	0.02	0.02	43
Insecticides					
Chlorpyrifos	3	1.0	0.43	0.43	402
Esfenvalerate	3	1.0	0.04	0.04	41
Lambda-cyhalothrin	37	1.0	0.02	0.02	336
Fungicides					
Azoxystrobin	20	1.0	0.10	0.10	697
Pyraclostrobin	27	1.0	0.09	0.09	864

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 2011 by survey participants in this area. 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 underestimate the total pounds of a.i. used at the state, area or sub-area levels.

Herbicides applied but not published included the following: 2,4-D, Acetochlor, Chlorimuron, Cloransulam, Fenoxaprop, Flumioxazin, Fluthiacet, Pendimethalin, Quizalofop, S-metolachlor, Sulfentrazone, Thifensulfuron, and Trifluralin.

Insecticides applied but not published included the following: Beta-cyfluthrin, Imidacloprid, Thiamethoxam, and Zeta-cypermethrin.

Fungicides applied but not published included the following: Propiconazole.

Table 24. Pesticide applications and rates for soybean – PMA 10

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Fluthiacet-methyl	16	1.0	0.00	0.00	6
Glyphosate	99	1.4	0.84	1.15	17,933
Imazethapyr	7	1.0	0.05	0.05	56
Saflufenacil	6	1.0	0.02	0.02	16
Insecticides					
Chlorpyrifos	4	1.0	0.53	0.53	303
Lambda-cyhalothrin	15	1.0	0.02	0.02	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 2011 by survey participants in this area. 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 underestimate the total pounds of a.i. used at the state, area or sub-area levels.

Herbicides applied but not published included the following: 2,4-D, Acetochlor, Chlorimuron, Clethodim, Dimethenamid-p, Fluazifop, Fomesafen, Pendimethalin, Quizalofop, Thifensulfuron, and Trifluralin.

Insecticides applied but not published included the following: Esfenvalerate and Thiamethoxam.

Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Pyraclostrobin, Streptomyces lydicus wyec, and Trifloxystrobin.

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

Active Ingredient	Published	Active Ingredient	Published
Herbicides		Insecticides	
2,4-D	P	Beta-cyfluthrin	P
Bromoxynil	P	Chlorpyrifos	P
Carfentrazone	*	Gamma-cyhalothrin	P
Clodinafop-propargyl	*	Lambda-cyhalothrin	P
Clopyralid	P	Methyl parathion	P
Dicamba	P	Zeta-cypermethrin	*
Fenoxaprop	P	Fungicides	
Florasulam	P	Azoxystrobin	*
Flucarbazone	P	Fluoxastrobin	*
Flufenacet	*	Metconazole	P
Fluroxypyr	P	Propiconazole	P
Glyphosate	P	Prothioconazole	P
MCPA	P	Pyraclostrobin	P
Mesosulfuron-methyl	P	Tebuconazole	P
Metribuzin	*	Trifloxystrobin	P
Pinoxaden	P		
Propoxycarbazone	P		
Pyrasulfotole	P		
Pyroxsulam	P		
Sethoxydim	*		
Thifensulfuron	P		
Tribenuron	P		
Trifluralin	P		

An “*” denotes data is not publishable due to use by less than 5 respondents.

A statewide summary of wheat pesticide applications is provided in Table 26. Twelve percent (12%) of all Minnesota wheat acres were surveyed for the 2011 season. Herbicides were applied to 98% of all surveyed wheat acres. Insecticides were applied to 32% of all acres and 73% of surveyed acres received fungicides.

Table 26. Pesticide applications and rates by active ingredient (a.i.) for wheat statewide⁶

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
2,4-D	9	1.0	0.37	0.37	5,966
Bromoxynil	47	1.0	0.20	0.21	16,426
Clopyralid	30	1.0	0.08	0.08	4,010
Dicamba	<1	1.0	0.08	0.08	65
Fenoxaprop	13	1.0	0.08	0.08	1,587
Florasulam	4	1.0	0.00	0.00	14
Flucarbazone	6	1.0	0.02	0.02	225
Fluroxypyr	34	1.0	0.08	0.08	4,476
Glyphosate	2	1.0	0.65	0.65	2,688
MCPA	33	1.0	0.28	0.28	15,800
Mesosulfuron-methyl	6	1.0	0.00	0.00	22
Pinoxaden	19	1.0	0.04	0.04	1,416
Propoxycarbazone	6	1.0	0.01	0.01	89
Pyrasulfotole	26	1.0	0.03	0.03	1,398
Pyroxsulam	3	1.0	0.01	0.01	64
Thifensulfuron	15	1.0	0.01	0.01	342
Tribenuron	15	1.0	0.00	0.00	89
Trifluralin	<1	1.0	0.57	0.57	124
Insecticides					
Beta-cyfluthrin	<1	1.0	0.01	0.01	7
Chlorpyrifos	8	1.0	0.33	0.33	4,219
Gamma-cyhalothrin	1	1.0	0.01	0.01	9
Lambda-cyhalothrin	21	1.0	0.02	0.02	680
Methyl parathion	3	1.0	0.21	0.21	1,040
Fungicides					
Metconazole	9	1.0	0.07	0.07	1,103
Propiconazole	27	1.0	0.06	0.07	3,030
Prothioconazole	16	1.0	0.09	0.09	2,428
Pyraclostrobin	17	1.1	0.07	0.07	2,007
Tebuconazole	30	1.0	0.10	0.10	4,955
Trifloxystrobin	9	1.0	0.06	0.06	833

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 2011 by survey participants in this area. Data in this table and the selection of survey participants

⁶ Excludes any products with less than 5 responses.

was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or underestimate the total pounds of a.i. used at the state, area or sub-area levels.

Herbicides applied but not published included the following: Carfentrazone, Clodinafop-propargyl, Flufenacet, Metribuzin, and Sethoxydim.

Insecticides applied but not published included the following: Zeta-cypermethrin.

Fungicides applied but not published included the following: Azoxystrobin and Fluoxastrobin.

Area Pesticide Applications – Wheat

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

Table 27. Summary (by PMA) of surveyed wheat acreage to which pesticides were applied

PMA	Number of Respondents	Wheat Acres	Herbicide Acres	Insecticides Acres	Fungicide Acres
1	305	144,770	144,230	50,930	112,196
4	63	12,296	12,296	607	5,005
5	6	308	308	0	0
6	49	5,075	5,075	1,585	3,657
7	20	1,354	1,354	685	831
8	38	1,428	1,427	104	815
9	4	96	0	0	0
10	7	303	303	0	55
Totals	500	167,935	164,993	53,911	122,559

Table 28. Pesticide applications and rates for wheat – PMA 1

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
2,4-D	9	1.0	0.36	0.36	4,687
Bromoxynil	45	1.0	0.20	0.21	13,905
Clopyralid	33	1.0	0.08	0.08	3,832
Fenoxaprop	12	1.0	0.08	0.08	1,333
Florasulam	4	1.0	0.00	0.00	12
Flucarbazone	7	1.0	0.02	0.02	224
Fluroxypyr	37	1.0	0.08	0.08	4,244
Glyphosate	1	1.0	0.57	0.57	1,033
MCPA	33	1.0	0.28	0.28	13,774
Mesosulfuron-Methyl	7	1.0	0.00	0.00	22
Pinoxaden	21	1.0	0.05	0.05	1,371
Propoxycarbazone	7	1.0	0.01	0.01	89
Pyrasulfotole	25	1.0	0.03	0.03	1,169
Thifensulfuron	16	1.1	0.01	0.01	325
Tribenuron	16	1.0	0.00	0.00	85
Insecticides					
Chlorpyrifos	8	1.0	0.33	0.33	4,033
Gamma-cyhalothrin	<1	1.0	0.01	0.01	5
Lambda-cyhalothrin	23	1.1	0.02	0.02	642
Methyl Parathion	3	1.0	0.21	0.21	1,040
Fungicides					
Metconazole	10	1.0	0.07	0.07	1,031
Propiconazole	30	1.0	0.07	0.07	2,893
Prothioconazole	17	1.0	0.09	0.09	2,247
Pyraclostrobin	15	1.1	0.07	0.07	1,653
Tebuconazole	34	1.0	0.10	0.10	4,849
Trifloxystrobin	9	1.0	0.06	0.06	772

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 2011 by survey participants in this area. 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 underestimate the total pounds of a.i. used at the state, area or sub-area levels.

Herbicides applied but not published included the following: Carfentrazone, Clodinafop-propargyl, Flufenacet, Metribuzin, and Pyroxsulam.

Insecticides applied but not published included the following: Beta-cyfluthrin and Zeta-cypermethrin.

Table 29. Pesticide applications and rates for wheat – PMA 4

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
2,4-D	8	1.0	0.43	0.45	447
Bromoxynil	65	1.0	0.19	0.19	1,552
Clopyralid	15	1.0	0.09	0.09	162
Dicamba	5	1.0	0.07	0.07	40
Fenoxaprop	13	1.0	0.07	0.07	127
Fluroxypyr	17	1.0	0.09	0.09	190
Glyphosate	12	1.0	0.70	0.70	1,050
MCPA	22	1.0	0.27	0.29	813
Pyrasulfotole	44	1.0	0.03	0.03	167
Fungicides					
Pyraclostrobin	18	1.0	0.06	0.06	134

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 2011 by survey participants in this area. 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 underestimate the total pounds of a.i. used at the state, area or sub-area levels.

Herbicides applied but not published included the following: Florasulam, Flucarbazone, Pinoxaden, Pyroxsulam, Thifensulfuron, and Tribenuron.

Insecticides applied but not published included the following: Chlorpyrifos and Gamma-cyhalothrin.

Fungicides applied but not published included the following: Azoxystrobin, Fluoxastrobin, Metconazole, Propiconazole, Prothioconazole, Tebuconazole, and Trifloxystrobin

Table 30. Pesticide applications and rates for wheat – PMA 5

No data was publishable for wheat in PMA 5

Herbicides applied but not published included the following: 2,4-D, Bromoxynil, Dicamba, Fenoxaprop, Glyphosate, MCPA, and Pyrasulfotole.

Table 31. Pesticide applications and rates for wheat – PMA 6

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
2,4-D	5	1.0	0.42	0.42	252
Bromoxynil	14	1.1	0.20	0.21	749
Fenoxaprop	2	1.0	0.08	0.08	83
MCPA	16	1.0	0.26	0.26	911
Pyrasulfotole	1	1.0	0.03	0.03	48
Insecticides					
Lambda-cyhalothrin	<1	1.0	0.02	0.02	26
Fungicides					
Propiconazole	2	1.1	0.06	0.06	98
Pyraclostrobin	2	1.2	0.06	0.07	135
Trifloxystrobin	1	1.0	0.03	0.03	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 2011 by survey participants in this area. 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 underestimate the total pounds of a.i. used at the state, area or sub-area levels.

Herbicides applied but not published included the following: Dicamba, Florasulam, Fluroxypyr, Glyphosate, Pyroxsulam, Sethoxydim, and Trifluralin.

Insecticides applied but not published included the following: Beta-cyfluthrin, Chlorpyrifos, and Gamma-cyhalothrin.

Fungicides applied but not published included the following: Metconazole, Prothioconazole, and Tebuconazole.

Table 32. Pesticide applications and rates for wheat – PMA 7

Agricultural Chemical	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
2,4-D	21	1.0	0.48	0.48	142
MCPA	22	1.0	0.43	0.43	132

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 2011 by survey participants in this area. 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 underestimate the total pounds of a.i. used at the state, area or sub-area levels.

Herbicides applied but not published included the following: Bromoxynil, Clopyralid, Fenoxaprop, Fluroxypyr, Glyphosate, and Trifluralin.

Insecticides applied but not published included the following: Lambda-cyhalothrin.

Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Prothioconazole, Pyraclostrobin, and Tebuconazole.

Table 33. Pesticide applications and rates for wheat – PMA 8

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
2,4-D	41	1.0	0.50	0.50	367
Bromoxynil	33	1.0	0.21	0.21	125
Fenoxaprop	13	1.0	0.06	0.06	14
MCPA	21	1.0	0.31	0.31	115
Fungicides					
Pyraclostrobin	45	1.0	0.05	0.05	43

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 2011 by survey participants in this area. 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 underestimate the total pounds of a.i. used at the state, area or sub-area levels.

Herbicides applied but not published included the following: Clopyralid, Dicamba, Glyphosate, Pyrasulfotole, and Trifluralin.

Insecticides applied but not published included the following: Chlorpyrifos and Lambda-cyhalothrin.

Fungicides applied but not published included the following: Fluoxastrobin, Prothioconazole, and Tebuconazole.

Table 34. Pesticide applications and rates for wheat – PMA 9

No data was publishable for wheat in Area 9

Table 35. Pesticide applications and rates for wheat – PMA 10

No data was publishable for wheat in Area 10
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Herbicides applied but not published included the following: 2,4-D, Azoxystrobin, Bromoxynil, Glyphosate, and MCPA.

Fungicides applied but not published included the following: Pyraclostrobin and Pyrasulfotole.

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

Active Ingredient	Published
Herbicides	
2,4-D	P
Aminopyralid	*
Clopyralid	*
Dicamba	*
Glyphosate	P
Imazamox	P
Metribuzin	*
Propionic acid	*
Sethoxydim	*
Insecticides	
Beta-cyfluthrin	*
Bifenthrin	*
Chlorpyrifos	P
Dimethoate	*
Gamma-cyhalothrin	P
Lambda-cyhalothrin	P
Thiamethoxam	*
Zeta-Cypermethrin	P

An “*” denotes data is not publishable due to use by less than 5 respondents.

A statewide summary of hay pesticide applications is provided in Table 37. Ten percent (10%) of all Minnesota hay acres were surveyed for the 2009 season. Herbicides were applied to 1% of all surveyed hay acres. Insecticides were applied to 9% of all acres and no surveyed acres were recorded as being applied with fungicides.

Table 37. Pesticide applications and rates by active ingredient (a.i.) for hay statewide⁷.

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
2,4-D	<1	1.0	0.88	0.88	197
Glyphosate	<1	1.0	0.74	0.74	183
Imazamox	1	1.0	0.04	0.04	43
Insecticides					
Chlorpyrifos	3	1.0	0.46	0.47	1,694
Gamma-cyhalothrin	<1	1.1	0.01	0.01	5
Lambda-cyhalothrin	5	1.3	0.02	0.03	194
Zeta-cypermethrin	1	1.8	0.01	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 2011 by survey participants in this area. 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, area or sub-area levels.

Herbicides applied but not published included the following: Aminopyralid, Clopyralid, Dicamba, Metribuzin, Propionic acid, and Sethoxydim.

Insecticides applied but not published included the following: Bifenthrin, Dimethoate, and Thiamethoxam.

⁷ Excludes any products with less than 5 responses.

Area Pesticide Applications – Hay

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

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

PMA	Number of Respondents	Hay Acres	Herbicide Acres	Insecticide Acres	Fungicide Acres
1	221	27,668	58	416	0
4	534	43,883	308	3,530	0
5	244	18,464	131	0	0
6	59	6,801	550	4,156	0
7	91	4,011	100	656	0
8	294	9,854	117	958	0
9	231	15,079	431	2,344	0
10	156	7,965	0	395	0
Totals	1,830	133,725	1,695	12,455	0

Table 39. Pesticide applications and rates for hay – PMA 1

No data is publishable for hay in Area 1.

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

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

Table 40. Pesticide applications and rates for hay – PMA 4

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year ¹
		<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Herbicide					
2,4-D	1	1.0	1.11	1.11	67
Insecticide					
Chlorpyrifos	42	1.0	0.50	0.52	1,015
Lambda-cyhalothrin	26	1.0	0.03	0.03	30

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 2011 by survey participants in this area. 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, area or sub-area levels.

Herbicides applied but not published included the following: Aminopyralid, Clopyralid, Glyphosate, Imazamox, and Metribuzin.

Insecticides applied but not published included the following: Bifenthrin, Dimethoate, Gamma-cyhalothrin, and Zeta-cypermethrin.

Table 41. Pesticide applications and rates for hay – PMA 5

No data is publishable for hay in Area 5.

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

Table 42. Pesticide applications and rates for hay – PMA 6

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year¹
		<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Insecticide					
Lambda-cyhalothrin	36	1.7	0.02	0.04	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 2011 by survey participants in this area. 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, area or sub-area levels.

Herbicides applied but not published included the following: Imazamox.

Insecticides applied but not published included the following: Beta-cyfluthrin, Bifenthrin, Chlorpyrifos, and Zeta-cypermethrin.

Table 43. Pesticide applications and rates for hay – PMA 7

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Insecticides					
Chlorpyrifos	9	1.0	0.51	0.51	196

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 2011 by survey participants in this area. 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, area or sub-area levels.

Herbicides applied but not published included the following: 2,4-D, Aminopyralid, Dicamba, and Propionic acid.

Insecticides applied but not published included the following: Gamma-cyhalothrin and Lambda-cyhalothrin.

Table 44. Pesticide applications and rates for hay – PMA 8

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Insecticides			<i>(a.i.)</i>	<i>(a.i.)</i>	<i>(a.i.)</i>
Chlorpyrifos	4	1.2	0.31	0.36	135
Lambda-cyhalothrin	8	1.1	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 2011 by survey participants in this area. 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, area or sub-area levels.

Herbicides applied but not published included the following: 2,4-D, Dicamba, Glyphosate, Metribuzin, and Sethoxydim.

Table 45. Pesticide applications and rates for hay – PMA 9

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Insecticides					
Lambda-Cyhalothrin	10	1.1	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 2011 by survey participants in this area. 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, area or sub-area levels.

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

Insecticides applied but not published included the following: Beta-cyfluthrin, Bifenthrin, Chlorpyrifos, Gamma-cyhalothrin, Thiamethoxam, and Zeta-cypermethrin.

Table 46. Pesticide applications and rates for hay – PMA 10

No data is publishable for hay in Area 10.

Insecticides applied but not published included the following: Chlorpyrifos and Lambda-cyhalothrin.

County Pesticide Applications

Tables 47 through 122 detail the percent of total surveyed acres receiving herbicides, insecticides and fungicides and the corresponding rates⁸.

PMA 1 County Data

Clay County

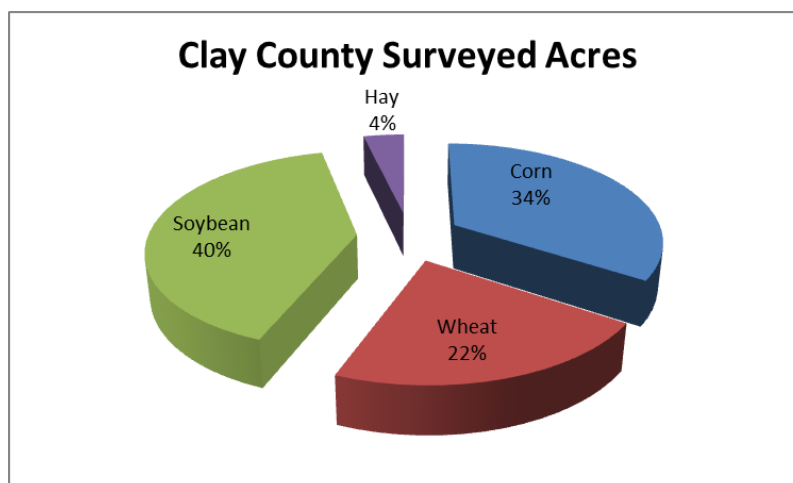


Table 47. Clay County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Herbicides			<i>(a.i.)</i>	<i>(a.i.)</i>	<i>(a.i.)</i>
2,4-D	4	1.0	0.40	0.40	829
Bromoxynil	13	1.0	0.17	0.17	1,232
Clopyralid	10	1.0	0.08	0.08	422
Fenoxaprop	5	1.0	0.08	0.08	205
Fluroxypyr	9	1.0	0.08	0.08	396
Glyphosate	73	1.4	0.83	1.17	47,629
MCPA	7	1.0	0.30	0.30	1,103
Pyrasulfotole	11	1.0	0.03	0.03	183
Insecticides					
Chlorpyrifos	13	1.0	0.30	0.30	2,148
Lambda-cyhalothrin	31	1.2	0.02	0.02	428

⁸ Excludes any products with less than 5 responses.

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Fungicides					
Propiconazole	7	1.0	0.04	0.05	187
Pyraclostrobin	23	1.1	0.09	0.10	1,286
Tebuconazole	7	1.0	0.10	0.10	361
Trifloxystrobin	4	1.0	0.03	0.03	70

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Acetochlor, Atrazine, Carfentrazone, Clethodim, Dicamba, Diflufenzopyr, Florasulam, Flucarbazone, Flumetsulam, Fluthiacet-methyl, Fomesafen, Imazamox, Imazethapyr, Mesotrione, Nicosulfuron, Pendimethalin, Pinoxaden, Pyroxsulam, Rimsulfuron, S-metolachlor, Tembotrione, and Thifensulfuron.

Insecticides applied but not published included the following: Esfenvalerate and Gamma-cyhalothrin.

Fungicides applied but not published included the following: Prothioconazole.

Grant County

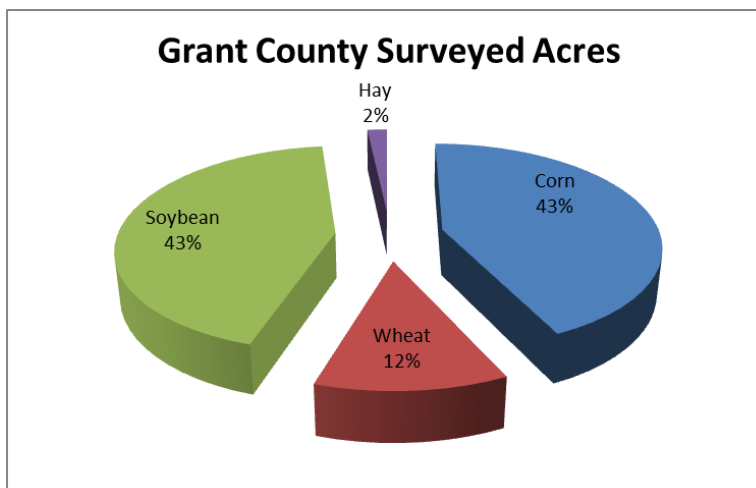


Table 48. Grant County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per 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	0.30	0.30	622
Acetochlor	8	1.0	0.93	0.93	2,867
Bromoxynil	5	1.0	0.25	0.25	501
Glyphosate	79	1.4	0.88	1.25	36,924
MCPA	6	1.0	0.25	0.25	538
Mesotrione	3	1.0	0.07	0.07	89
Insecticides					
Chlorpyrifos	13	1.1	0.33	0.35	1,775
Esfenvalerate	5	1.0	0.02	0.02	47
Lambda-cyhalothrin	23	1.0	0.02	0.02	197
Fungicides					
Pyraclostrobin	2	1.0	0.12	0.12	78

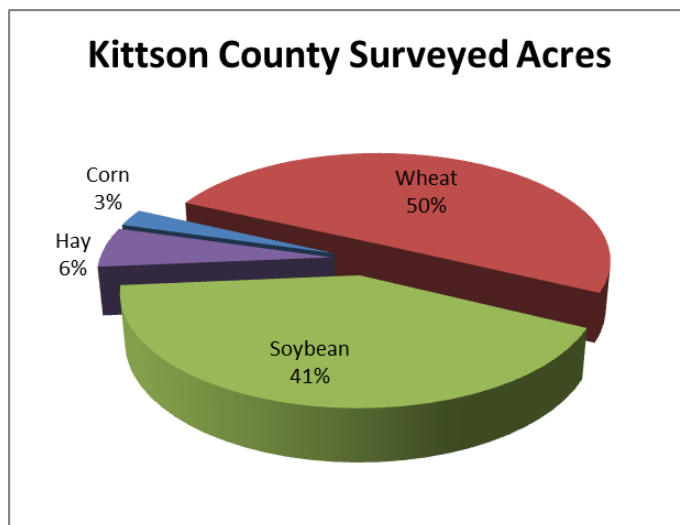
¹ Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2011 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Atrazine, Bentazon, Clethodim, Clodinafop-propargyl, Clopyralid, Dicamba, Diflufenzopyr, Florasulam, Fluazifop, Flumetsulam, Fluroxypyr, Fluthiacet-methyl, Fomesafen, Imazethapyr, Nicosulfuron, Pendimethalin, Pyrasulfotole, Rimsulfuron, S-metolachlor, and Tembotrione.

Insecticides applied but not published included the following: Bifenthrin, Gamma-cyhalothrin, and Zeta-cypermethrin.

Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Prothioconazole, and Tebuconazole.

Kittson County

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Bromoxynil	5	1.1	0.16	0.18	532
Clopyralid	36	1.0	0.08	0.08	1,694
Flucarbazone	5	1.0	0.02	0.02	66
Fluroxypyr	36	1.0	0.08	0.08	1,694
Glyphosate	44	1.7	0.78	1.33	34,996
MCPA	10	1.0	0.30	0.30	1,756
Mesosulfuron-methyl	13	1.0	0.00	0.00	18
Pinoxaden	17	1.0	0.05	0.05	489
Propoxycarbazone	13	1.0	0.01	0.01	71
Pyrasulfotole	5	1.0	0.03	0.03	81
Thifensulfuron	16	1.0	0.01	0.01	126
Tribenuron	16	1.0	0.00	0.00	32
Insecticides					
Chlorpyrifos	15	1.0	0.43	0.43	3,872
Lambda-cyhalothrin	22	1.0	0.02	0.02	254
Fungicides					
Propiconazole	9	1.0	0.08	0.08	435
Prothioconazole	14	1.0	0.09	0.09	744
Tebuconazole	29	1.0	0.10	0.10	1,796

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Acetochlor, Atrazine, Clodinafop-propargyl, Dicamba, Diflufenzopyr, and Imazethapyr.

Insecticides applied but not published included the following: Beta-cyfluthrin, Imidacloprid, Methyl parathion, and Thiamethoxam.

Fungicides applied but not published included the following: Azoxystrobin, Metconazole, Pyraclostrobin, Tetraconazole, and Trifloxystrobin.

Mahnomens County

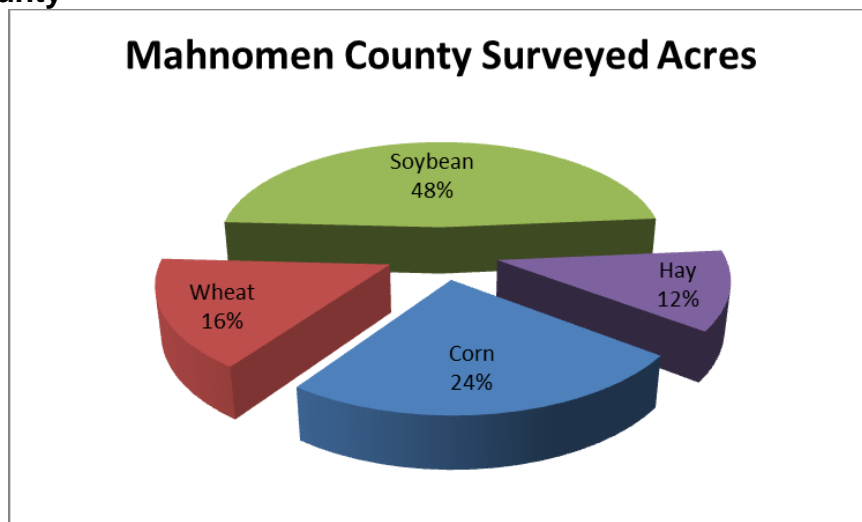


Table 50. Mahnomens County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds
Herbicides					
Acetochlor	5	1.0	0.77	0.77	741
Bromoxynil	10	1.0	0.23	0.24	475
Clopyralid	11	1.0	0.08	0.08	165
Fenoxaprop	4	1.0	0.08	0.08	61
Flumetsulam	5	1.0	0.02	0.02	24
Fluroxypyr	6	1.0	0.09	0.09	112
Glyphosate	69	1.6	0.82	1.32	17,842
MCPA	9	1.0	0.33	0.33	585
Pyrasulfotole	4	1.1	0.03	0.04	29
Insecticides					
Chlorpyrifos	16	1.4	0.30	0.43	1,369
Gamma-cyhalothrin	10	1.5	0.01	0.01	16
Lambda-cyhalothrin	18	1.1	0.02	0.02	84
Fungicides					
Propiconazole	7	1.0	0.04	0.04	55
Pyraclostrobin	15	1.0	0.09	0.09	271
Tebuconazole	4	1.0	0.09	0.09	71
Trifloxystrobin	5	1.0	0.03	0.03	33

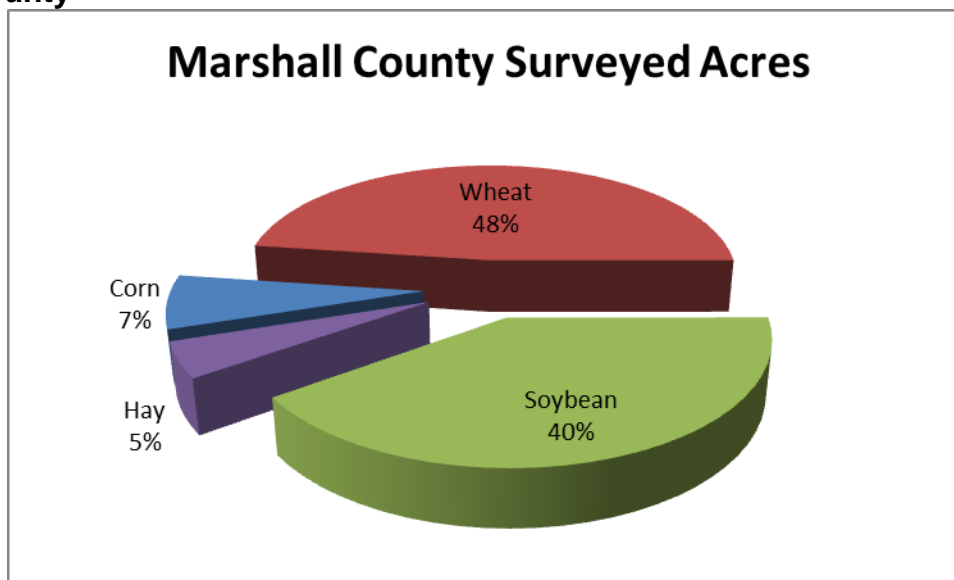
¹ Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2011 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Clethodim, Dicamba, Diflufenzopyr, Dimethenamid-p, Florasulam, Flucarbazone, Flumiclorac, Imazamox, Imazethapyr, Mesotrione, Pinoxaden, Pyroxsulam, Thifensulfuron, and Tribenuron.

Insecticides applied but not published included the following: Beta-cyfluthrin, Bifenthrin, Cyfluthrin, Esfenvalerate, Methyl parathion, Phostebupirim, Tefluthrin, and Zeta-cypermethrin.

Fungicides applied but not published included the following: Prothioconazole.

Marshall County

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Bromoxynil	24	1.2	0.18	0.21	2,418
Clopyralid	20	1.0	0.08	0.08	779
Flucarbazone	9	1.0	0.02	0.02	95
Fluroxypyr	20	1.0	0.08	0.08	756
Glyphosate	47	1.8	0.91	1.62	36,697
MCPA	8	1.0	0.28	0.28	1,052
Pinoxaden	16	1.0	0.05	0.05	378
Pyrasulfotole	18	1.2	0.03	0.04	320
Insecticides					
Chlorpyrifos	15	1.0	0.28	0.28	1,987
Lambda-cyhalothrin	30	1.0	0.02	0.02	285
Fungicides					
Propiconazole	12	1.0	0.06	0.06	321
Prothioconazole	10	1.0	0.08	0.08	401
Pyraclostrobin	16	1.0	0.07	0.07	549
Tebuconazole	16	1.0	0.10	0.10	752

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-d, Acetochlor, Dicamba, Diflufenzopyr, Ethalfluralin, Fenoxaprop, Flufenacet, Flumetsulam, Mesosulfuron-methyl, Metribuzin, Propoxycarbazone, Saflufenacil, Thifensulfuron, and Tribenuron.

Insecticides applied but not published included the following: Gamma-cyhalothrin and

Methyl parathion.

Fungicides applied but not published included the following: Metconazole and Trifloxystrobin.

Norman County

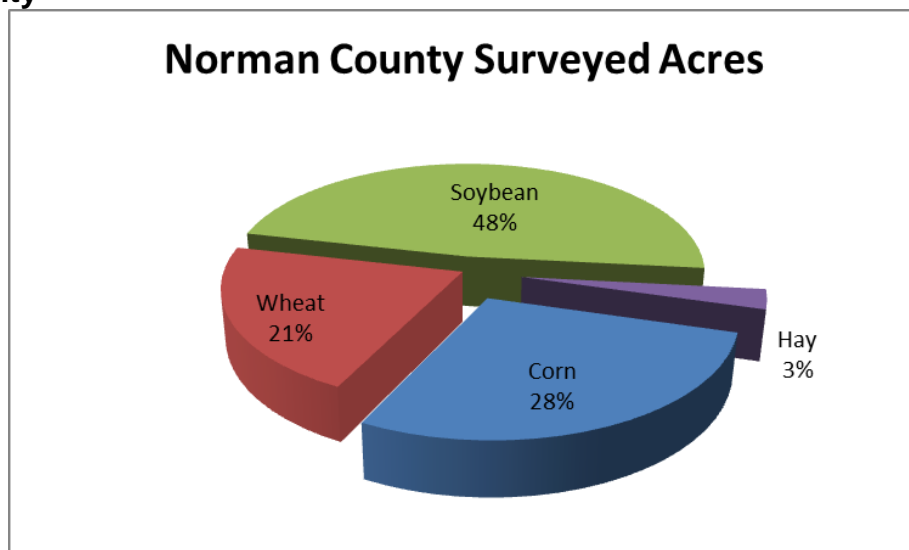


Table 52. Norman County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Bromoxynil	12	1.0	0.22	0.22	1,475
Clopyralid	8	1.0	0.06	0.06	295
Fluroxypyr	7	1.0	0.06	0.06	263
Glyphosate	72	1.6	0.85	1.34	52,923
MCPA	7	1.0	0.27	0.27	1,067
Pinoxaden	5	1.0	0.05	0.05	139
Pyrasulfotole	6	1.0	0.03	0.03	99
Insecticide					
Chlorpyrifos	14	1.0	0.38	0.40	2,997
Lambda-cyhalothrin	29	1.0	0.02	0.02	363
Fungicide					
Propiconazole	9	1.0	0.05	0.05	272
Pyraclostrobin	12	1.0	0.08	0.08	499
Tebuconazole	5	1.0	0.10	0.10	281
Trifloxystrobin	4	1.0	0.05	0.05	91

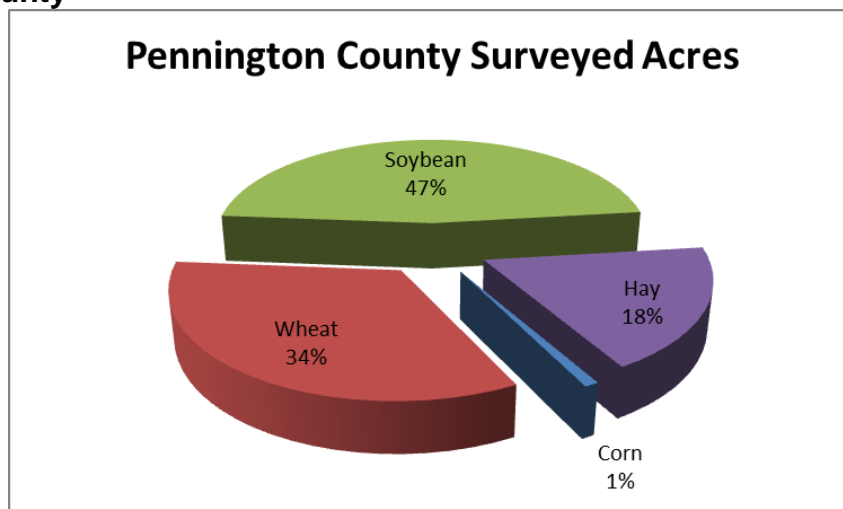
¹ Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2011 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Acetochlor, Atrazine, Bromoxynil, Clopyralid, Dicamba, Diflufenzopyr, Dimethenamid-p, Fenoxaprop, Flucarbazone, Flumetsulam, Foramsulfuron, Glyphosate, Imazamox, MCPA, Quizalofop, Saflufenacil, Thifensulfuron, and Tribenuron.

Insecticides applied but not published included the following: Gamma-cyhalothrin.

Fungicides applied but not published included the following: Metconazole and Propiconazole.

Pennington County

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Bromoxynil	17	1.0	0.20	0.21	991
Fenoxaprop	6	1.0	0.07	0.07	120
Glyphosate	49	1.7	0.79	1.31	18,190
MCPA	18	1.0	0.28	0.28	1,451
Pyrasulfotole	7	1.0	0.03	0.03	63
Thifensulfuron	11	1.0	0.01	0.01	46
Tribenuron	11	1.0	0.00	0.00	11
Insecticides					
Chlorpyrifos	29	1.0	0.34	0.34	2,812
Lambda-cyhalothrin	15	1.0	0.02	0.02	93
Fungicides					
Propiconazole	22	1.0	0.06	0.07	406
Tebuconazole	13	1.0	0.10	0.10	381
Trifloxystrobin	11	1.0	0.07	0.07	206

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Clopyralid, Flucarbazone, Fluroxypyr, and Pinoxaden.

Insecticides applied but not published included the following: Beta-cyfluthrin, Bifenthrin, Imidacloprid, and Zeta-cypermethrin.

Fungicides applied but not published included the following: Propiconazole and Pyraclostrobin.

Polk County

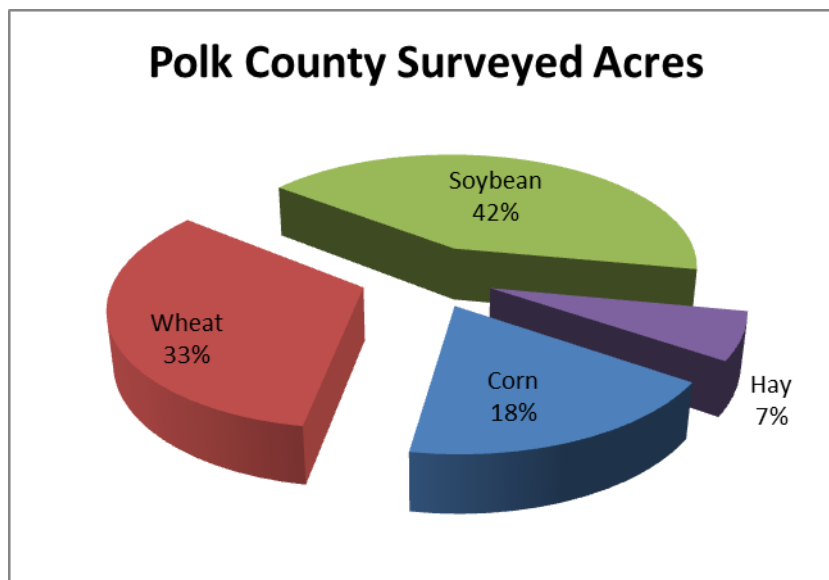


Table 54. Polk County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Bromoxynil	15	1.0	0.20	0.20	1,181
Clopyralid	19	1.0	0.08	0.08	616
Fluroxypyr	18	1.0	0.08	0.08	591
Glyphosate	61	1.4	0.79	1.08	25,478
MCPA	6	1.0	0.23	0.23	520
Pinoxaden	4	1.0	0.02	0.02	38
Pyrasulfotole	7	1.0	0.03	0.03	88
Insecticides					
Chlorpyrifos	6	1.0	0.36	0.36	824
Lambda-cyhalothrin	30	1.0	0.02	0.02	259
Fungicides					
Propiconazole	12	1.0	0.05	0.05	235
Prothioconazole	10	1.0	0.12	0.12	484
Pyraclostrobin	9	1.0	0.10	0.10	346
Tebuconazole	10	1.0	0.05	0.05	201

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2, 4-D, Acetochlor, Fenoxaprop, Flucarbazone, Flumetsulam, Fomesafen, Nicosulfuron, Thifensulfuron, and Tribenuron.

Insecticides applied but not published included the following: Beta-cyfluthrin, Bifenthrin, and Methyl parathion.

Fungicides applied but not published included the following: Prothioconazole.

Red Lake County

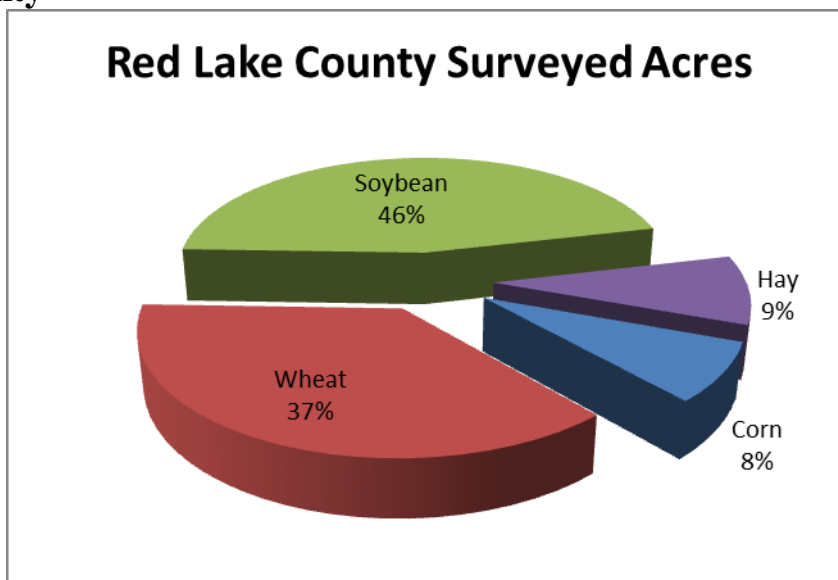


Table 55. Red Lake County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Bromoxynil	27	1.0	0.22	0.22	1,679
Fenoxaprop	7	1.0	0.07	0.07	142
Glyphosate	47	1.8	0.85	1.49	19,976
MCPA	12	1.0	0.39	0.39	1,364
Pyrasulfotole	17	1.0	0.03	0.03	130
Insecticides					
Bifenthrin	6	1.0	0.08	0.08	143
Chlorpyrifos	9	1.0	0.41	0.41	1,098
Lambda-cyhalothrin	16	1.0	0.02	0.02	111
Fungicides					
Propiconazole	22	1.0	0.06	0.06	369
Pyraclostrobin	14	1.0	0.07	0.07	272
Tebuconazole	10	1.0	0.09	0.09	272
Trifloxystrobin	16	1.0	0.06	0.06	260

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2, 4-D, Acetochlor, Chlorimuron, Clopyralid, Cloransulam, Flucarbazone, Flumetsulam, Fluroxypyr, Imazethapyr, Pinoxaden, Tembotrione, Thifensulfuron, and Tribenuron.

Insecticides applied but not published included the following: Esfenvalerate and Zeta-cypermethrin.

Fungicides applied but not published included the following: Prothioconazole.

Roseau County

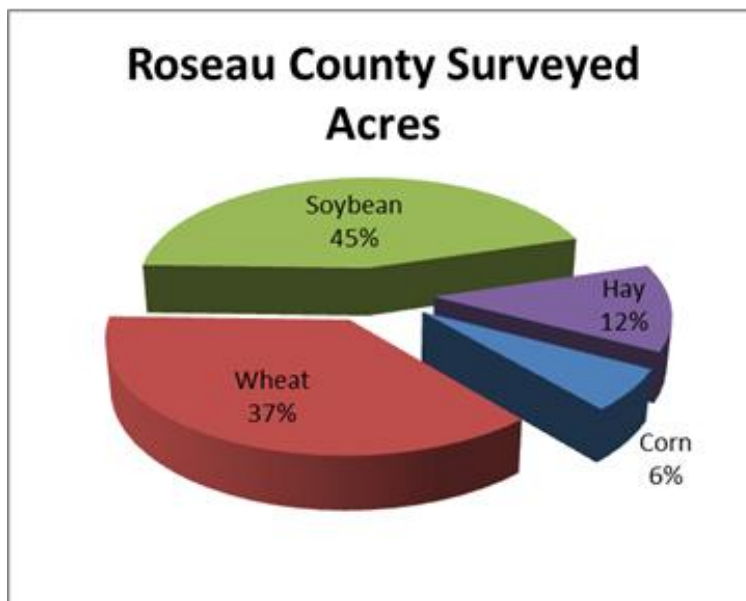


Table 56. Roseau County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Bromoxynil	9	1.0	0.22	0.22	651
Fenoxaprop	5	1.0	0.07	0.07	131
Glyphosate	48	1.3	0.82	1.06	17,551
MCPA	16	1.0	0.28	0.28	1,549
Thifensulfuron	21	1.0	0.02	0.02	118
Tribenuron	21	1.0	0.00	0.00	30
Insecticides					
Bifenthrin	5	1.3	0.06	0.08	143
Chlorpyrifos	8	1.0	0.23	0.23	650
Lambda-cyhalothrin	48	1.0	0.02	0.02	321
Fungicides					
Propiconazole	14	1.0	0.07	0.07	335
Prothioconazole	9	1.0	0.09	0.09	286
Pyraclostrobin	4	1.3	0.05	0.07	82
Tebuconazole	15	1.0	0.10	0.10	516

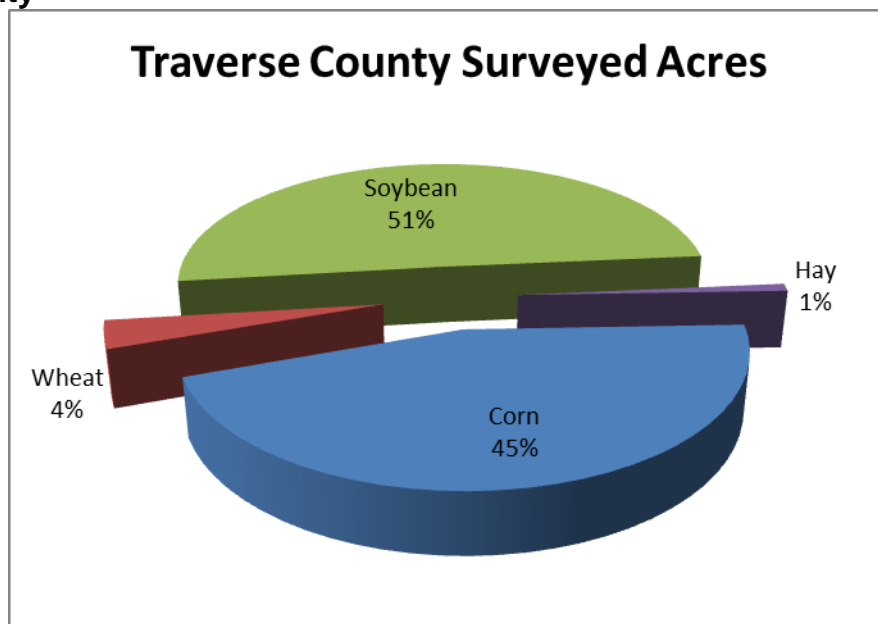
¹ Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2011 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Acetochlor, Bentazon, Clopyralid, Florasulam, Flucarbazone, Flumetsulam, Fluroxypyr, Mesosulfuron-methyl, Metribuzin, Pinoxaden, Propoxycarbazone, Pyrasulfotole, Pyroxsulam, and S-metolachlor.

Insecticides applied but not published included the following: Deltamethrin and Methyl-parathion.

Fungicides applied but not published included the following: Azoxystrobin and Metconazole.

Traverse County

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Acetochlor	8	1.0	0.98	0.98	4,393
Bromoxynil	3	1.0	0.22	0.22	394
Clopyralid	5	1.0	0.06	0.06	165
Flumetsulam	5	1.0	0.02	0.02	68
Glyphosate	89	1.4	0.84	1.21	62,343
MCPA	2	1.0	0.25	0.25	344
Mesotrione	7	1.0	0.10	0.10	427
Pyrasulfotole	1	1.0	0.04	0.04	22
Insecticides					
Chlorpyrifos	2	1.0	0.52	0.52	461
Gamma-cyhalothrin	2	1.0	0.01	0.01	14
Lambda-cyhalothrin	24	1.1	0.02	0.02	332
Fungicides					
Pyraclostrobin	5	1.0	0.06	0.06	176

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Bentazon, Clethodim, Cloransulam, Dicamba, Diflufenzopyr, Dimethenamid-p, Fenoxaprop, Fluazifop, Fluthiacet-methyl, Fomesafen, Foramsulfuron, Glufosinate-ammonium, Metribuzin, S-metolachlor, Saflufenacil, Tembotrione, and Thifensulfuron.

Insecticides applied but not published included the following: Bifenthrin, Cyfluthrin, Dimethoate, and Phostebupirim.

Fungicides applied but not published included the following: Propiconazole, Prothioconazole, Tebuconazole, and Tetraconazole.

Wilkin County

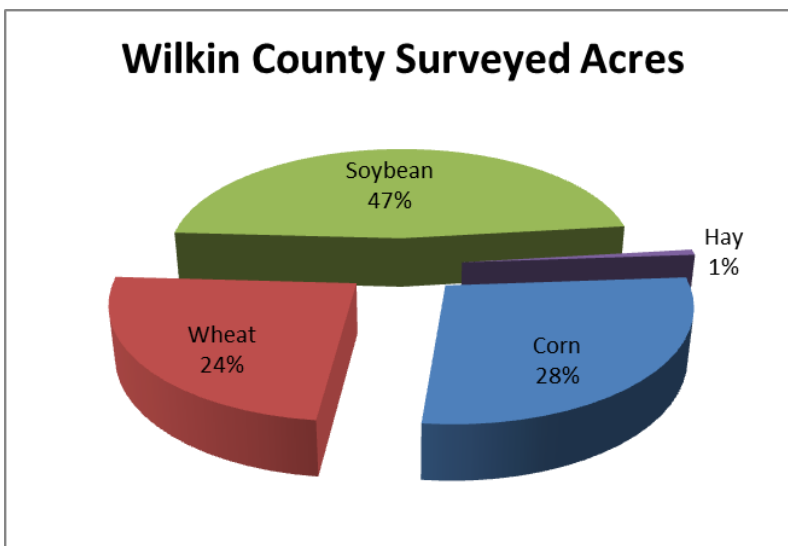


Table 58. Wilkin County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Bromoxynil	19	1.0	0.23	0.23	2,376
Dicamba	5	1.0	0.08	0.08	223
Diflufenzopyr	5	1.0	0.03	0.03	89
Fenoxaprop	5	1.0	0.08	0.08	242
Glyphosate	68	1.4	0.80	1.16	43,943
MCPA	17	1.0	0.25	0.25	2,444
Pyrasulfotole	6	1.0	0.03	0.03	115
Insecticides					
Chlorpyrifos	4	1.0	0.38	0.38	797
Lambda-cyhalothrin	14	1.0	0.02	0.02	182
Fungicides					
Propiconazole	8	1.0	0.08	0.08	361
Pyraclostrobin	7	1.0	0.08	0.09	346

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Acetochlor, Clethodim, Clopyralid, Dimethenamid-p, Ethalfluralin, Flumioxazin, Fluroxypyr, Fomesafen, Glufosinate-ammonium, Imazamox, Mesotrione, Pinoxaden, S-metolachlor, Saflufenacil, Tembotrione, and Thifensulfuron.

Insecticides applied but not published included the following: Esfenvalerate and Gamma-cyhalothrin.

Fungicides applied but not published included the following: Metconazole, Prothioconazole, Tebuconazole, Tetraconazole, and Trifloxystrobin.

PMA 4 County Data

Becker County

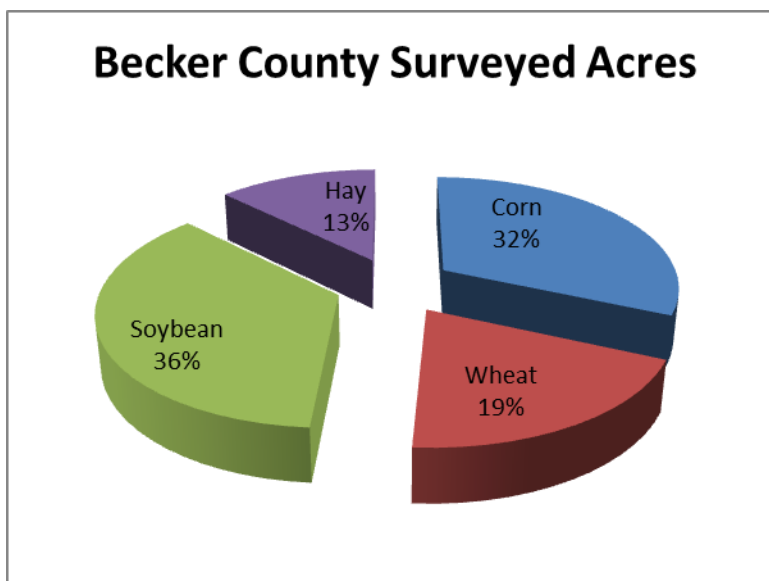


Table 59. Becker County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Bromoxynil	18	1.0	0.18	0.18	1,034
Glyphosate	66	1.4	0.74	1.07	22,801
Insecticides					
Chlorpyrifos	15	1.0	0.36	0.37	1,763
Lambda-cyhalothrin	22	1.0	0.02	0.02	169
Fungicides					
Pyraclostrobin	5	1.0	0.08	0.08	139

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Acetochlor, Aminopyralid, Clopyralid, Dicamba, Diflufenzopyr, Dimethenamid-p, Fenoxaprop, Florasulam, Flumetsulam, Flumioxazin, Fluroxypyr, Foramsulfuron, MCPA, Mesotrione, Pinoxaden, Pyrasulfotole, Pyroxsulam, and S-metolachlor.

Insecticides applied but not published included the following: Esfenvalerate and Gamma-cyhalothrin.

Fungicides applied but not published included the following: Azoxystrobin, Metconazole, Propiconazole, Prothioconazole, Tebuconazole, Tetraconazole, and Trifloxystrobin.

Benton County

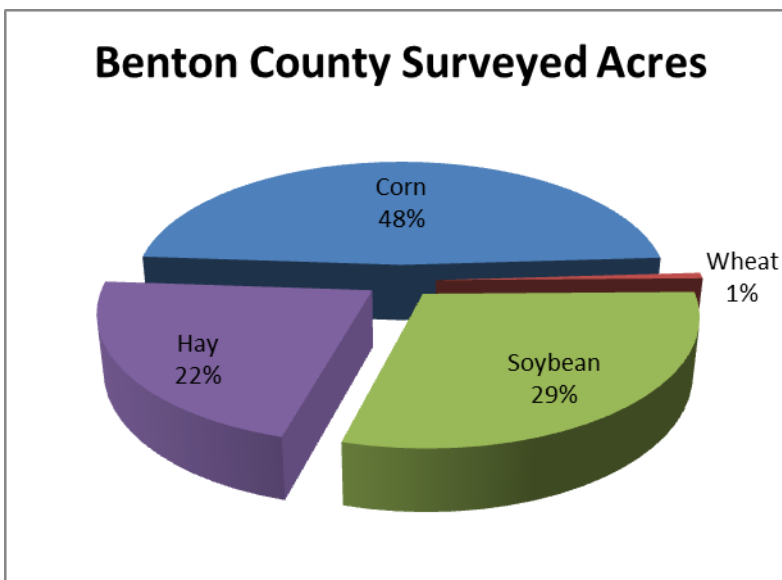


Table 60. Benton County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Acetochlor	33	1.0	0.96	1.00	3,668
Atrazine	4	1.0	0.77	0.77	362
Clopyralid	29	1.0	0.07	0.07	223
Flumetsulam	29	1.0	0.03	0.03	92
Glyphosate	74	1.1	0.92	0.99	8,235

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Bromoxynil, Chlorimuron, Clethodim, Dicamba, Diflufenopyr, Dimethenamid-p, Flumioxazin, Fomesafen, Imazamox, Imazethapyr, MCPA, Nicosulfuron, Pendimethalin, Rimsulfuron, S-metolachlor, and Thifensulfuron.

Insecticides applied but not published included the following: Lambda-cyhalothrin.

Fungicides applied but not published included the following: Pyraclostrobin.

Cass County

No data is publishable for Cass County.

Herbicides applied but not published included the following: Clopyralid, Dicamba, Flumetsulam, Glyphosate, Nicosulfuron, and Rimsulfuron.

Insecticides applied but not published included the following: Esfenvalerate.

Crow Wing County

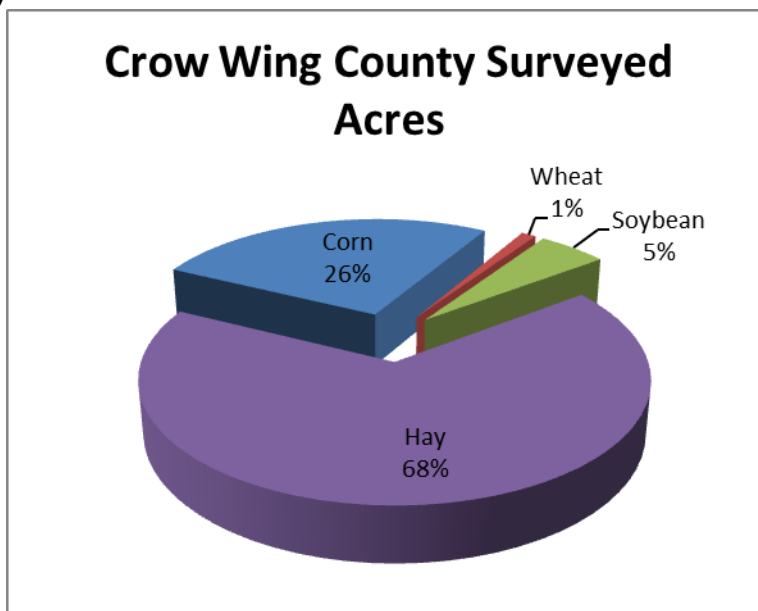


Table 61. Crow Wing County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Herbicides			<i>(a.i.)</i>	<i>(a.i.)</i>	<i>(a.i.)</i>
Glyphosate	31	1.4	0.87	1.19	2,669

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2, 4-D, Acetochlor, Bromoxynil, Clopyralid, Dicamba, Diflufenzopyr, Fenoxaprop, Flumetsulam, Glufosinate-ammonium, Mesotrione, Metribuzin, Nicosulfuron, Pyrasulfotole, and S-metolachlor.

Insecticides applied but not published included the following: Chlorpyrifos and Lambda-cyhalothrin.

Fungicides applied but not published included the following: Pyraclostrobin.

Douglas County

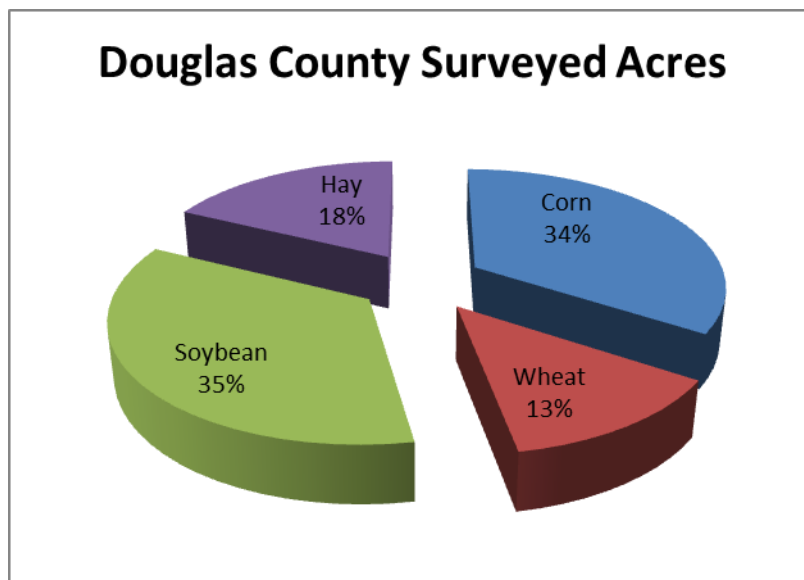


Table 62. Douglas County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Bromoxynil	5	1.0	0.24	0.24	112
Dicamba	12	1.0	0.11	0.11	107
Glyphosate	65	1.2	1.02	1.18	6,625
MCPA	8	1.2	0.31	0.38	247
Insecticides					
Lambda-Cyhalothrin	12	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 2011 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, area or county levels.

Herbicides applied but not published included the following: Acetochlor, Clethodim, Clopyralid, Diflufenzopyr, Fenoxaprop, Flucarbazone, Flumetsulam, Flumioxazin, Mesotrione, Primisulfuron, Pyrasulfotole, S-metolachlor, Tembotrione, and Thifensulfuron.

Insecticides applied but not published included the following: Chlorpyrifos and Zeta-cypermethrin.

Fungicides applied but not published included the following: Fluoxastrobin, Prothioconazole, and Tebuconazole.

Hubbard County

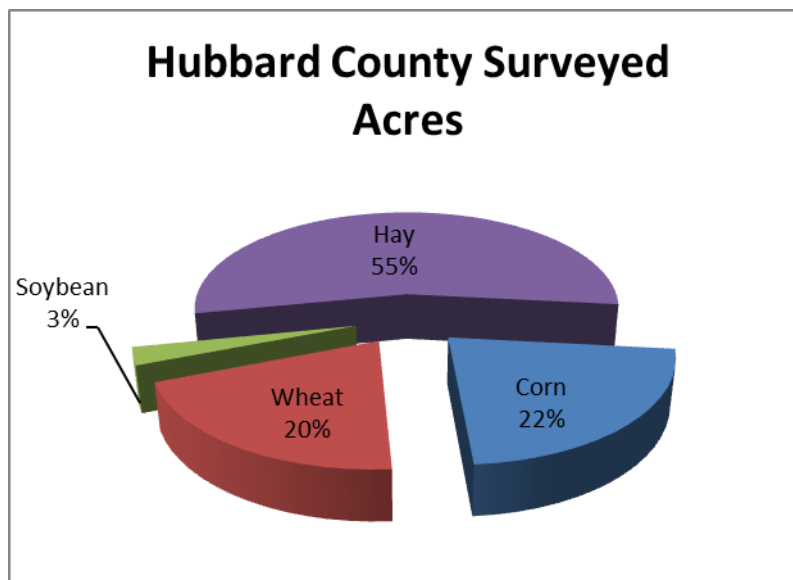


Table 63. Hubbard County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Herbicides			<i>(a.i.)</i>	<i>(a.i.)</i>	<i>(a.i.)</i>
Glyphosate	23	1.2	0.77	0.89	1,388

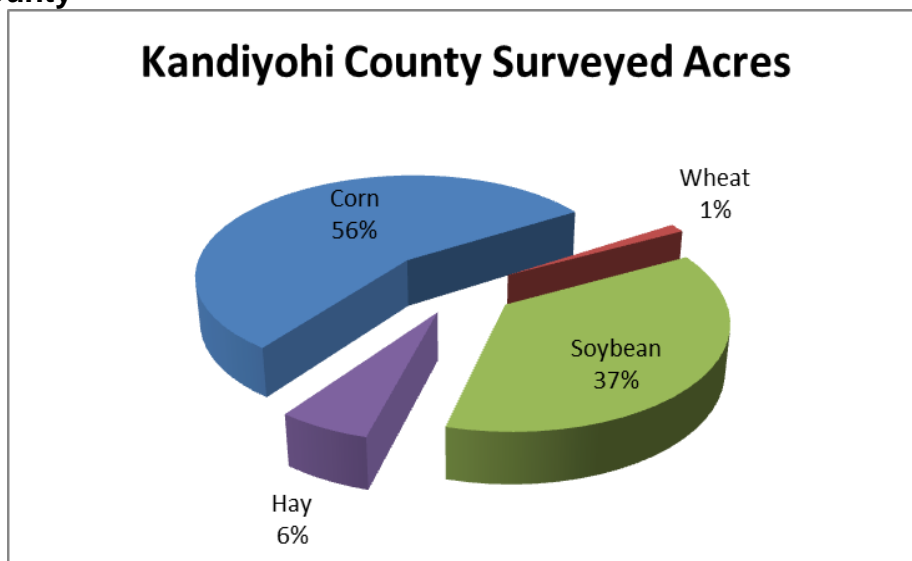
¹ Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2011 by survey participants in this county. Data in this table and the selection of survey participants was not statistically “weighted” in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Atrazine, Bromoxynil, Dicamba, Fenoxaprop, Foramsulfuron, Pinoxaden, Primisulfuron, Pyrasulfotole, Thifensulfuron, and Tribenuron.

Insecticides applied but not published included the following: Lambda-cyhalothrin and Thiamethoxam.

Fungicides applied but not published included the following: Pyraclostrobin.

Kandiyohi County

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Acetochlor	25	1.0	0.94	0.94	4,546
Clopyralid	20	1.0	0.07	0.07	249
Dicamba	9	1.0	0.10	0.10	178
Diflufenzopyr	7	1.0	0.04	0.04	46
Flumetsulam	20	1.0	0.03	0.03	103
Glyphosate	88	1.6	0.86	1.36	22,838
Insecticides					
Chlorpyrifos	10	1.0	0.51	0.53	1,045
Esfenvalerate	8	1.0	0.05	0.05	67
Lambda-cyhalothrin	7	1.0	0.02	0.02	26
Fungicides					
Pyraclostrobin	11	1.0	0.10	0.10	199

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Bromoxynil, Clethodim, Dimethenamid-p, Flumiclorac, Fluthiacet-methyl, Fomesafen, MCPA, Mesotrione, Quizalofop, and Thifensulfuron.

Insecticides applied but not published included the following: Bifenthrin and Esfenvalerate.

Fungicides applied but not published included the following: Propiconazole and Trifloxystrobin.

Morrison County

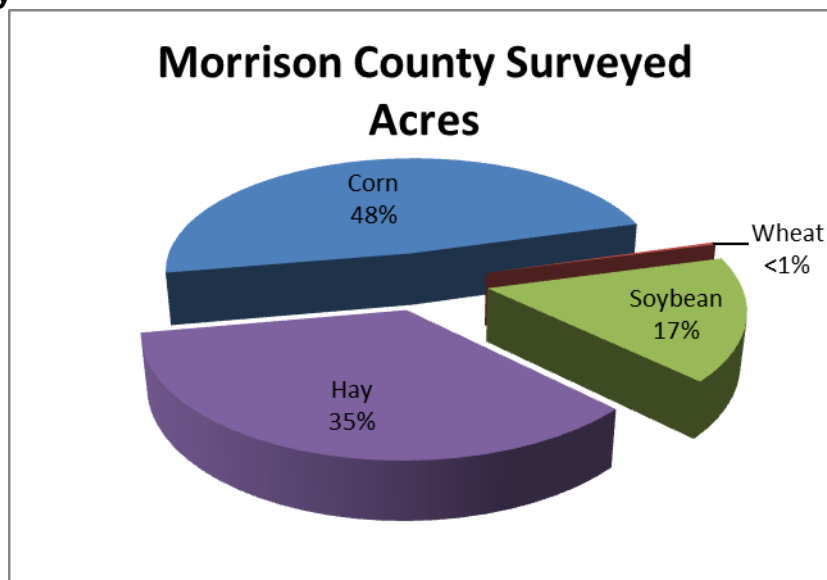


Table 65. Morrison County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Acetochlor	9	1.1	0.75	0.79	743
Clopyralid	8	1.0	0.06	0.06	53
Flumetsulam	8	1.0	0.02	0.02	22
Glyphosate	48	1.2	0.85	1.03	5,454
Mesotrione	28	1.0	0.12	0.12	377
S-metolachlor	27	1.0	1.23	1.23	3,581
Insecticides					
Chlorpyrifos	11	1.0	0.52	0.52	603
Lambda-cyhalothrin	5	1.0	0.02	0.02	14

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Atrazine, Clethodim, Dicamba, Diflufenzopyr, Fomesafen, Imazamox, and Rimsulfuron.

Insecticides applied but not published included the following: Dimethoate.

Fungicides applied but not published included the following: Prothioconazole.

Otter Tail County

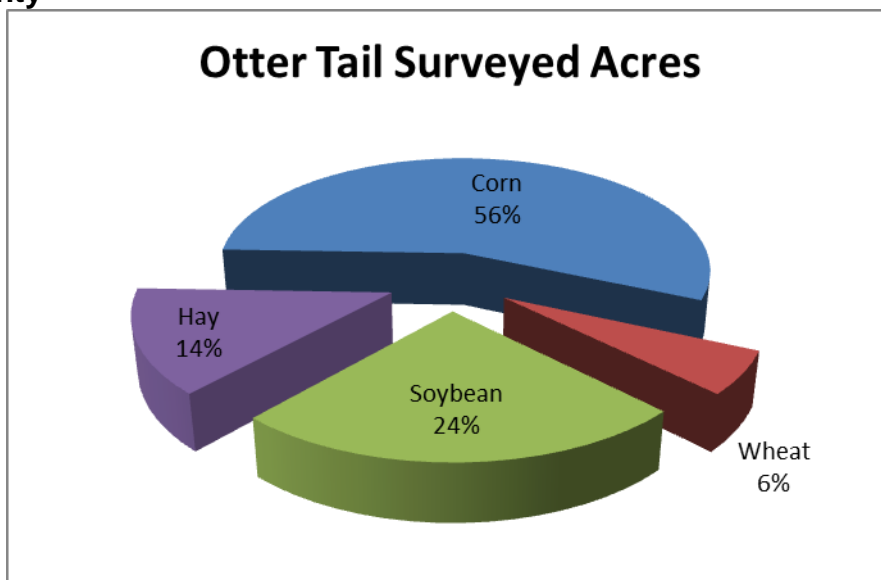


Table 66. Otter Tail County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Glyphosate	74	1.3	0.83	1.10	19,338
Insecticides					
Bifenthrin	3	1.0	0.03	0.03	19
Lambda-cyhalothrin	18	1.0	0.02	0.02	109
Fungicides					
Pyraclostrobin	7	1.1	0.09	0.09	155

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Acetochlor, Atrazine, Bromoxynil, Clethodim, Clopyralid, Dicamba, Diflufenzopyr, Dimethenamid-p, Fenoxaprop, Florasulam, Flumiclorac, Fluroxypyr, Fomesafen, Glyphosate, Imazamox, MCPA, Metolachlor, Pyrasulfotole, Pyroxsulam, and Saflufenacil.

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

Fungicides applied but not published included the following: Tetraconazole.

Pope County

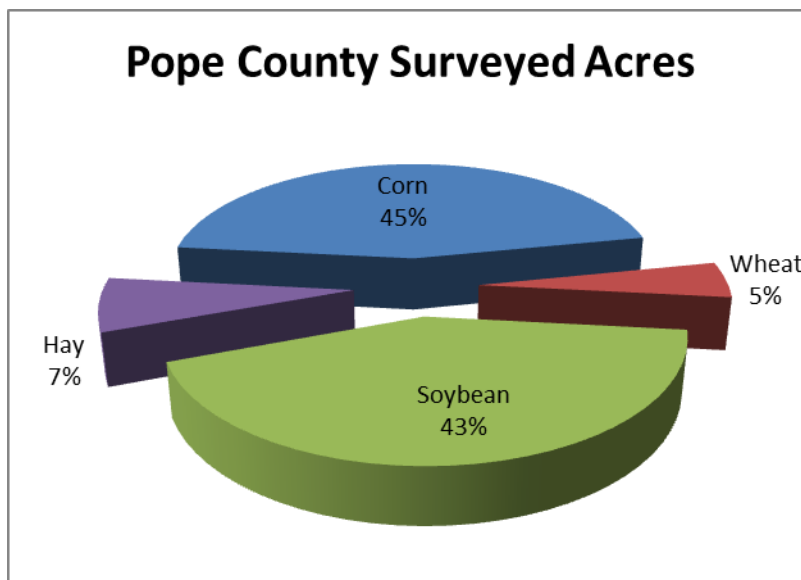


Table 67. Pope County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
2,4-D	3	1.1	0.48	0.52	295
Acetochlor	18	1.0	0.92	0.94	2,976
Clopyralid	17	1.0	0.06	0.06	186
Flumetsulam	16	1.0	0.03	0.03	72
Glyphosate	86	1.3	0.93	1.22	18,587
Insecticides					
Chlorpyrifos	4	1.0	0.41	0.41	271
Lambda-Cyhalothrin	30	1.1	0.02	0.03	135
Fungicides					
Azoxystrobin	6	1.2	0.10	0.12	132

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Bromoxynil, Clethodim, Dicamba, Diflufenzopyr, Dimethenamid-p, Fluazifop, Flumiclorac, Flumioxazin, MCPA, Mesotrione, Nicosulfuron, Quizalofop, Rimsulfuron, S-metolachlor, Saflufenacil, Thifensulfuron, and Trifluralin.

Insecticides applied but not published included the following: Beta-cyfluthrin, Bifenthrin, Imidacloprid, and Thiamethoxam

Fungicides applied but not published included the following: Mefenoxam, Propiconazole, Prothioconazole, Pyraclostrobin, Tebuconazole, and Trifloxystrobin.

Sherburne County

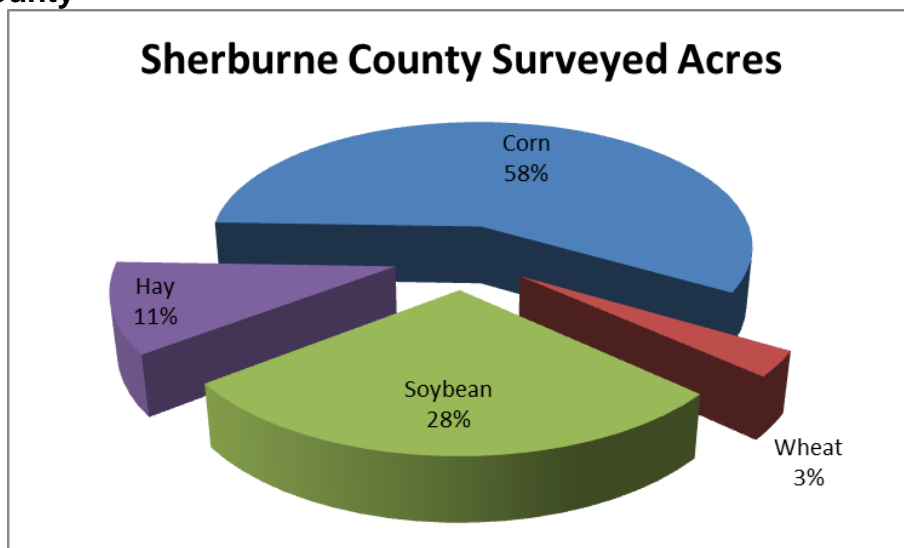


Table 68. Sherburne County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Glyphosate	79	1.0	0.86	0.90	5,727
Mesotrione	9	1.0	0.08	0.08	57
S-metolachlor	12	1.0	0.83	0.83	766

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Acetochlor, Atrazine, Bromoxynil, Clethodim, Clopyralid, Dimethenamid-p, Flumetsulam, Imazethapyr, MCPA, Metribuzin, Pendimethalin, Pyrasulfotole, Saflufenacil, Tembotrione, and Trifluralin.

Insecticides applied but not published included the following: Beta-cyfluthrin, Imidacloprid, and Lambda-cyhalothrin.

Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, and Pyraclostrobin.

Stearns County

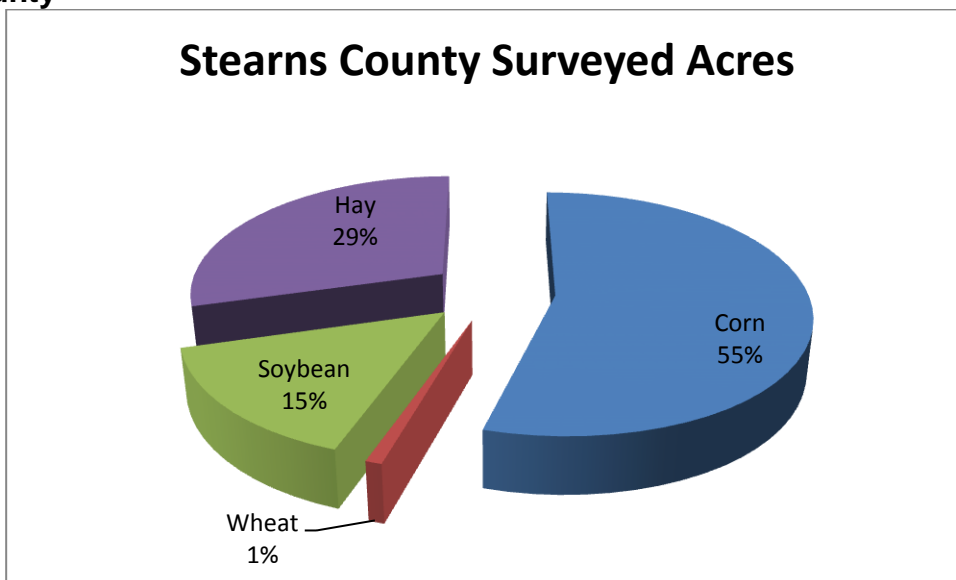


Table 69. Stearns County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Acetochlor	25	1.1	1.11	1.28	2,554
Clopyralid	18	1.2	0.06	0.08	111
Dicamba	6	1.0	0.14	0.14	69
Flumetsulam	18	1.2	0.03	0.03	47
Glyphosate	69	1.1	0.80	0.91	5,058
Insecticides					
Chlorpyrifos	12	1.0	0.89	0.89	851

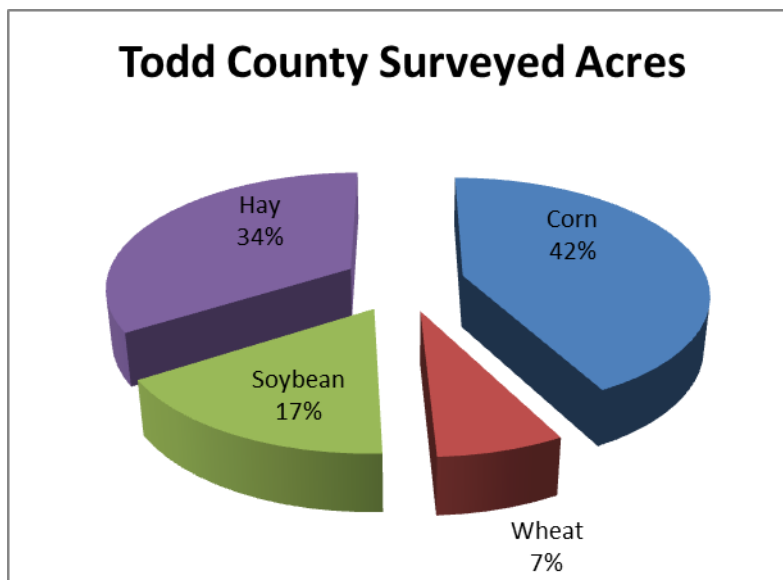
¹ Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2011 by survey participants in this county. Data in this table and the selection of survey participants was not statistically “weighted” in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Atrazine, Bromoxynil, Chlorimuron, Clethodim, Diflufenzopyr, Dimethenamid-p, Flumioxazin, Fluthiacet-methyl, Fomesafen, Mesotrione, Nicosulfuron, Pyrasulfotole, Rimsulfuron, S-metolachlor, Saflufenacil, and Topramezone.

Insecticides applied but not published included the following: Bifenthrin, Cyfluthrin, Gamma-cyhalothrin, Lambda-cyhalothrin, Phostebupirim, Thiamethoxam, Propiconazole, and Trifloxystrobin.

Fungicides applied but not published included the following: Propiconazole and Trifloxystrobin.

Todd County

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Acetochlor	16	1.0	0.95	0.95	1,212
Clopyralid	13	1.0	0.07	0.07	72
Dicamba	9	1.0	0.19	0.19	131
Flumetsulam	13	1.0	0.03	0.03	30
Glyphosate	46	1.1	0.92	1.01	3,745
Insecticides					
Lambda-cyhalothrin	9	1.0	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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Clethodim, Diflufenzopyr, Dimethenamid-p, Florasulam, Fluroxypyr, MCPA, Mesotrione, Metolachlor, Nicosulfuron, Primisulfuron, Pyroxsulam, Rimsulfuron, S-metolachlor, Saflufenacil, Tembotrione, Thifensulfuron, Topramezone, and Triencarbazone-methyl.

Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, Cyfluthrin, Phostebupirim, Thiamethoxam, and Zeta-cypermethrin.

Fungicides applied but not published included the following: Prothioconazole and Pyraclostrobin.

Wadena County

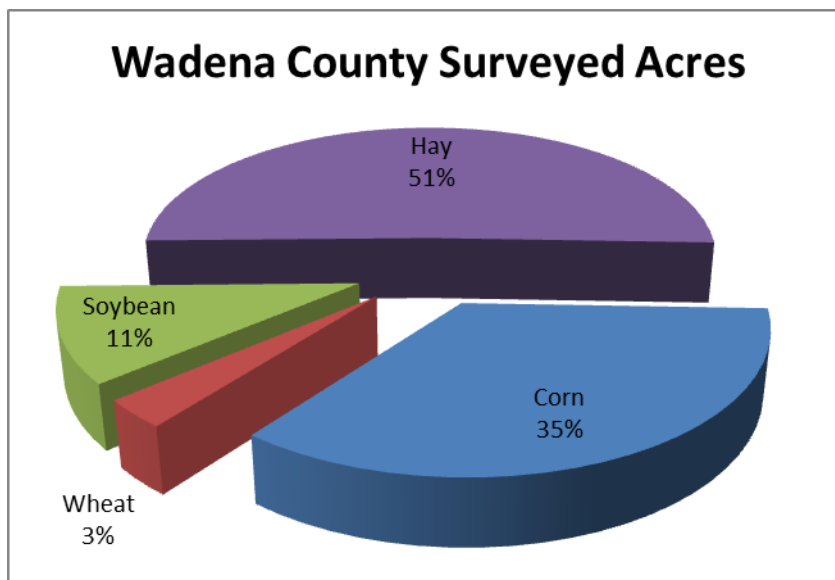


Table 71. Wadena County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Dicamba	25	1.0	0.12	0.12	277
Glyphosate	40	1.3	0.90	1.19	4,318

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Bromoxynil, Diflufenzopyr, Glufosinate-ammonium, MCPA, and Rimsulfuron.

Insecticides applied but not published included the following: Bifenthrin, Chlorethoxyfos, and Chlorpyrifos.

Fungicides applied but not published included the following: Pyraclostrobin.

PMA 5 County Data

Aitkin County

No data is publishable for Aitkin County.

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

Chisago County

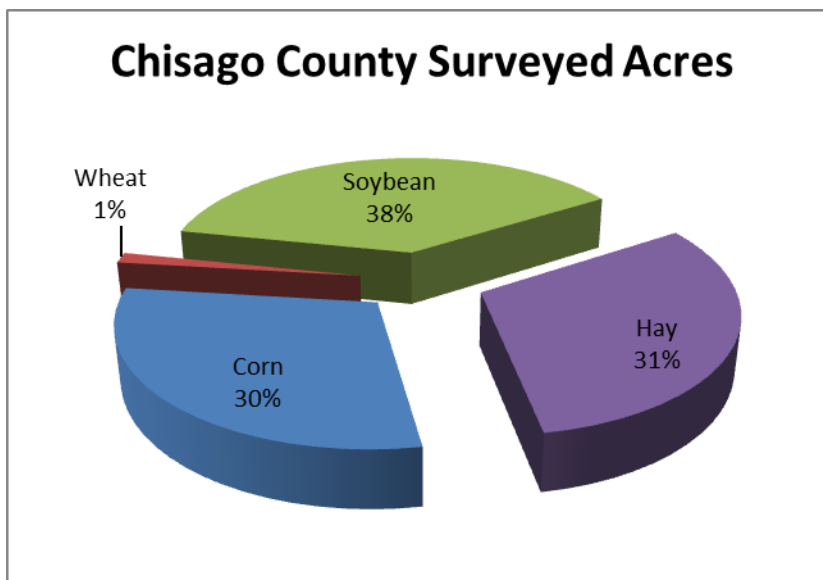


Table 72. Chisago County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Atrazine	12	1.0	0.70	0.70	409
Glyphosate	56	1.2	0.77	0.92	2,426
Imazethapyr	9	1.2	0.04	0.05	20
Mesotrione	10	1.0	0.11	0.11	51
S-metolachlor	10	1.0	1.15	1.15	513

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Bromoxynil, Cloransulam, Imazethapyr, Nicosulfuron, Pyrasulfotole, Rimsulfuron, Sulfentrazone, and Thifensulfuron.

Insecticides applied but not published included the following: Tefluthrin.

Fungicides applied but not published include the following: Propiconazole and Trifloxystrobin.

Isanti County

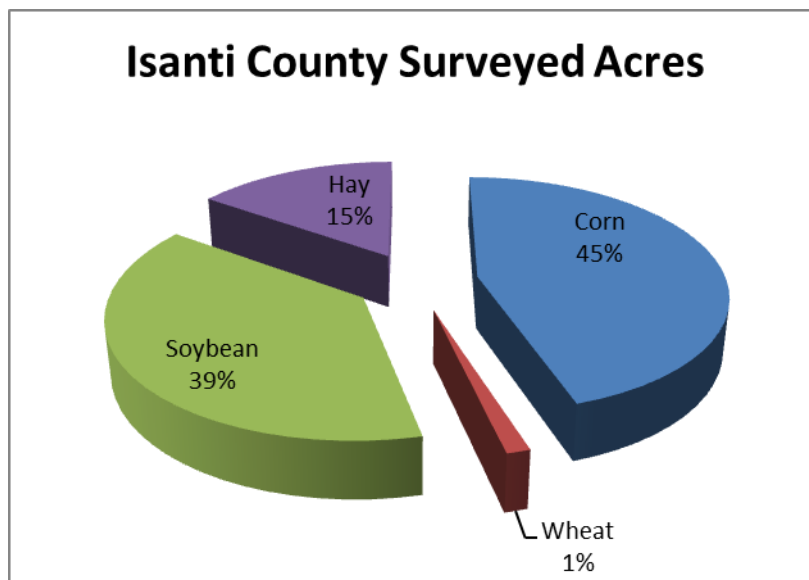


Table 73. Isanti County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Herbicides			<i>(a.i.)</i>	<i>(a.i.)</i>	<i>(a.i.)</i>
Glyphosate	83	1.3	0.86	1.12	7,060

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Bromoxynil, Clethodim, Fenoxaprop, Glufosinate-ammonium, Mesotrione, Pyrasulfotole, S-metolachlor.

Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, and Tefluthrin.

Fungicides applied but not published include the following: Pyraclostrobin.

Kanabec County

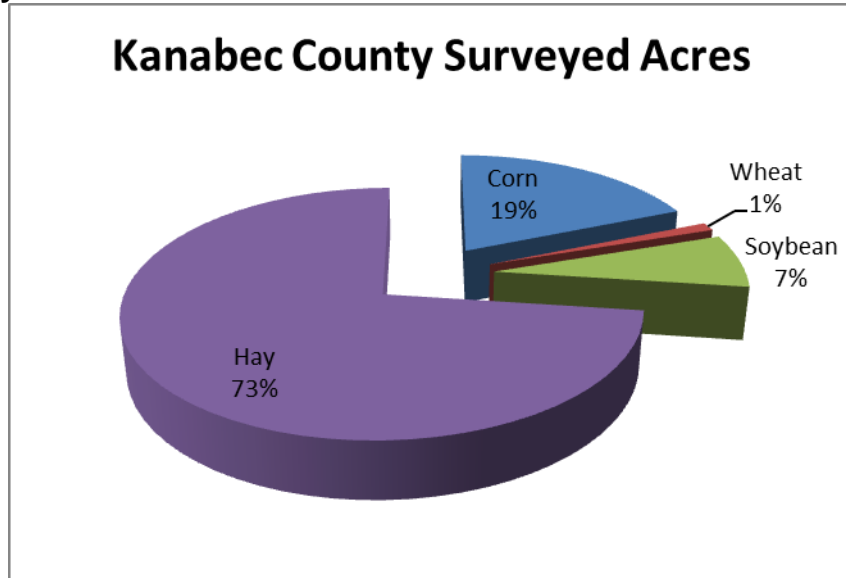


Table 74. Kanabec County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Herbicides			<i>(a.i.)</i>	<i>(a.i.)</i>	<i>(a.i.)</i>
Atrazine	3	1.0	1.10	1.10	152
Glyphosate	19	1.0	0.87	0.87	838

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Acetochlor, Bromoxynil, Dicamba, Diflufenzopyr, Dimethenamid-p, Fenoxaprop, Glufosinate-ammonium, Mesotrione, Pendimethalin, Pyrasulfotole, S-metolachlor, Thifensulfuron, Topramezone.

Mille Lacs County

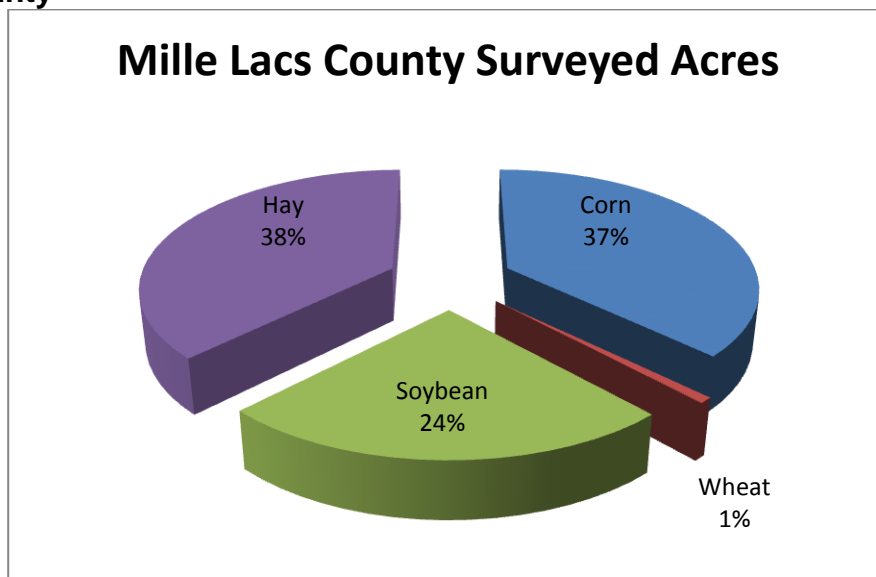


Table 75. Mille Lacs pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Acetochlor	15	1.0	1.55	1.55	1,716
Glyphosate	51	1.2	0.81	0.97	3,653

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Atrazine, Chlorimuron, Clethodim, Clopyralid, Cloransulam, Dicamba, Diflufenzopyr, Dimethenamid-p, Flumetsulam, Imazamox, Imazethapyr, Mesotrione, Pendimethalin, Quizalofop, S-metolachlor, Saflufenacil.

Insecticides applied but not published included the following: Gamma-cyhalothrin.

Fungicides applied but not published included the following: Propiconazole, Pyraclostrobin, and Trifloxystrobin.

Pine County

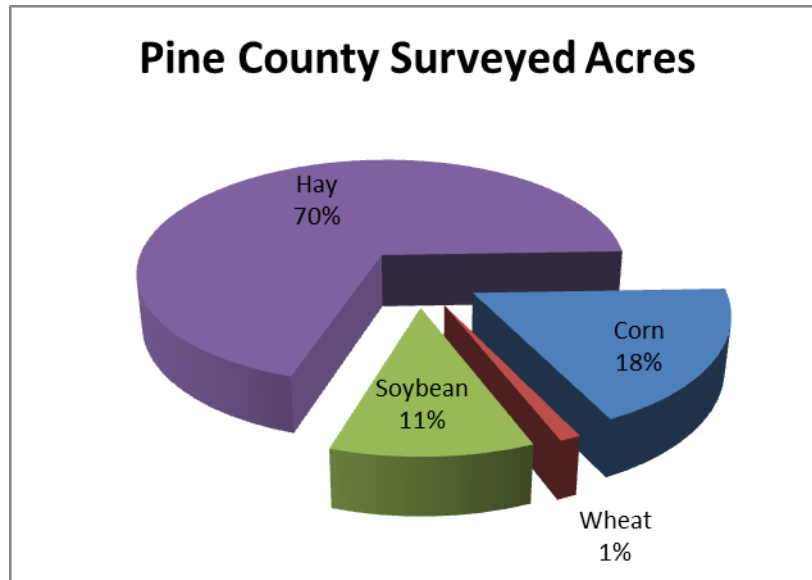


Table 76. Pine County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Glyphosate	28	1.1	0.75	0.84	1,818

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Acetochlor, Atrazine, Bromoxynil, Imazethapyr, MCPA, Mesotrione, Nicosulfuron, Pendimethalin, Quizalofop, Rimsulfuron, S-metolachlor, and Thifensulfuron.

Fungicides applied but not published included the following: Fluoxastrobin and Tebuconazole.

PMA 6 County Data

Big Stone County

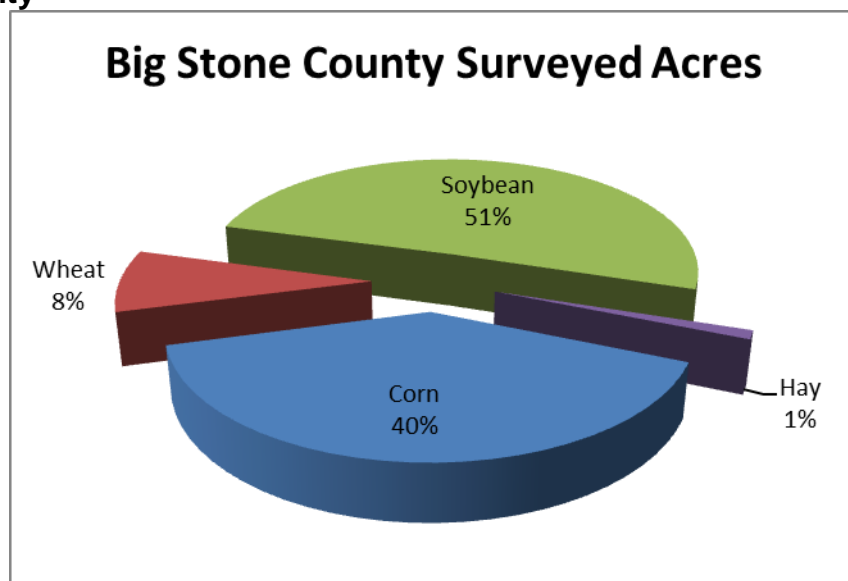


Table 77. Big Stone County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Herbicides			<i>(a.i.)</i>	<i>(a.i.)</i>	<i>(a.i.)</i>
Acetochlor	23	1.0	1.19	1.19	5,819
Bromoxynil	6	1.0	0.20	0.20	235
Clopyralid	17	1.0	0.06	0.06	222
Fenoxaprop	3	1.0	0.08	0.08	59
Flumetsulam	17	1.0	0.03	0.03	92
Glyphosate	82	1.5	0.88	1.29	22,086
MCPA	5	1.0	0.25	0.25	255
Pyrasulfotole	4	1.0	0.03	0.03	26
Insecticides					
Chlorpyrifos	16	1.0	0.45	0.45	1,472
Lambda-cyhalothrin	16	1.0	0.02	0.03	84
Fungicides					
Propiconazole	3	1.3	0.08	0.11	68

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Clethodim, Florasulam, Flumioxazin, Fluroxypyr, Fluthiacet-methyl, Fomesafen, Glufosinate-ammonium, Mesotrione, Pyrasulfotole, Pyroxsulam, Quizalofop, S-metolachlor, and Sethoxydim.

Insecticides applied but not published included the following: Beta-cyfluthrin, Bifenthrin, Gamma-cyhalothrin, and Zeta-cypermethrin.

Fungicides applied but not published included the following: Pyraclostrobin, Tetraconazole, and Trifloxystrobin.

Chippewa County

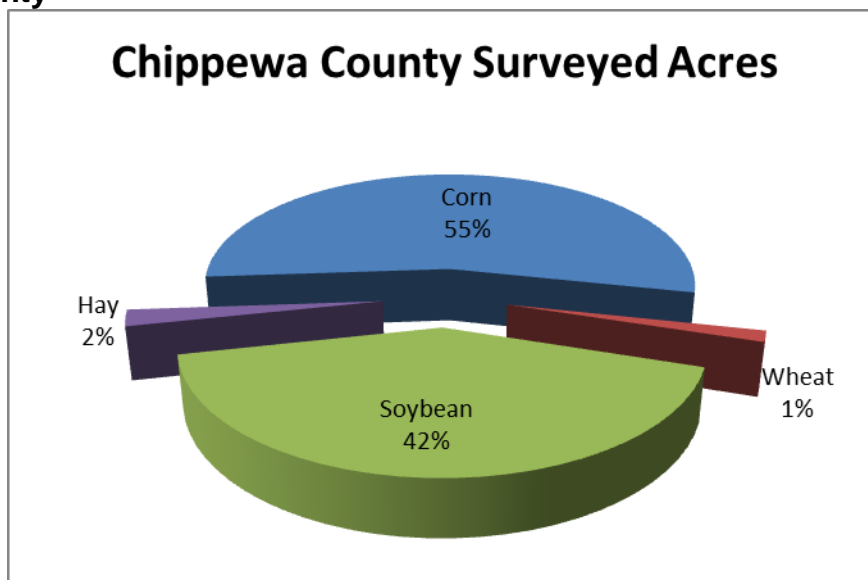


Table 78. Chippewa County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Herbicides			<i>(a.i.)</i>	<i>(a.i.)</i>	<i>(a.i.)</i>
Acetochlor	11	1.1	0.93	0.98	2,524
Clopyralid	8	1.0	0.06	0.06	116
Flumetsulam	8	1.0	0.03	0.03	48
Glyphosate	86	1.6	0.90	1.43	28,304
Saflufenacil	18	1.0	0.06	0.06	234
Insecticides					
Chlorpyrifos	19	1.0	0.55	0.55	2,379
Lambda-cyhalothrin	8	1.1	0.02	0.02	39
Fungicides					
Pyraclostrobin	10	1.1	0.10	0.11	249

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Bromoxynil, Cloransulam, Dicamba, Diflufenzopyr, Dimethenamid-p, Florasulam, Fluazifop, Fluroxypyr, Fluthiacet-methyl, Fomesafen, MCPA, Phenmedipham, Pyroxsulam, Quizalofop, S-metolachlor, Sulfentrazone, Tembotrione, Thifensulfuron, and Trifluralin.

Insecticides applied but not published included the following: Bifenthrin, Cyfluthrin, Esfenvalerate, Gamma-cyhalothrin, Phostebupirim, Thiamethoxam.

Fungicides applied but not published included the following: Metconazole, Propiconazole, and Trifloxystrobin.

Lac Qui Parle County

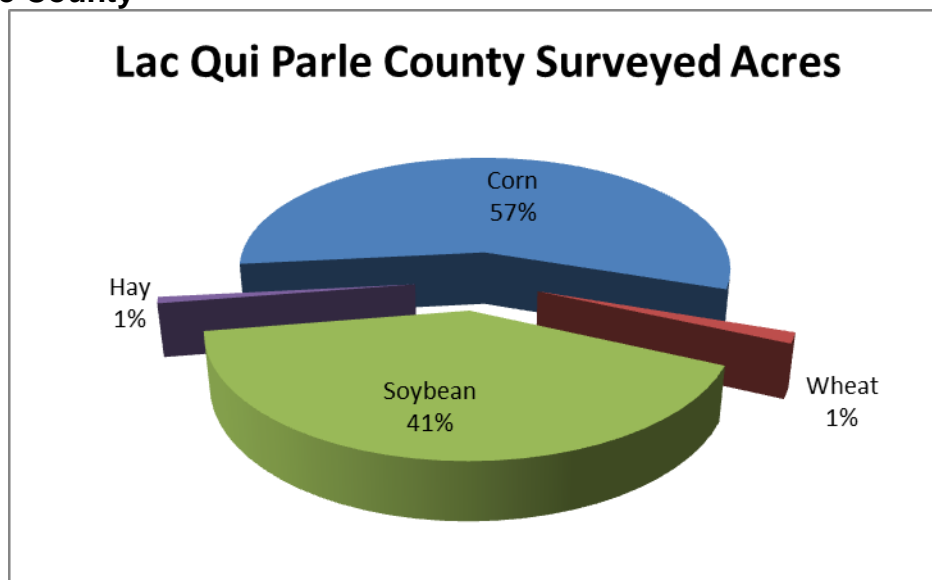


Table 79. Lac Qui Parle County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Acetochlor	12	1.0	0.92	0.92	2,316
Clopyralid	10	1.0	0.07	0.07	159
Flumetsulam	10	1.0	0.03	0.03	66
Glyphosate	80	1.5	0.87	1.35	23,589
Mesotrione	14	1.0	0.09	0.09	278
S-metolachlor	11	1.0	0.91	0.91	2,248
Insecticides					
Chlorpyrifos	14	1.0	0.30	0.30	956
Lambda-Cyhalothrin	17	1.0	0.02	0.02	86

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Atrazine, Bromoxynil, Clethodim, Cloransulam, Dicamba, Fenoxaprop, Flumioxazin, Fluthiacet-methyl, Imazapyr, Imazethapyr, MCPA, Pyrasulfotole, Quizalofop, Sulfentrazone, Tembotrione, Thifensulfuron, and Trifluralin.

Insecticides applied but not published included the following: Bifenthrin, Cyfluthrin, Esfenvalerate, Gamma-cyhalothrin, Phostebupirim, Tefluthrin, Thiamethoxam, and Zeta-cypermethrin.

Fungicides applied but not published included the following: Pyraclostrobin.

Stevens County

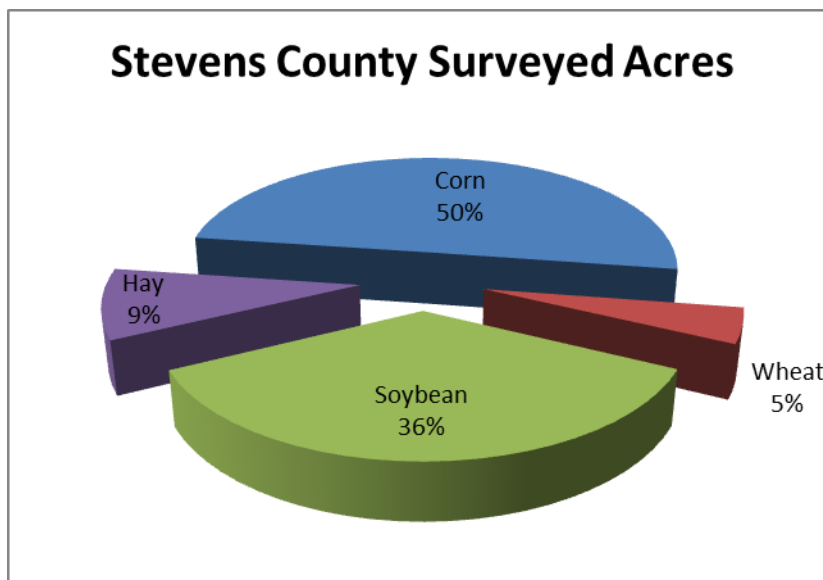


Table 80. Stevens County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Herbicides			(a.i.)	(a.i.)	(a.i.)
Acetochlor	20	1.0	1.05	1.05	9,950
Bromoxynil	4	1.2	0.19	0.22	369
Clopyralid	12	1.0	0.06	0.06	327
Dicamba	11	1.0	0.06	0.06	331
Diflufenzopyr	11	1.0	0.03	0.03	126
Flumetsulam	12	1.0	0.02	0.02	135
Glyphosate	80	1.5	0.97	1.44	54,679
MCPA	3	1.0	0.20	0.20	306
Mesotrione	5	1.0	0.06	0.06	147
Insecticides					
Chlorpyrifos	6	1.0	0.41	0.41	1,084
Lambda-Cyhalothrin	20	1.2	0.02	0.02	218
Fungicides					
Pyraclostrobin	2	1.1	0.06	0.06	72

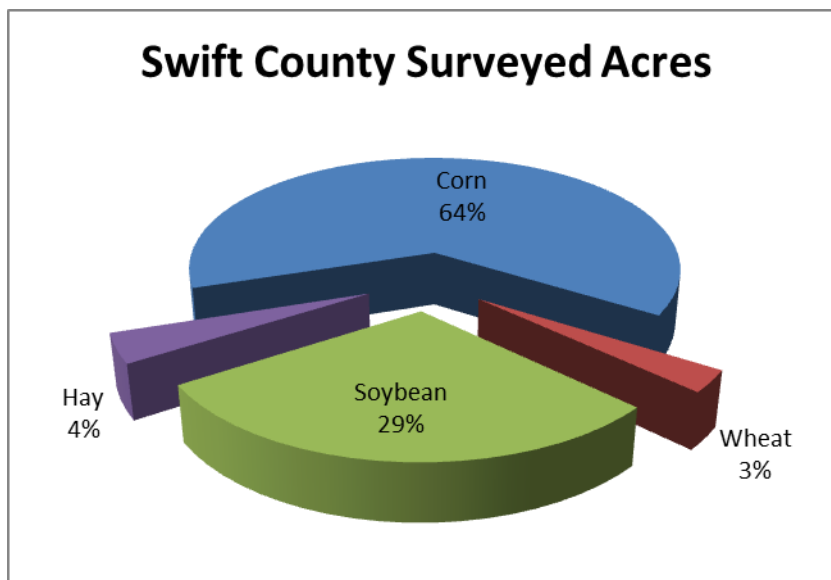
¹ Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2011 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Atrazine, Clethodim, Cloransulam, Dimethenamid-p, Fenoxaprop, Florasulam, Fluazifop, Flumioxazin, Fluroxypyr, Fluthiacet-methyl, Fomesafen, Glufosinate-ammonium, Imazamox, Pyrasulfotole, Pyroxsulam, S-metolachlor, Saflufenacil, Sulfentrazone, Tembotrione, and Thifensulfuron.

Insecticides applied but not published included the following: Beta-cyfluthrin, Cyfluthrin, Esfenvalerate, Gamma-cyhalothrin, Phostebupirim, and Zeta-cypermethrin.

Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, and Trifloxystrobin.

Swift County

**Table 81. Swift County pesticide applications and rates**

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Acetochlor	30	1.0	0.74	0.74	6,237
Bromoxynil	2	1.0	0.20	0.20	89
Clethodim	5	1.3	0.06	0.08	100
Clopyralid	21	1.0	0.04	0.04	221
Flumetsulam	21	1.0	0.02	0.02	92
Glyphosate	84	1.4	0.87	1.21	28,703
Mesotrione	14	1.0	0.08	0.08	334
Insecticides					
Bifenthrin	4	1.0	0.06	0.06	68
Lambda-cyhalothrin	15	1.0	0.02	0.02	91
Fungicides					
Pyraclostrobin	2	1.0	0.07	0.07	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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Dicamba, Diflufenzopyr, Dimethenamid-p, Fenoxaprop, Flumioxazin, Fluthiacet-methyl, MCPA, Phenmedipham, Pyrasulfotole, Quizalofop, S-metolachlor, Saflufenacil, Tembotrione, Topramezone, and Trifluralin.

Insecticides applied but not published included the following: Beta-cyfluthrin, Chlorpyrifos, Cyfluthrin, Esfenvalerate, Gamma-cyhalothrin, Imidacloprid, Phostebupirim, Tefluthrin, and Zeta-cypermethrin.

Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, and Trifloxystrobin.

Yellow Medicine County

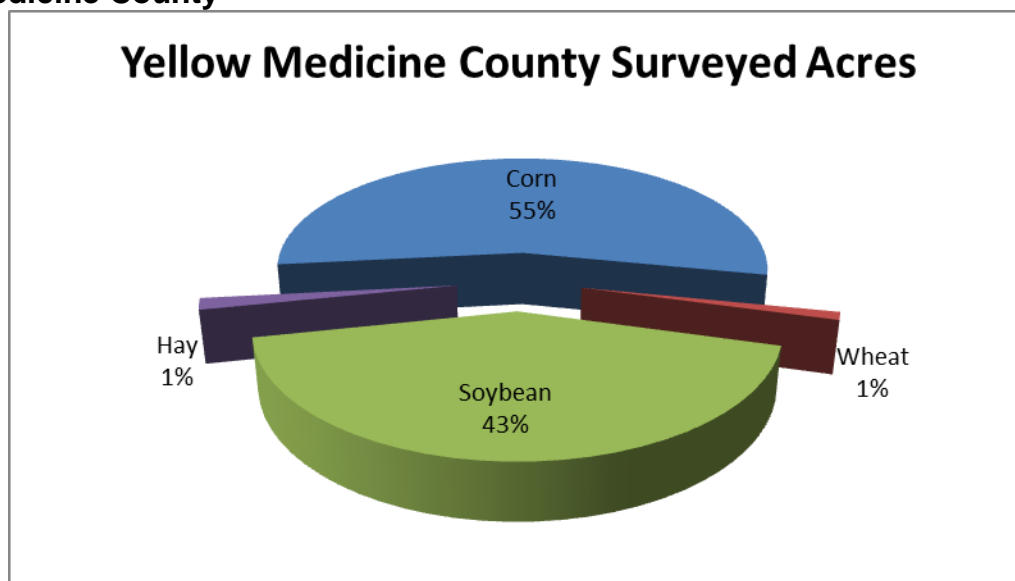


Table 82. Yellow Medicine County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Acetochlor	21	1.0	1.30	1.30	5,738
Clopyralid	12	1.0	0.07	0.07	171
Flumetsulam	12	1.0	0.03	0.03	71
Glyphosate	89	1.4	0.91	1.30	24,540
Insecticides					
Chlorpyrifos	18	1.0	0.52	0.52	1,998
Lambda-cyhalothrin	12	1.0	0.02	0.02	61

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Bromoxynil, Clethodim, Cloransulam, Dicamba, Diflufenopyr, Flumioxazin, Fomesafen, MCPA, Mesotrione, Nicosulfuron, Pendimethalin, Rimsulfuron, S-metolachlor, Sulfentrazone, Tembotrione, Triencarbazone-methyl, and Trifluralin.

Insecticides applied but not published included the following: Beta-cyfluthrin, Bifenthrin, Chlorethoxyfos, Cyfluthrin, Gamma-cyhalothrin, Imidacloprid, Phostebupirim, and Thiamethoxam

Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, and Pyraclostrobin.

PMA 7 County Data

Lincoln County

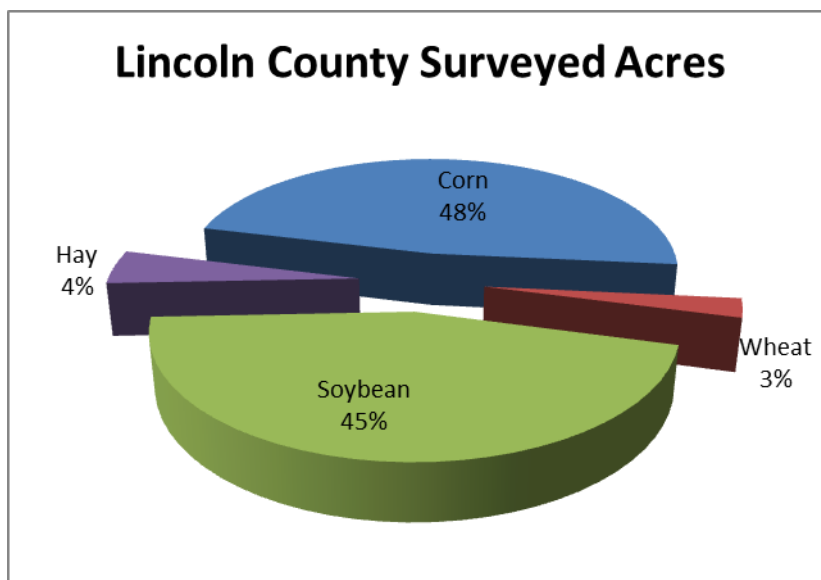


Table 83. Lincoln County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Acetochlor	21	1.0	1.11	1.11	4,594
Clethodim	5	1.0	0.07	0.07	65
Clopyralid	8	1.0	0.06	0.06	102
Flumetsulam	8	1.0	0.03	0.03	42
Glyphosate	86	1.4	0.84	1.21	20,188
MCPA	2	1.0	0.43	0.43	132
Mesotrione	9	1.0	0.07	0.07	130
Insecticides					
Chlorpyrifos	17	1.0	0.44	0.44	1,419
Lambda-cyhalothrin	18	1.1	0.02	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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Bromoxynil, Dicamba, Diflufenzopyr, Fluazifop, Flumioxazin, Fomesafen, S-metolachlor, and Thifensulfuron.

Insecticides applied but not published included the following: Bifenthrin, Chlorethoxyfos, Cyfluthrin, Gamma-cyhalothrin, Phostebupirim, and Zeta-cypermethrin.

Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Prothioconazole, Pyraclostrobin, Tebuconazole, Tetraconazole, and Trifloxystrobin.

Lyon County

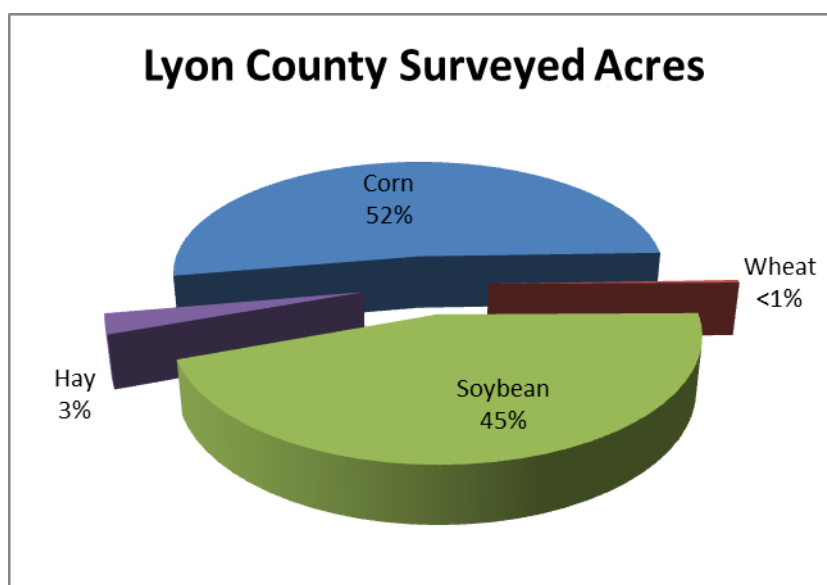


Table 84. Lyon County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Herbicides			<i>(a.i.)</i>	<i>(a.i.)</i>	<i>(a.i.)</i>
Acetochlor	17	1.0	0.89	0.89	3,110
Clopyralid	17	1.0	0.07	0.07	233
Flumetsulam	17	1.0	0.03	0.03	96
Glyphosate	92	1.3	0.94	1.23	22,997
Mesotrione	14	1.0	0.12	0.12	343
S-metolachlor	14	1.0	1.22	1.22	3,431
Insecticides					
Chlorpyrifos	22	1.0	0.48	0.48	2,094

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Clethodim, Cloransulam, Dicamba, Diflufenopyr, Glufosinate-ammonium, Imazethapyr, Pendimethalin, Saflufenacil, and Sulfentrazone.

Insecticides applied but not published included the following: Bifenthrin, Chlorethoxyfos, Esfenvalerate, Gamma-cyhalothrin, Lambda-cyhalothrin, and Phorate.

Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Pyraclostrobin, and Tebuconazole.

Murray County

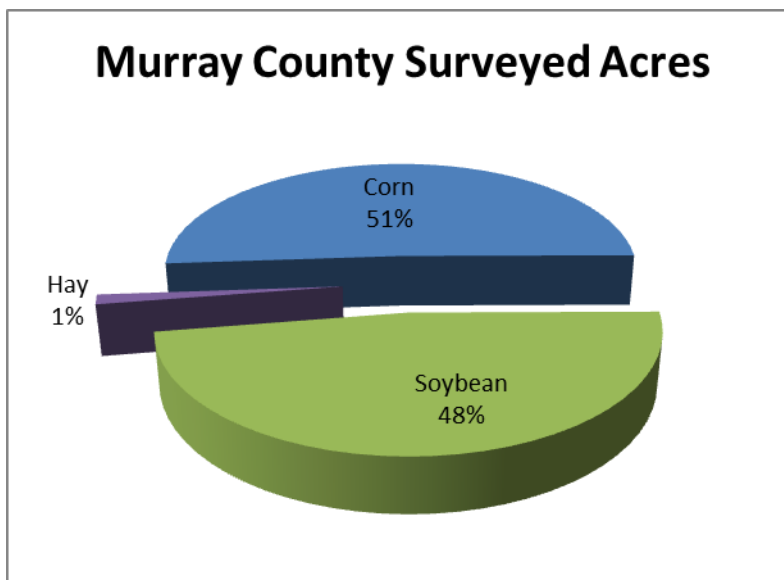


Table 85. Murray County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Herbicides			<i>(a.i.)</i>	<i>(a.i.)</i>	<i>(a.i.)</i>
Acetochlor	9	1.0	0.90	0.90	1,792
Glyphosate	96	1.5	0.93	1.44	30,130
Mesotrione	24	1.0	0.08	0.08	415
S-metolachlor	18	1.0	1.05	1.05	4,088
Insecticides					
Bifenthrin	11	1.0	0.06	0.06	139
Chlorpyrifos	15	1.0	0.43	0.43	1,433
Lambda-cyhalothrin	14	1.0	0.03	0.03	77

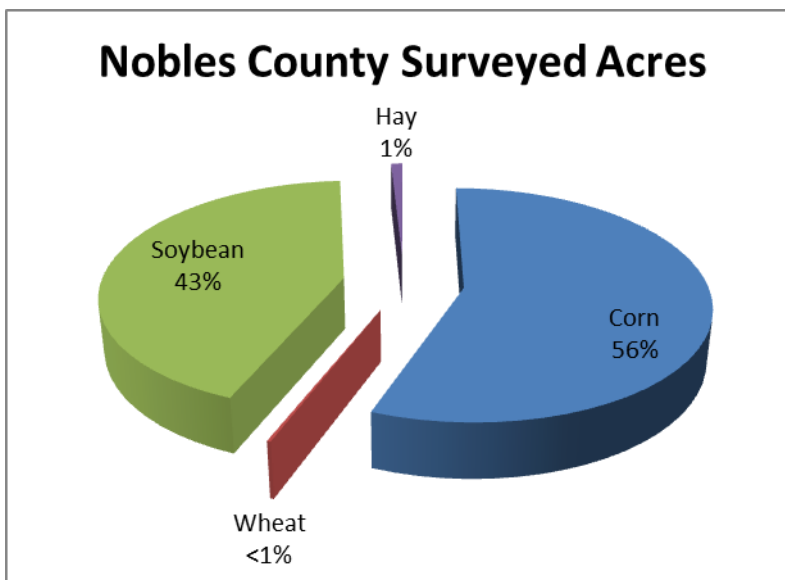
¹ Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2011 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Atrazine, Clethodim, Clopyralid, Cloransulam, Fluazifop, Flumetsulam, Fomesafen, Quizalofop, Sulfentrazone, and Trifluralin.

Insecticides applied but not published included the following: Tefluthrin and Terbufos.

Fungicides applied but not published included the following: Propiconazole, Pyraclostrobin, and Trifloxystrobin.

Nobles County

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Acetochlor	36	1.0	0.94	0.94	6,516
Clopyralid	24	1.0	0.07	0.07	346
Cloransulam	14	1.0	0.03	0.03	69
Flumetsulam	24	1.0	0.03	0.03	143
Glyphosate	88	1.3	0.87	1.09	18,478
Sulfentrazone	14	1.0	0.20	0.20	539
Insecticides					
Chlorpyrifos	13	1.0	0.64	0.64	1,653
Lambda-cyhalothrin	9	1.0	0.02	0.02	38
Fungicides					
Pyraclostrobin	10	1.0	0.09	0.09	181

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Clethodim, Dimethenamid-p, Fenoxaprop, Fluazifop, Flumiclorac, Fomesafen, Glufosinate-ammonium, Mesotrione, S-metolachlor, and Trifluralin.

Insecticides applied but not published included the following: Bifenthrin, Chlorethoxyfos, Cyfluthrin, Dimethoate, Esfenvalerate, Phostebupirim, Tefluthrin, Terbufos, and Thiamethoxam.

Fungicides applied but not published included the following: Metconazole, Propiconazole, and Trifloxystrobin.

Pipestone County

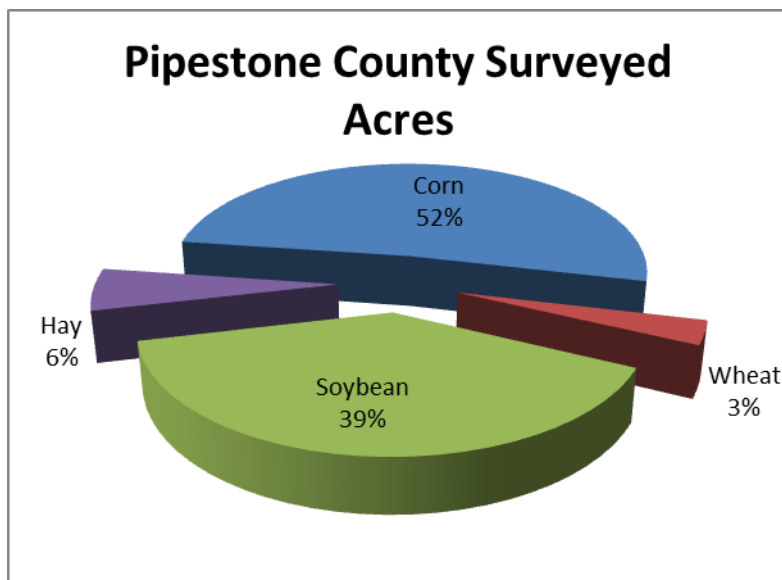


Table 87. Pipestone County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Acetochlor	30	1.0	0.98	0.98	6,514
Clopyralid	17	1.0	0.07	0.07	251
Flumetsulam	17	1.0	0.03	0.03	100
Glyphosate	88	1.3	0.82	1.05	20,184
Insecticides					
Chlorpyrifos	11	1.0	0.45	0.45	1,083
Cyfluthrin	7	1.0	0.01	0.01	9
Lambda-cyhalothrin	22	1.0	0.02	0.02	98

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Dicamba, Diflufenzopyr, Dimethenamid-p, Fenoxaprop, Fluroxypyr, Fomesafen, Imazethapyr, Mesotrione, Metolachlor, S-metolachlor, Saflufenacil, Topramezone, and Trifluralin.

Insecticides applied but not published include the following: Cyfluthrin, Esfenvalerate, Phostebupirim, and Tefluthrin.

Fungicides applied but not published included the following: Azoxystrobin, Mefenoxam, Propiconazole, Prothioconazole, Pyraclostrobin, Tebuconazole, Tetraconazole, and Trifloxystrobin.

Rock County

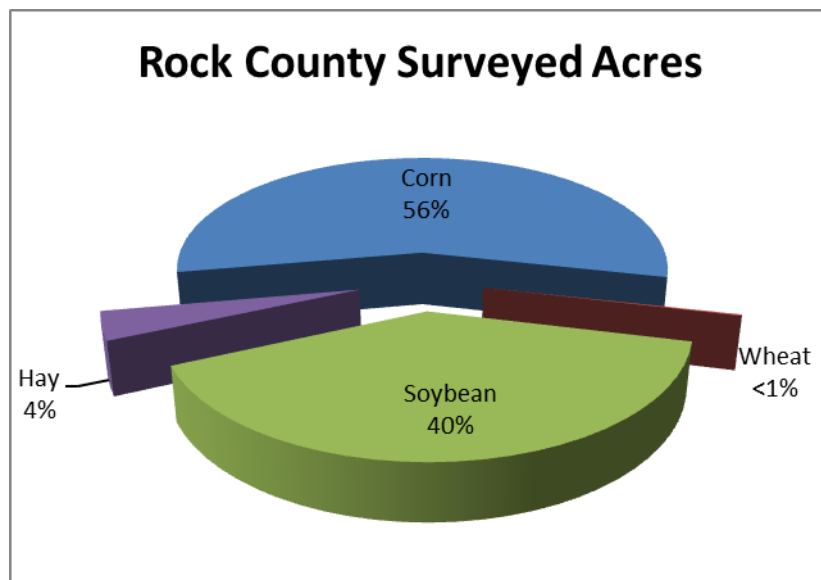


Table 88. Rock County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Acetochlor	39	1.1	1.04	1.14	9,962
Clopyralid	26	1.0	0.08	0.08	437
Flumetsulam	26	1.0	0.03	0.03	179
Glyphosate	88	1.3	0.82	1.07	20,927
Mesotrione	8	1.0	0.08	0.08	132
Pendimethalin	5	1.0	1.07	1.07	1,130
Insecticides					
Bifenthrin	11	1.0	0.07	0.07	167
Chlorpyrifos	10	1.0	0.50	0.50	1,081
Lambda-cyhalothrin	16	1.0	0.02	0.02	79
Fungicides					
Pyraclostrobin	10	1.0	0.10	0.10	215

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Aminopyralid, Atrazine, Clethodim, Cloransulam, Dicamba, Diflufenzopyr, Fluazifop, Flumioxazin, Imazethapyr, Propionic acid, S-metolachlor, Saflufenacil, Sulfentrazone, Tembotrione, and Thifensulfuron.

Insecticides applied but not published included the following: Beta-cyfluthrin, Cyfluthrin, Esfenvalerate, Gamma-cyhalothrin, Imidacloprid, Phostebupirim, Tefluthrin, and Thiamethoxam.

Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Tebuconazole, Tetraconazole, and Trifloxystrobin.

PMA 8 County Data

Blue Earth County

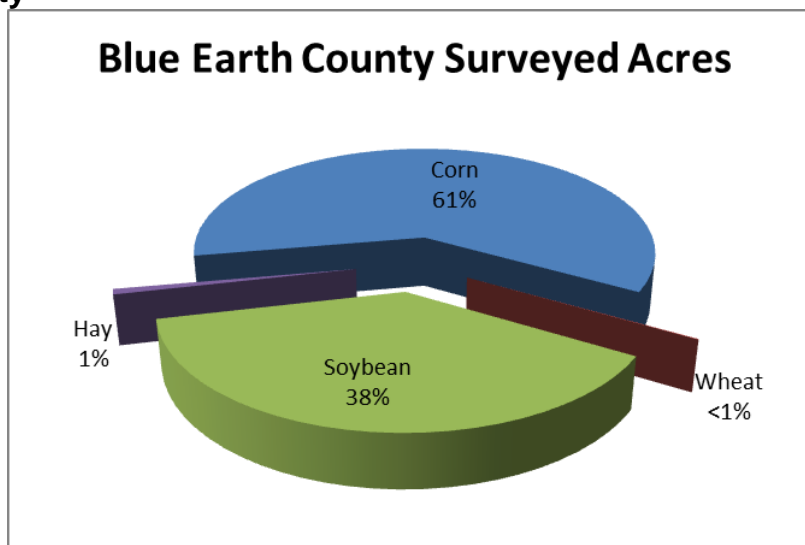


Table 89. Blue Earth County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Acetochlor	17	1.0	1.16	1.16	5,347
Atrazine	6	1.0	0.33	0.33	572
Fluazifop	6	1.1	0.05	0.05	80
Glyphosate	88	1.4	0.81	1.15	27,064
Mesotrione	23	1.0	0.07	0.07	436
S-metolachlor	25	1.0	0.91	0.91	5,993
Insecticides					
Chlorpyrifos	8	1.0	0.53	0.53	1,142
Lambda-cyhalothrin	15	1.0	0.02	0.03	102
Tefluthrin	8	1.0	0.11	0.11	215
Thiamethoxam	7	1.0	0.03	0.03	56
Fungicides					
Azoxystrobin	8	1.0	0.10	0.10	215

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Clethodim, Clopyralid, Cloransulam, Dicamba, Diflufenzopyr, Flumetsulam, Fluthiacet-methyl, Fomesafen, Imazethapyr, Primisulfuron, Quizalofop, Sulfentrazone, Tembotrione, Topramezone, and Trifluralin.

Insecticides applied but not published included the following: Bifenthrin, Cyfluthrin, Esfenvalerate, Phostebupirim, and Terbufos.

Fungicides applied but not published included the following: Metconazole, Propiconazole, Pyraclostrobin, and Trifloxystrobin.

Brown County

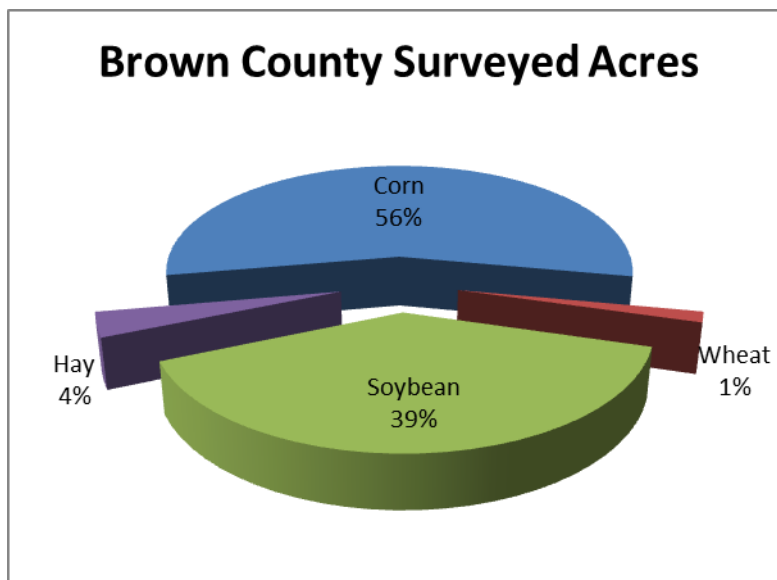


Table 90. Brown County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Acetochlor	21	1.0	1.09	1.09	3,691
Clopyralid	10	1.0	0.06	0.06	95
Flumetsulam	10	1.0	0.02	0.02	37
Glyphosate	86	1.5	0.85	1.32	18,743
Mesotrione	12	1.0	0.08	0.08	155
S-metolachlor	10	1.0	0.89	0.89	1,482
Insecticides					
Chlorpyrifos	11	1.0	0.47	0.47	877
Lambda-cyhalothrin	16	1.0	0.03	0.03	71
Thiamethoxam	7	1.0	0.03	0.03	38
Fungicides					
Pyraclostrobin	4	1.0	0.08	0.08	57

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Bromoxynil, Chlorimuron, Cloransulam, Dimethenamid-p, Fenoxaprop, Fluazifop, Fomesafen, Glufosinate-ammonium, Imazethapyr, Lactofen, Nicosulfuron, Pendimethalin, Quizalofop, Saflufenacil, Tembotrione, Thifensulfuron, and Topramezone.

Insecticides applied but not published included the following: Beta-cyfluthrin, Bifenthrin, Cyfluthrin, Gamma-cyhalothrin, Imidacloprid, Phostebupirim, Tefluthrin, and Terbufos.

Fungicides applied but not published included the following: Azoxystrobin and Metconazole.

Cottonwood County

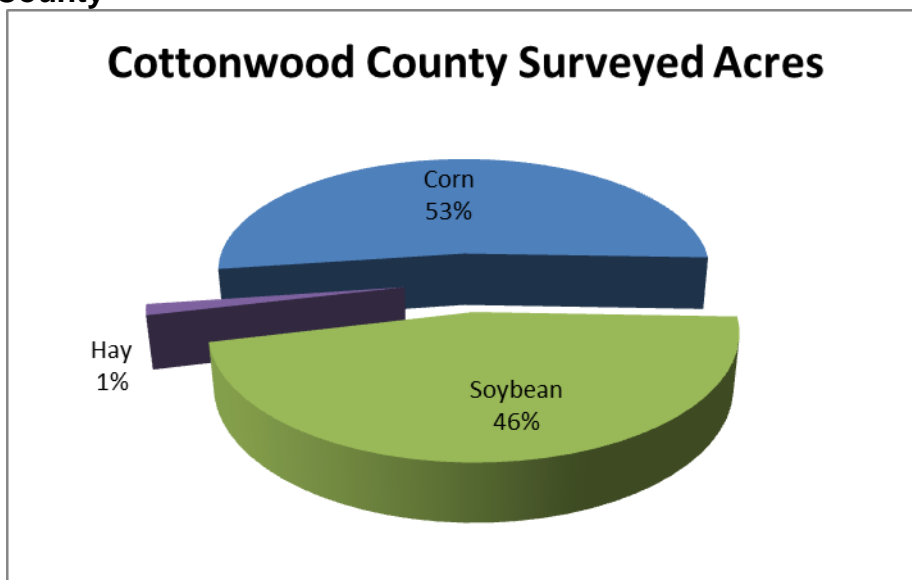


Table 91. Cottonwood County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Herbicides			(a.i.)	(a.i.)	(a.i.)
Fluazifop	6	1.0	0.04	0.04	64
Flumetsulam	4	1.0	0.02	0.02	22
Glyphosate	89	1.4	0.88	1.20	27,093
Mesotrione	14	1.0	0.08	0.08	297
S-metolachlor	10	1.0	1.09	1.09	2,675
Insecticides					
Bifenthrin	5	1.0	0.07	0.07	93
Chlorpyrifos	5	1.0	0.49	0.49	684
Lambda-cyhalothrin	15	1.0	0.02	0.02	86
Fungicides					
Pyraclostrobin	12	1.0	0.08	0.08	236

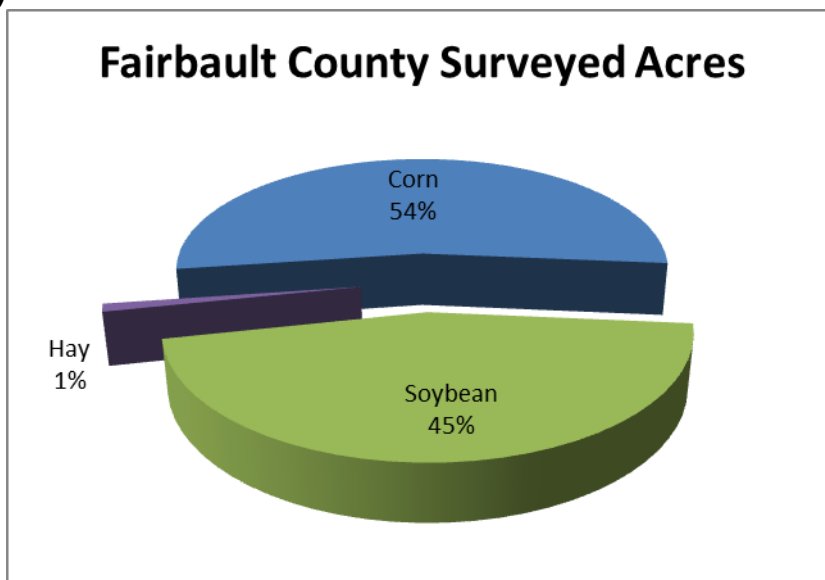
¹ Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2011 by survey participants in this county. Data in this table and the selection of survey participants was not statistically “weighted” in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Atrazine, Chlorimuron, Clethodim, Clopyralid, Cloransulam, Dicamba, Diflufenzopyr, Dimethenamid-p, Flumioxazin, Pendimethalin, Quizalofop, Sulfentrazone, Tembotrione, Thifensulfuron, and Trifluralin.

Insecticides applied but not published included the following: Beta-cyfluthrin, Cyfluthrin, Esfenvalerate, Imidacloprid, Phostebupirim, Tefluthrin, Thiamethoxam, and Zeta-cypermethrin.

Fungicides applied but not published included the following: Azoxystrobin, Mefenoxam, Propiconazole, and Trifloxystrobin.

Faribault County

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Acetochlor	5	1.1	0.95	1.01	1,567
Dimethenamid-p	9	1.0	0.64	0.64	1,630
Fluthiacet-methyl	5	1.0	0.00	0.00	5
Glyphosate	89	1.3	0.90	1.21	31,446
Mesotrione	11	1.0	0.10	0.10	322
S-metolachlor	10	1.1	1.11	1.18	3,513
Insecticides					
Bifenthrin	6	1.0	0.04	0.04	68
Chlorpyrifos	11	1.0	0.56	0.56	1,755
Lambda-cyhalothrin	17	1.1	0.03	0.03	137
Thiamethoxam	9	1.0	0.04	0.04	97
Fungicides					
Pyraclostrobin	41	1.0	0.09	0.09	1,147

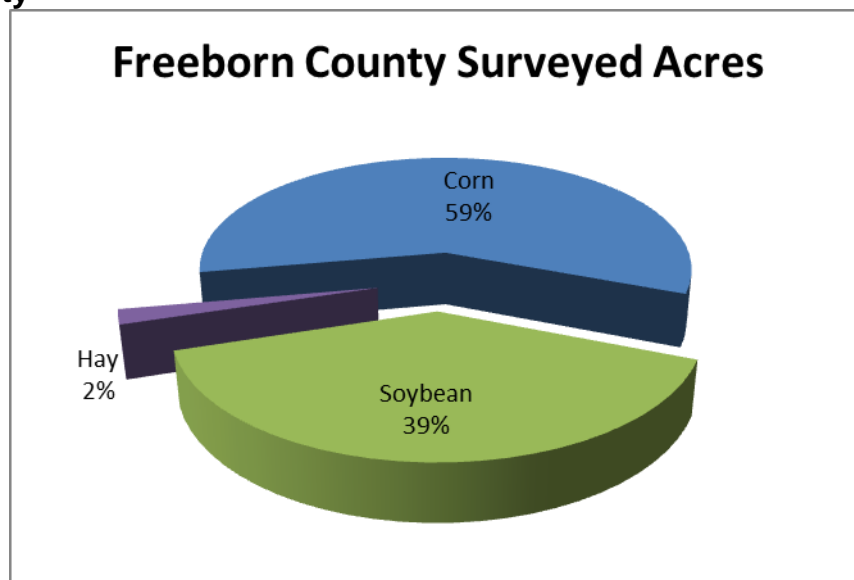
¹ Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2011 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Atrazine, Clethodim, Clopyralid, Cloransulam, Dicamba, Diflufenzopyr, Fluazifop, Flumetsulam, Glufosinate-ammonium, Imazethapyr, Saflufenacil, Sulfentrazone, Tembotrione, Thifensulfuron, Triencarbazone-methyl, and Trifluralin.

Insecticides applied but not published included the following: Chlorethoxyfos, Cyfluthrin, Esfenvalerate, Phostebupirim, Tefluthrin, Terbufos, and Zeta-cypermethrin.

Fungicides applied but not published included the following: Azoxystrobin, Mefenoxam, Metconazole, and Propiconazole.

Freeborn County

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Acetochlor	32	1.0	1.49	1.49	11,961
Atrazine	10	1.0	0.83	0.83	2,144
Clethodim	5	1.0	0.09	0.09	107
Clopyralid	18	1.0	0.09	0.09	428
Glyphosate	83	1.5	0.83	1.22	25,715
Insecticides					
Chlorpyrifos	8	1.1	0.66	0.70	1,521
Esfenvalerate	6	1.0	0.03	0.03	52
Lambda-cyhalothrin	12	1.0	0.02	0.02	72
Fungicides					
Pyraclostrobin	21	1.0	0.08	0.08	451

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Cloransulam, Dicamba, Diflufenzopyr, Dimethenamid-p, Fluazifop, Flumetsulam, Fluthiacet-methyl, Glufosinate-ammonium, Mesotrione, Metribuzin, S-metolachlor, Saflufenacil, Sulfentrazone, and Tembotrione.

Insecticides applied but not published included the following: Bifenthrin, Cyfluthrin, Phostebupirim, and Thiamethoxam.

Fungicides applied but not published included the following: Azoxystrobin, Fluoxastrobin, Metconazole, Propiconazole, Tebuconazole, and Trifloxystrobin.

Jackson County

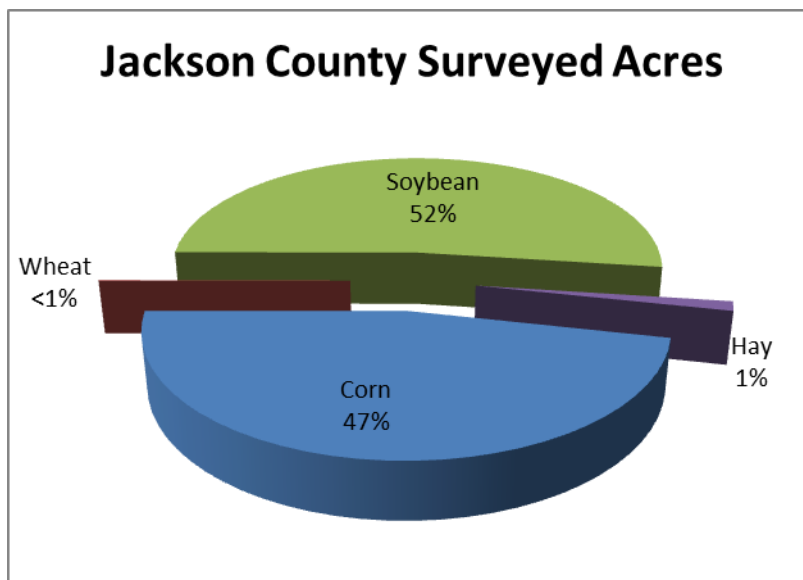


Table 94. Jackson County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Acetochlor	11	1.0	1.10	1.10	4,014
Dimethenamid-p	11	1.0	0.53	0.53	1,926
Glyphosate	97	1.4	0.85	1.16	37,109
Mesotrione	18	1.0	0.11	0.11	666
Saflufenacil	6	1.0	0.04	0.04	72
Insecticides					
Chlorpyrifos	6	1.0	0.45	0.45	944
Lambda-cyhalothrin	31	1.0	0.03	0.03	289
Tefluthrin	5	1.0	0.11	0.11	180
Thiamethoxam	4	1.0	0.03	0.03	44
Fungicides					
Pyraclostrobin	24	1.0	0.10	0.10	780

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Bromoxynil, Clethodim, Clopyralid, Cloransulam, Dicamba, Diflufenzopyr, Fluazifop, Flumetsulam, Fomesafen, Imazethapyr, MCPA, Pendimethalin, Rimsulfuron, S-metolachlor, Sulfentrazone, Thifensulfuron, Topramezone, and Trifluralin.

Insecticides applied but not published included the following: Bifenthrin, Cyfluthrin, Esfenvalerate, and Phostebupirim.

Fungicides applied but not published included the following: Azoxystrobin, Metconazole, Propiconazole, Prothioconazole, Tebuconazole, and Trifloxystrobin.

Le Sueur County

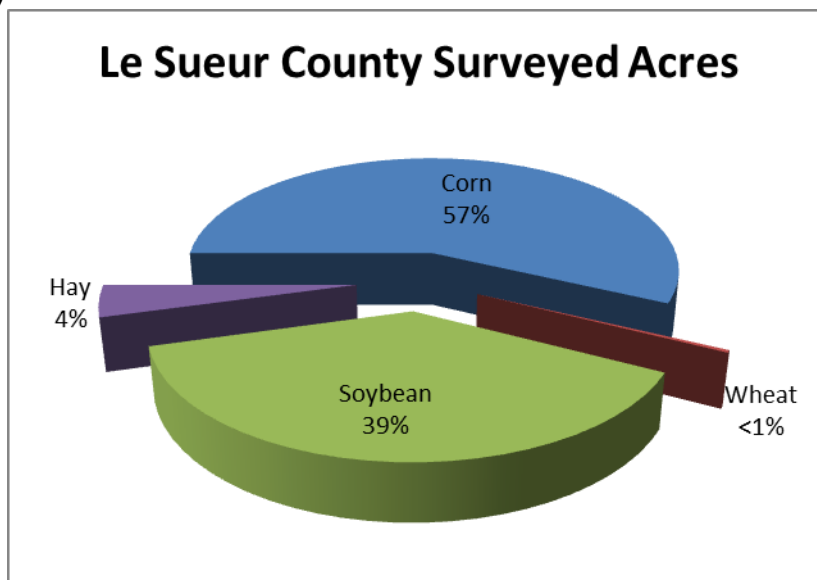


Table 95. Le Sueur County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Acetochlor	17	1.0	0.65	0.65	1,711
Glyphosate	90	1.3	0.78	0.99	13,793
Mesotrione	11	1.0	0.08	0.08	138
Insecticides					
Lambda-Cyhalothrin	15	1.0	0.02	0.02	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 2011 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, area or county levels.

Herbicides applied but not published included the following: Bromoxynil, Clethodim, Clopyralid, Cloransulam, Fenoxaprop, Flumetsulam, Fluthiacet-methyl, Fomesafen, Glufosinate-ammonium, Imazamox, Lactofen, Pendimethalin, S-metolachlor, Sulfentrazone, Tembotrione, Thifensulfuron, Topramezone, and Trifluralin.

Insecticides applied but not published included the following: Beta-cyfluthrin, Chlorpyrifos, Cyfluthrin, Imidacloprid, Phostebupirim, and Thiamethoxam.

Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Pyraclostrobin, and Trifloxystrobin.

Martin County

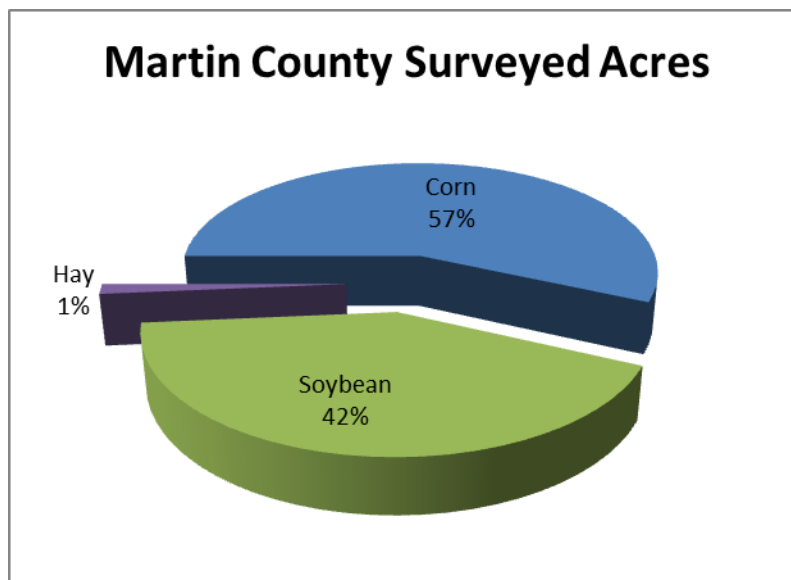


Table 96. Martin County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Herbicides			<i>(a.i.)</i>	<i>(a.i.)</i>	<i>(a.i.)</i>
Acetochlor	32	1.0	1.06	1.06	11,185
Atrazine	7	1.0	0.41	0.41	1,000
Clopyralid	11	1.0	0.07	0.07	228
Flumetsulam	10	1.0	0.03	0.03	92
Glyphosate	93	1.4	0.85	1.22	37,982
Mesotrione	12	1.0	0.07	0.07	288
Insecticides					
Chlorpyrifos	23	1.0	0.56	0.56	4,187
Lambda-cyhalothrin	14	1.0	0.02	0.02	105
Fungicides					
Pyraclostrobin	12	1.0	0.09	0.09	378

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Clethodim, Dicamba, Dimethenamid-p, Flumiclorac, Flumioxazin, Fluthiacet-methyl, Imazethapyr, Propionic acid, Rimsulfuron, S-metolachlor, Saflufenacil, Tembotrione, Thifensulfuron, and Trifluralin.

Insecticides applied but not published included the following: Bifenthrin, Chlorethoxyfos, Cyfluthrin, Gamma-cyhalothrin, Phostebupirim, Tefluthrin, Thiamethoxam, and Zeta-cypermethrin.

Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, and Trifloxystrobin.

McLeod County

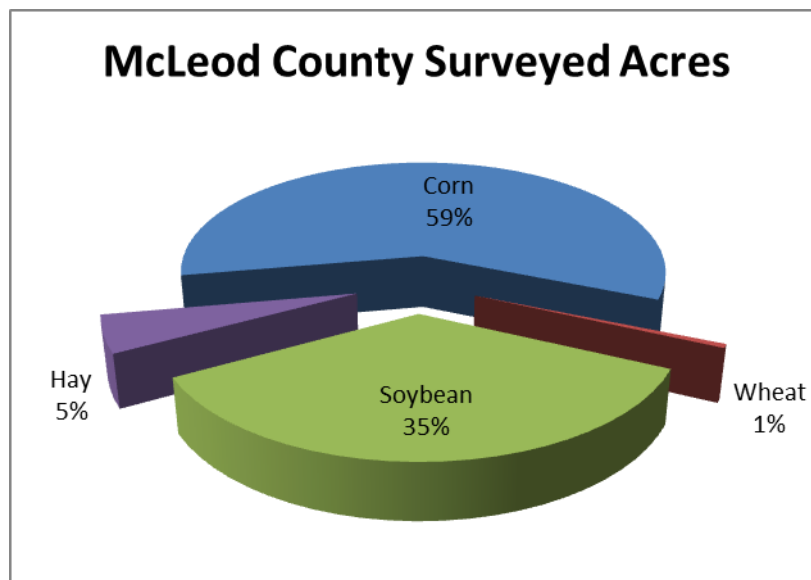


Table 97. McLeod County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Acetochlor	32	1.0	0.85	0.85	3,056
Glyphosate	92	1.3	0.92	1.13	11,384
Mesotrione	13	1.0	0.07	0.07	102
Acetochlor	32	1.0	0.85	0.85	3,056
Insecticides					
Chlorpyrifos	10	1.0	0.38	0.38	431
Lambda-cyhalothrin	13	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 2011 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, area or county levels.

Herbicides applied but not published included the following: Atrazine, Bromoxynil, Clethodim, Clopyralid, Dicamba, Diflufenzopyr, Fluazifop, Flumetsulam, Fluthiacet-methyl, Glufosinate-ammonium, MCPA, Quizalofop, Rimsulfuron, S-metolachlor, Tembotrione, Thifensulfuron, and Topramezone.

Insecticides applied but not published included the following: Bifenthrin, Esfenvalerate, Tefluthrin, Thiamethoxam, and Zeta-cypermethrin.

Fungicides applied but not published included the following: Azoxystrobin, Chlorothalonil, and Pyraclostrobin.

Meeker County

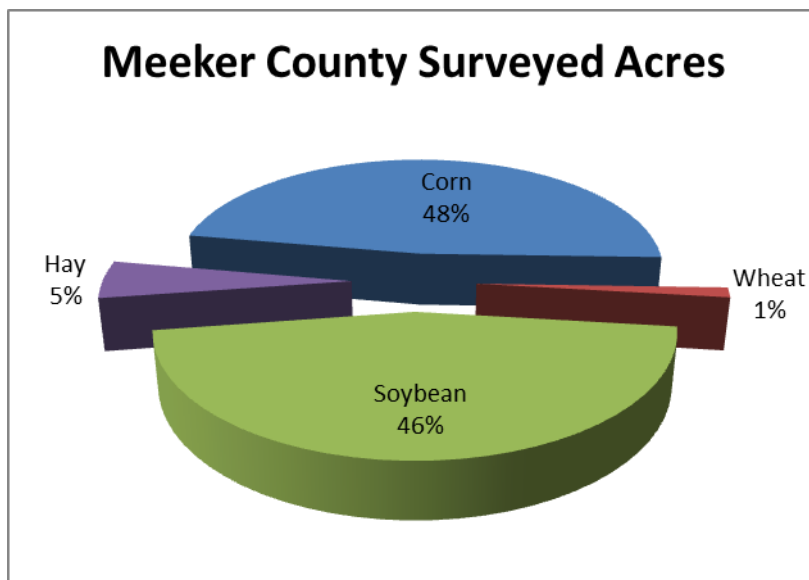


Table 98. Meeker County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
2,4-D	1	1.0	0.41	0.41	53
Acetochlor	18	1.0	1.08	1.08	4,592
Clopyralid	13	1.0	0.07	0.07	210
Dicamba	5	1.0	0.12	0.12	148
Diflufenzopyr	4	1.0	0.03	0.03	28
Flumetsulam	13	1.0	0.03	0.03	87
Fluthiacet-methyl	8	1.0	0.00	0.00	8
Glyphosate	92	1.6	0.83	1.28	27,381
Insecticides					
Chlorpyrifos	9	1.0	0.30	0.30	600
Lambda-cyhalothrin	15	1.0	0.02	0.02	65
Fungicides					
Pyraclostrobin	15	1.0	0.07	0.07	268

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Atrazine, Bromoxynil, Clethodim, Dimethenamid-p, Fenoxaprop, Fluazifop, Fomesafen, Imazethapyr, Mesotrione, Pendimethalin, Pyrasulfotole, S-metolachlor, Saflufenacil, and Tembotrione.

Insecticides applied but not published included the following: Bifenthrin, Cyfluthrin, Esfenvalerate, Gamma-cyhalothrin, Phostebupirim, Tefluthrin, Terbufos, and Thiamethoxam.

Fungicides applied but not published included the following: Azoxystrobin, Metconazole, Propiconazole, Tetraconazole, and Trifloxystrobin.

Nicollet County

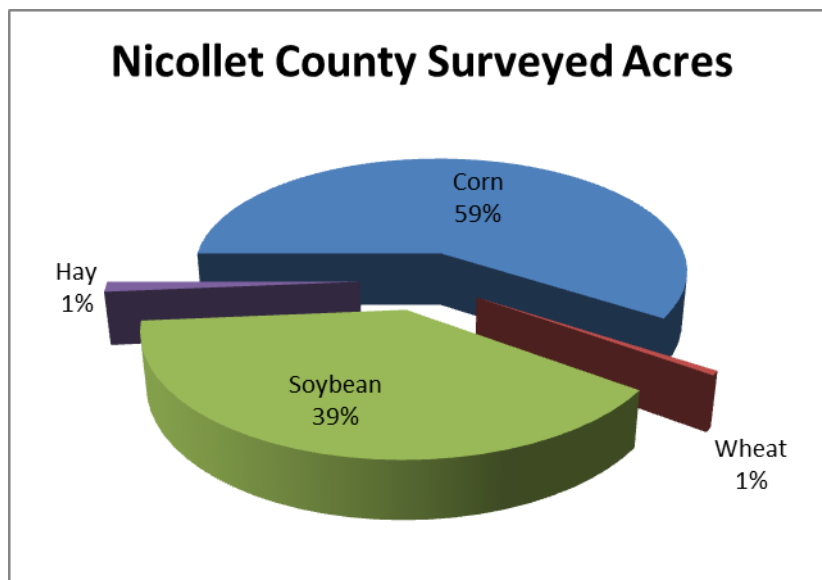


Table 99. Nicollet County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Acetochlor	14	1.0	1.17	1.17	3,383
Clopyralid	5	1.0	0.06	0.06	64
Flumetsulam	5	1.0	0.03	0.03	26
Glyphosate	91	1.3	0.90	1.18	21,441
Mesotrione	32	1.0	0.09	0.09	618
S-metolachlor	28	1.0	1.00	1.03	5,741
Insecticides					
Bifenthrin	4	1.0	0.08	0.08	71
Chlorpyrifos	8	1.0	0.58	0.58	955
Lambda-cyhalothrin	25	1.0	0.02	0.02	119
Fungicides					
Azoxystrobin	3	1.0	0.10	0.10	61
Pyraclostrobin	6	1.0	0.10	0.10	115

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Clethodim, Dicamba, Diflufenzopyr, Dimethenamid-p, Fluazifop, Fomesafen, Glufosinate-ammonium, Saflufenacil, Tembotrione, Thifensulfuron, Topramezone, and Triencarbazone-methyl.

Insecticides applied but not published included the following: Chlorethoxyfos, Cyfluthrin, Esfenvalerate, Phostebupirim, Tefluthrin, and Thiamethoxam

Redwood County

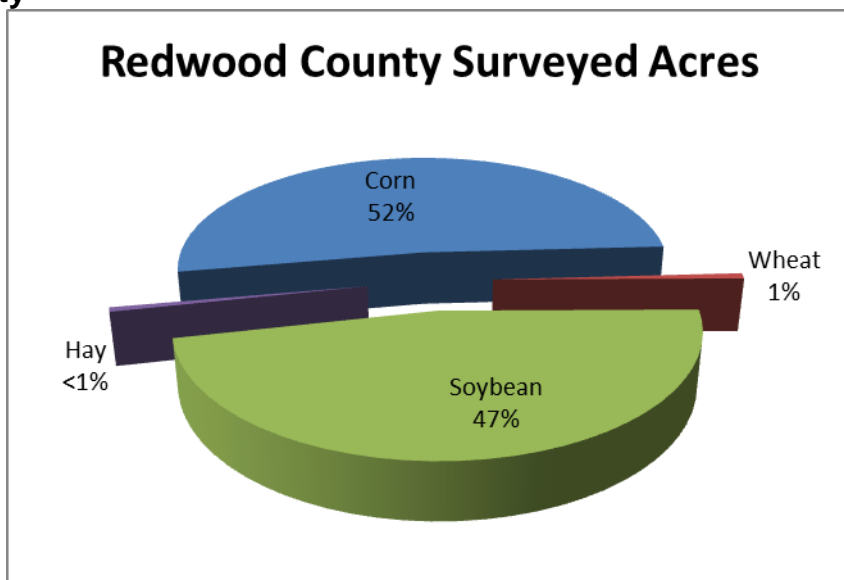


Table 100. Redwood County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
2,4-D	<1	1.0	0.60	0.60	121
Acetochlor	40	1.0	1.38	1.38	10,600
Fluazifop	<1	1.1	0.10	0.10	109
Fomesafen	1	1.0	0.27	0.27	241
Glyphosate	90	1.4	0.94	1.35	34,703
Mesotrione	1	1.0	0.09	0.09	153
Tembotrione	<1	1.0	0.06	0.06	123
Insecticides					
Bifenthrin	<1	1.0	0.07	0.07	118
Chlorpyrifos	6	1.0	0.41	0.41	1,560
Fungicides					
Pyraclostrobin	1	1.0	0.09	0.09	277

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Clethodim, Clopyralid, Dicamba, Dimethenamid-p, Flumetsulam, Flumioxazin, Fluthiacet-methyl, Imazethapyr, Pendimethalin, S-metolachlor, Saflufenacil, and Trifluralin.

Insecticides applied but not published included the following: Beta-cyfluthrin, Chlorethoxyfos, Cyfluthrin, Esfenvalerate, Gamma-cyhalothrin, Imidacloprid, Lambda-cyhalothrin, Phostebupirim, and Tefluthrin.

Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Tebuconazole, and Trifloxystrobin.

Renville County

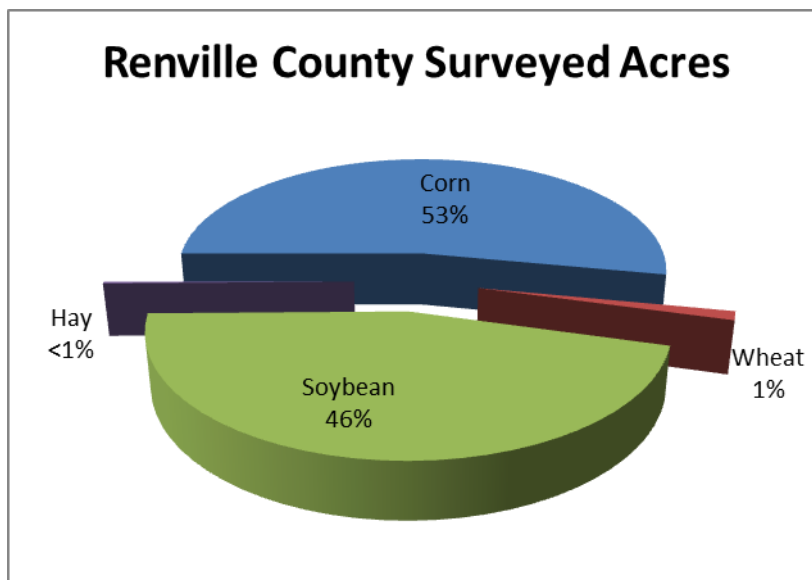


Table 101. Renville County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Acetochlor	25	1.0	0.90	0.90	8,275
Glyphosate	96	1.4	0.79	1.17	40,659
Tembotrione	11	1.0	0.08	0.08	333
Insecticides					
Bifenthrin	3	1.0	0.08	0.08	80
Chlorpyrifos	11	1.0	0.55	0.55	2,233
Cyfluthrin	21	1.0	0.01	0.01	51
Esfenvalerate	5	1.0	0.03	0.03	62
Lambda-cyhalothrin	20	1.0	0.03	0.03	200
Phostebupirim	21	1.0	0.13	0.13	1,031
Fungicides					
Pyraclostrobin	2	1.0	0.07	0.07	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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Bromoxynil, Clethodim, Clopyralid, Dicamba, Diflufenzopyr, Dimethenamid-p, Fluazifop, Flumetsulam, Flumioxazin, Fluthiacet-methyl, Fomesafen, Lactofen, MCPA, Saflufenacil, and Triencarbazone-methyl.

Insecticides applied but not published included the following: Beta-cyfluthrin, Imidacloprid, Phorate, and Tefluthrin.

Fungicides applied but not published included the following: Propiconazole, Prothioconazole, Tebuconazole, and Trifloxystrobin.

Rice County

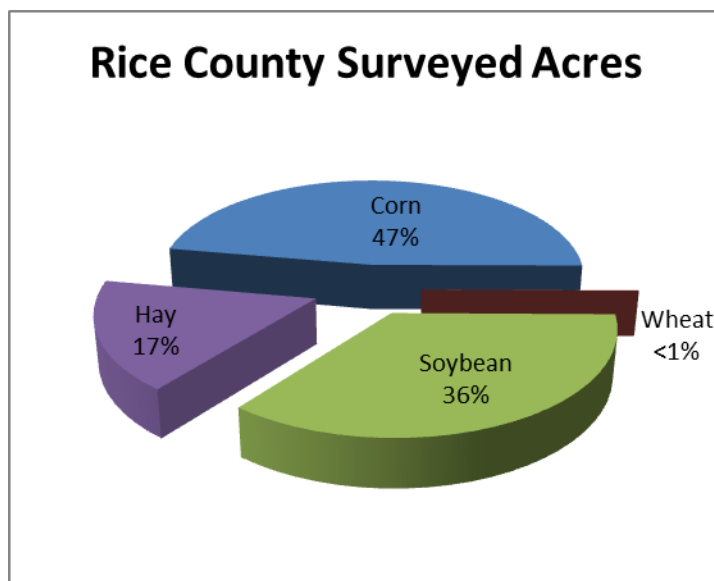


Table 102. Rice County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Herbicides			<i>(a.i.)</i>	<i>(a.i.)</i>	<i>(a.i.)</i>
Glyphosate	70	1.3	0.91	1.10	5,029
Insecticides					
Lambda-cyhalothrin	9	1.0	0.03	0.03	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 2011 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, area or county levels.

Herbicides applied but not published included the following: Acetochlor, Atrazine, Clopyralid, Dicamba, Diflufenzopyr, Dimethenamid-p, Flumetsulam, Fluthiacet-methyl, Fomesafen, Mesotrione, Nicosulfuron, S-metolachlor, Sethoxydim, Tembotrione, and Topramezone.

Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, and Tefluthrin.

Sibley County

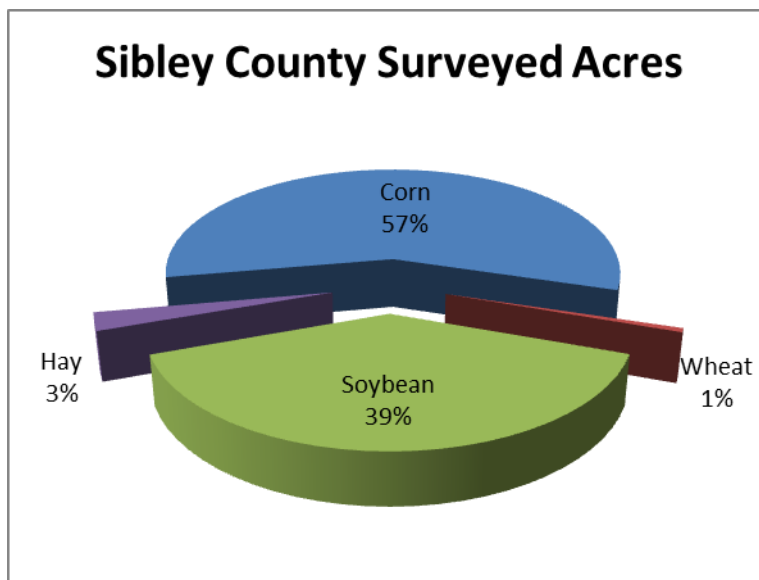


Table 103. Sibley County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
2,4-D	1	1.0	0.45	0.45	69
Acetochlor	18	1.0	1.37	1.37	4,447
Dicamba	4	1.0	0.15	0.15	113
Glyphosate	94	1.4	0.89	1.25	21,631
Mesotrione	5	1.0	0.10	0.10	98
S-metolachlor	3	1.0	1.33	1.33	618
Insecticides					
Chlorpyrifos	4	1.0	0.63	0.65	528
Esfenvalerate	8	1.0	0.03	0.03	37
Lambda-cyhalothrin	13	1.0	0.02	0.02	60

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Atrazine, Bromoxynil, Chlorimuron, Clethodim, Clopyralid, Cloransulam, Diflufenzopyr, Dimethenamid-p, Fenoxaprop, Fluazifop, Flumetsulam, Flumioxazin, Fomesafen, Nicosulfuron, Phenmedipham, Pyrasulfotole, Rimsulfuron, Tembotrione, and Thifensulfuron.

Insecticides applied but not published included the following: Bifenthrin, Cyfluthrin, Phostebupirim, and Tefluthrin.

Fungicides applied but not published included the following: Azoxystrobin, Fluoxastrobin, Propiconazole, Pyraclostrobin, and Tebuconazole.

Steele County

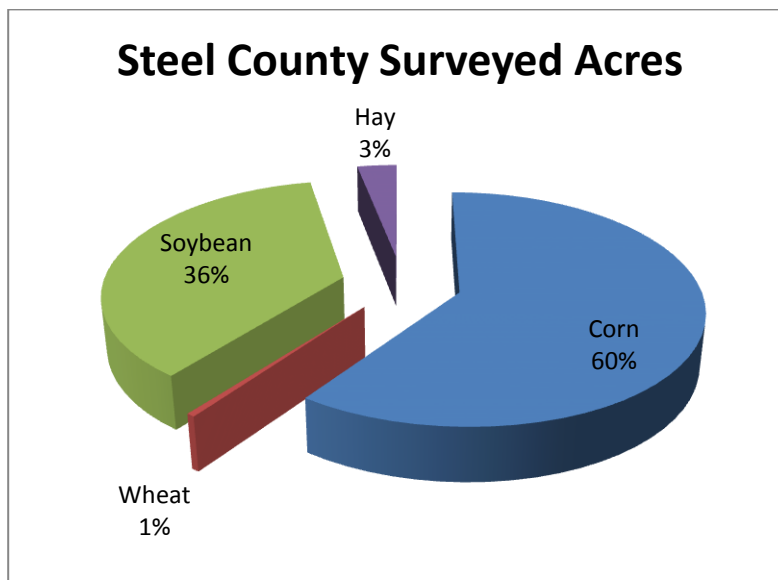


Table 104. Steele County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Acetochlor	32	1.0	1.12	1.12	7,243
Atrazine	8	1.0	0.56	0.56	882
Clopyralid	15	1.0	0.06	0.06	184
Flumetsulam	15	1.0	0.03	0.03	76
Glyphosate	88	1.3	0.75	0.95	16,675
Mesotrione	30	1.0	0.06	0.06	381
Insecticides					
Lambda-cyhalothrin	20	1.0	0.02	0.02	92
Tefluthrin	19	1.0	0.12	0.12	451
Fungicides					
Azoxystrobin	7	1.0	0.10	0.10	127
Pyraclostrobin	7	1.0	0.08	0.08	121

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Clethodim, Cloransulam, Dicamba, Diflufenzopyr, Dimethenamid-p, Fenoxaprop, Fluazifop, Flumiclorac, Fomesafen, Imazethapyr, Rimsulfuron, S-metolachlor, Saflufenacil, Sulfentrazone, Thifensulfuron, and Tribenuron.

Insecticides applied but not published included the following: Chlorpyrifos, Cyfluthrin, Esfenvalerate, Phostebupirim, and Thiamethoxam.

Fungicides applied but not published included the following: Propiconazole, Prothioconazole, and Tebuconazole.

Waseca County

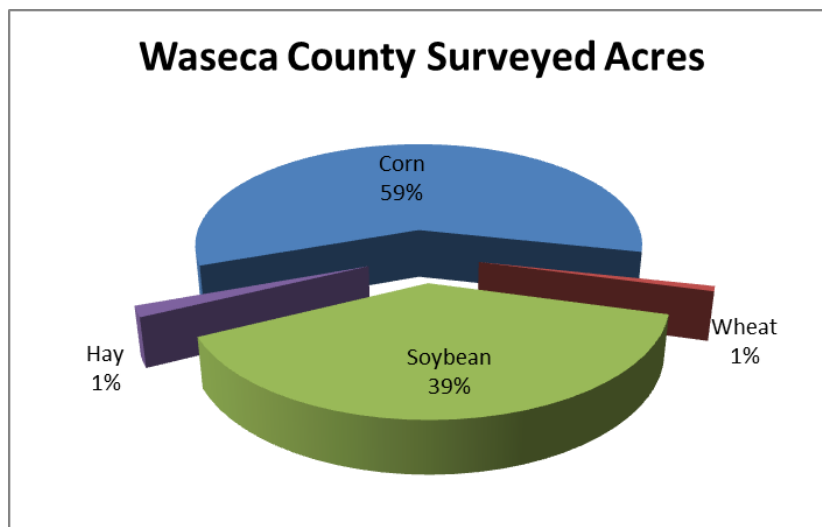


Table 105. Waseca County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Acetochlor	9	1.0	1.01	1.01	1,479
Fomesafen	4	1.0	0.27	0.27	178
Glyphosate	94	1.3	0.83	1.09	17,282
Mesotrione	28	1.0	0.09	0.09	442
S-metolachlor	22	1.0	1.21	1.21	4,601
Insecticides					
Chlorpyrifos	5	1.0	0.66	0.66	566
Lambda-cyhalothrin	27	1.0	0.02	0.02	112
Thiamethoxam	16	1.0	0.03	0.03	88
Fungicides					
Azoxystrobin	29	1.0	0.10	0.10	473
Pyraclostrobin	12	1.0	0.09	0.09	174

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Clethodim, Cloransulam, Dicamba, Dimethenamid-p, Fluazifop, Flumioxazin, Fluthiacet-methyl, Imazethapyr, Pendimethalin, Saflufenacil, Tembotrione, and Thifensulfuron.

Insecticides applied but not published included the following: Bifenthrin, Cyfluthrin, Esfenvalerate, Phorate, Phostebupirim, and Tefluthrin.

Fungicides applied but not published included the following: Mefenoxam, Propiconazole, and Streptomyces lydicus wyec 108.

Watonwan County

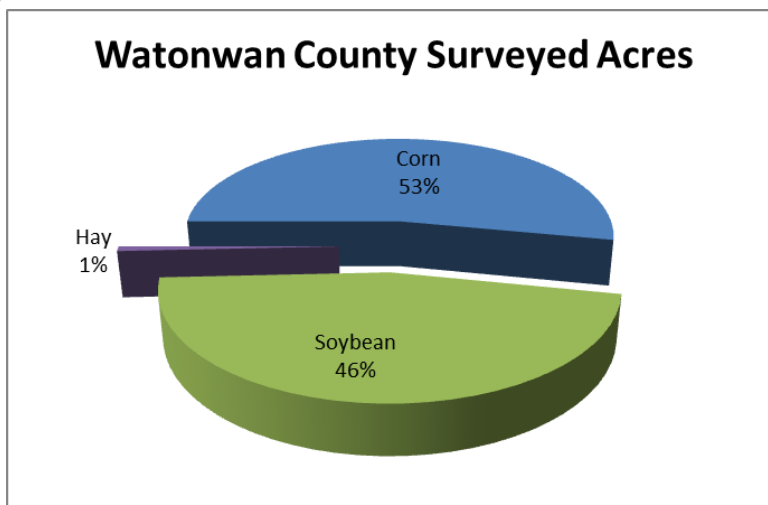


Table 106. Watonwan County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Herbicides			<i>(a.i.)</i>	<i>(a.i.)</i>	<i>(a.i.)</i>
Acetochlor	29	1.0	0.97	0.97	8,631
Atrazine	12	1.0	0.40	0.40	1,414
Clethodim	5	1.0	0.08	0.08	126
Clopyralid	14	1.0	0.07	0.07	302
Flumetsulam	14	1.0	0.03	0.03	122
Fluthiacet-methyl	6	1.0	0.00	0.00	6
Glyphosate	86	1.4	0.79	1.14	29,523
Mesotrione	13	1.0	0.09	0.09	378
Insecticides					
Bifenthrin	6	1.0	0.04	0.04	66
Chlorpyrifos	20	1.0	0.47	0.47	2,792
Lambda-cyhalothrin	12	1.1	0.03	0.03	98
Zeta-cypermethrin	6	1.0	0.02	0.02	36
Fungicides					
Azoxystrobin	10	1.0	0.10	0.10	327

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Cloransulam, Dicamba, Fluazifop, Flumiclorac, Fomesafen, Glufosinate-ammonium, S-metolachlor, Sulfentrazone, Tembotrione, and Thifensulfuron.

Insecticides applied but not published included the following: Cyfluthrin, Gamma-cyhalothrin, Phostebupirim, Terbufos, and Thiamethoxam.

Fungicides applied but not published included the following: Propiconazole and Pyraclostrobin.

Wright County

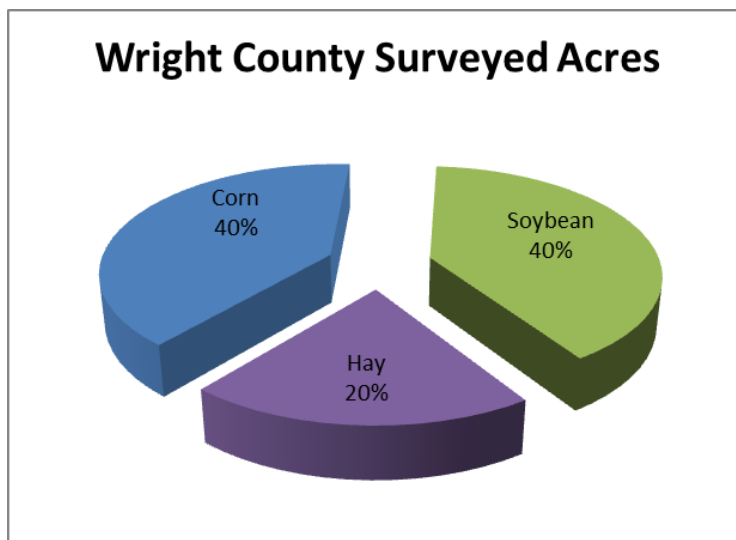


Table 107. Wright County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Acetochlor	9	1.1	0.94	1.01	799
Clopyralid	9	1.0	0.07	0.07	52
Dicamba	13	1.0	0.08	0.08	86
Diflufenzopyr	13	1.0	0.03	0.03	33
Flumetsulam	9	1.0	0.03	0.03	21
Glyphosate	74	1.4	0.95	1.34	8,337
Insecticides					
Chlorpyrifos	10	1.0	0.65	0.65	532
Lambda-cyhalothrin	19	1.0	0.02	0.02	38
Fungicides					
Pyraclostrobin	20	1.0	0.08	0.08	140

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Chlorimuron, Clethodim, Dimethenamid-p, Flumiclorac, Fluthiacet-methyl, Halosulfuron, Mesotrione, Metribuzin, Pendimethalin, S-metolachlor, Thifensulfuron, Topramezone, and Trifluralin.

Insecticides applied but not published included the following: Bifenthrin, Esfenvalerate, and Thiamethoxam.

Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, and Trifloxystrobin.

PMA 9 County Data

Dodge County

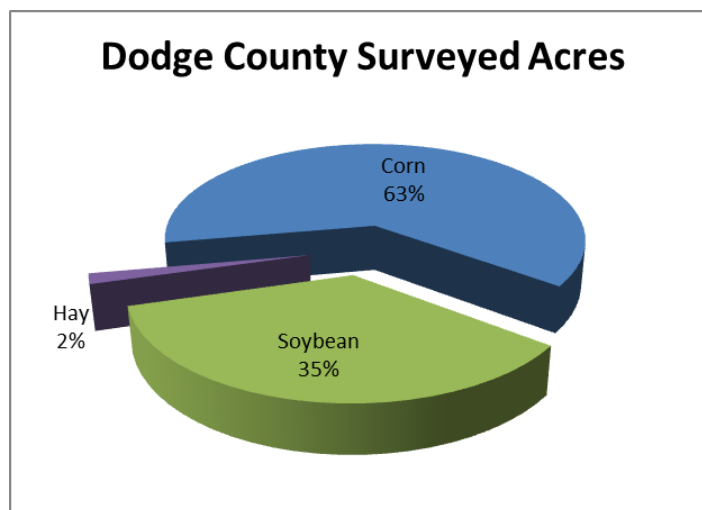


Table 108. Dodge County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Acetochlor	8	1.0	0.95	0.96	3,003
Clopyralid	8	1.0	0.07	0.07	229
Flumetsulam	8	1.0	0.03	0.03	95
Glyphosate	96	1.4	0.85	1.19	42,540
Imazethapyr	2	1.0	0.06	0.06	50
Mesotrione	37	1.0	0.09	0.09	1,299
S-metolachlor	37	1.0	0.98	1.02	14,090
Saflufenacil	2	1.0	0.03	0.03	21
Insecticides					
Chlorpyrifos	1	1.0	0.52	0.52	283
Lambda-cyhalothrin	28	1.0	0.03	0.03	266
Tefluthrin	3	1.0	0.12	0.12	135
Fungicides					
Pyraclostrobin	22	1.0	0.07	0.07	583

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Clethodim, Cloransulam, Dicamba, Diflufenzopyr, Dimethenamid-p, Fluazifop, Fluthiacet-methyl, Fomesafen, Glufosinate-ammonium, Pendimethalin, Quizalofop, Sulfentrazone, and Topramezone.

Insecticides applied but not published included the following: Bifenthrin, Cyfluthrin, Phostebupirim, Thiamethoxam, and Zeta-cypermethrin.

Fungicides applied but not published included the following: Azoxystrobin, Metconazole, and Propiconazole.

Fillmore County

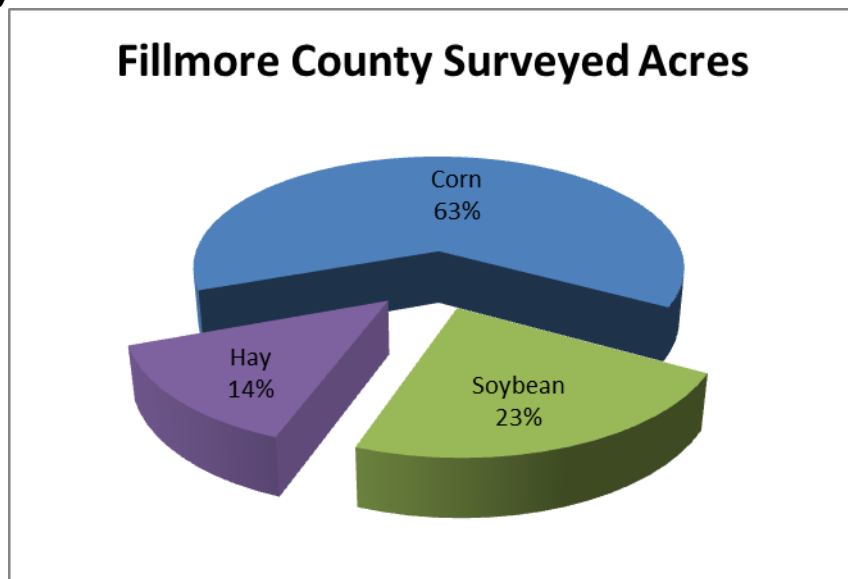


Table 109. Fillmore County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Acetochlor	26	1.0	1.38	1.38	4,461
Clopyralid	14	1.0	0.07	0.07	121
Dicamba	5	1.0	0.07	0.07	49
Flumetsulam	14	1.0	0.03	0.03	50
Glyphosate	81	1.3	0.81	1.02	10,403
Mesotrione	9	1.0	0.08	0.08	95
S-metolachlor	11	1.0	0.85	0.85	1,185
Insecticides					
Tefluthrin	2	1.0	0.11	0.11	32
Fungicides					
Pyraclostrobin	10	1.0	0.10	0.10	129

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Atrazine, Clethodim, Cloransulam, Diflufenopyr, Dimethenamid-p, Fluazifop, Fomesafen, Imazethapyr, Primisulfuron, Saflufenacil, Sulfentrazone, and Tembotrione.

Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, Cyfluthrin, Esfenvalerate, Gamma-cyhalothrin, Lambda-cyhalothrin, Phostebupirim, and Zeta-cypermethrin.

Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, and Trifloxystrobin.

Goodhue County

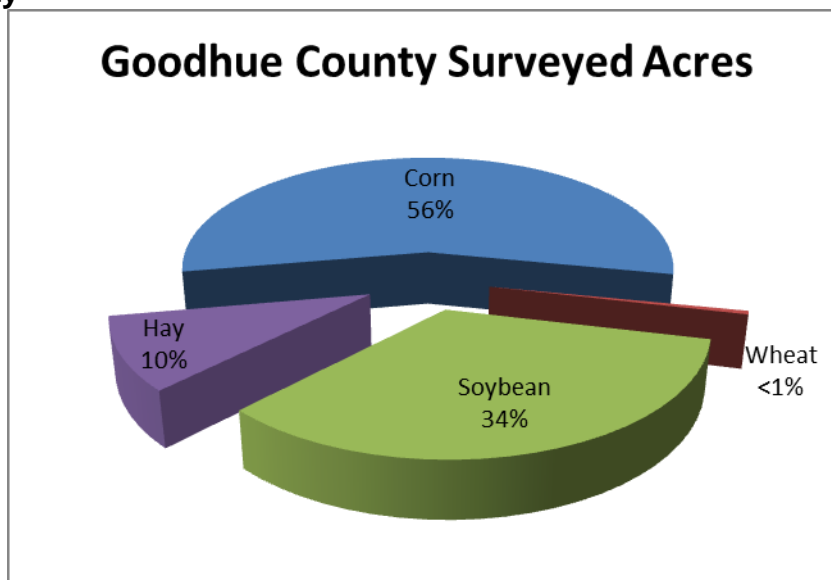


Table 110. Goodhue County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Herbicides			<i>(a.i.)</i>	<i>(a.i.)</i>	<i>(a.i.)</i>
Acetochlor	17	1.2	1.27	1.56	3,146
Clopyralid	14	1.0	0.09	0.09	150
Dicamba	3	1.0	0.13	0.13	53
Flumetsulam	14	1.0	0.04	0.04	62
Glyphosate	83	1.3	0.84	1.08	10,646
Saflufenacil	17	1.0	0.04	0.04	82

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Chlorimuron, Cloransulam, Diflufenzopyr, Dimethenamid-p, Fluazifop, Flumioxazin, Imazethapyr, Mesotrione, Primisulfuron, Quizalofop, S-metolachlor, Sulfentrazone, Tembotrione, Thifensulfuron, and Triencarbazone-methyl.

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

Fungicides applied but not published included the following: Pyraclostrobin.

Houston County

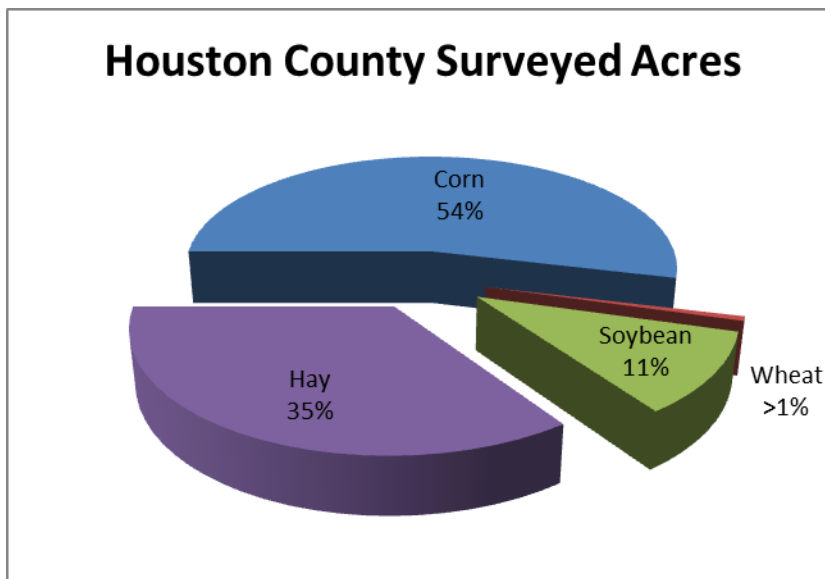


Table 111. Houston County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Herbicides			(a.i.)	(a.i.)	(a.i.)
Acetochlor	21	1.0	0.94	0.94	1,286
Atrazine	17	1.0	0.41	0.41	470
Clopyralid	18	1.0	0.07	0.07	83
Dicamba	9	1.0	0.08	0.08	46
Diflufenzopyr	8	1.0	0.03	0.03	14
Flumetsulam	18	1.0	0.03	0.03	34
Glyphosate	55	1.0	0.76	0.79	2,877
Mesotrione	10	1.0	0.10	0.10	70
S-metolachlor	10	1.0	1.04	1.04	674

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Chlorimuron, Clethodim, Fluthiacet-methyl, Halosulfuron, Imazethapyr, Nicosulfuron, Rimsulfuron, Tembotrione, Thifensulfuron, and Topramezone.

Insecticides applied but not published included the following: Beta-cyfluthrin, Chlorpyrifos, and Lambda-cyhalothrin.

Fungicides applied but not published included the following: Azoxystrobin and Pyraclostrobin.

Mower County

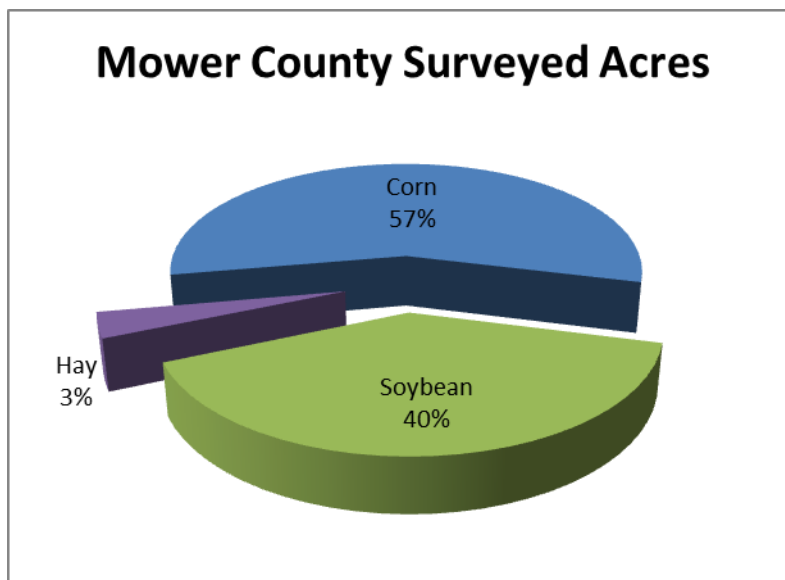


Table 112. Mower County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Acetochlor	15	1.0	1.24	1.24	4,245
Atrazine	8	1.0	0.51	0.51	955
Glyphosate	92	1.5	0.80	1.20	24,735
Mesotrione	6	1.0	0.09	0.09	123
S-metolachlor	5	1.3	1.00	1.26	1,457
Insecticides					
Chlorpyrifos	4	1.0	0.96	0.96	866
Lambda-cyhalothrin	11	1.0	0.02	0.02	53
Fungicides					
Pyraclostrobin	29	1.0	0.10	0.10	653

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Bromoxynil, Clethodim, Fenoxaprop, Fluazifop, Fomesafen, Glufosinate-ammonium, Imazethapyr, Tembotrione, and Tribenuron.

Insecticides applied but not published included the following: Beta-cyfluthrin, Bifenthrin, Chlorethoxyfos, Cyfluthrin, Esfenvalerate, Imidacloprid, Phostebupirim, Tefluthrin, Thiamethoxam, and Zeta-cypermethrin.

Fungicides applied but not published included the following: Azoxystrobin and Propiconazole.

Olmsted County

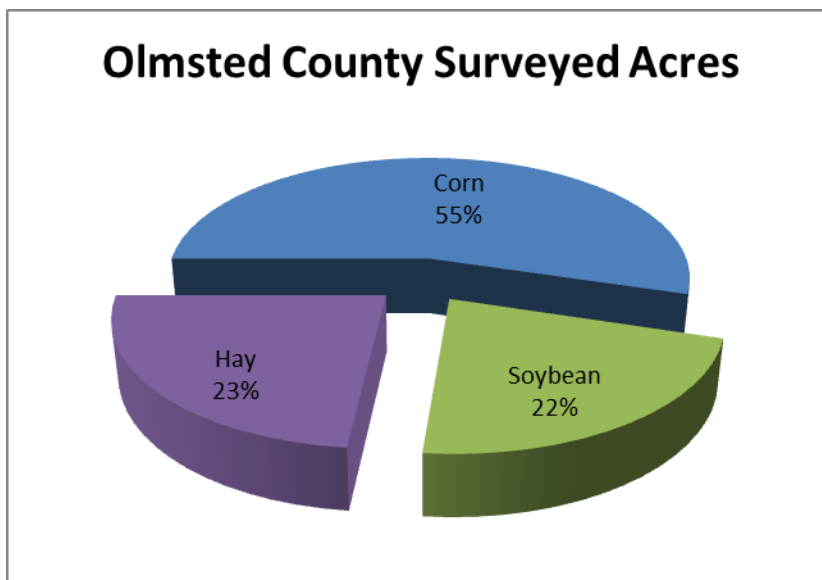


Table 113. Olmsted County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Herbicides			<i>(a.i.)</i>	<i>(a.i.)</i>	<i>(a.i.)</i>
Acetochlor	12	1.0	1.03	1.03	1,740
Clopyralid	8	1.0	0.08	0.08	91
Dicamba	4	1.0	0.18	0.18	97
Dimethenamid-p	11	1.0	0.62	0.62	985
Flumetsulam	8	1.0	0.03	0.03	38
Glyphosate	55	1.5	0.86	1.33	10,633
Saflufenacil	8	1.0	0.06	0.06	74
Insecticides					
Lambda-cyhalothrin	12	1.0	0.02	0.02	33
Fungicides					
Pyraclostrobin	12	1.0	0.09	0.09	144

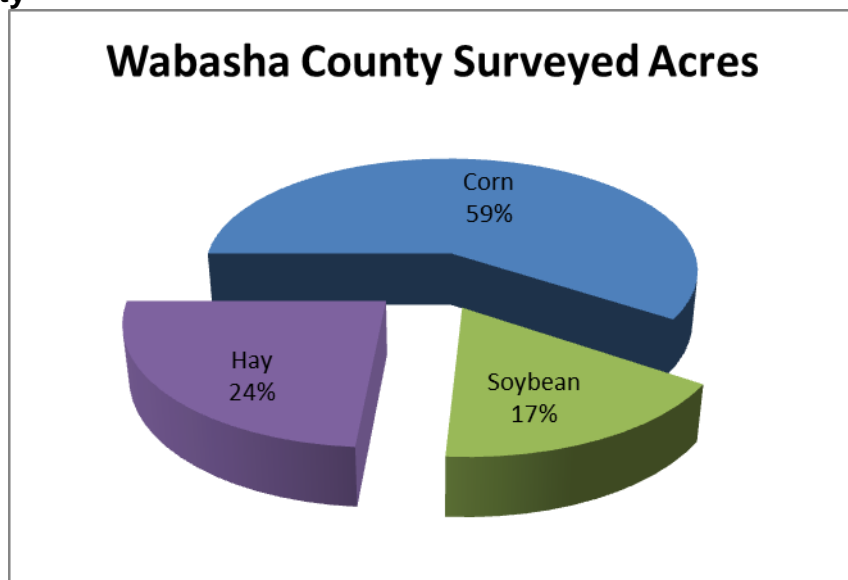
¹ Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2011 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Diflufenzopyr, Fluazifop, Fomesafen, Imazamox, Imazethapyr, Mesotrione, Nicosulfuron, S-metolachlor, Tembotrione, Thifensulfuron, Triencarbazone-methyl, and Trifluralin.

Insecticides applied but not published included the following: Beta-cyfluthrin, Bifenthrin, Chlorpyrifos, Cyfluthrin, Esfenvalerate, Phostebupirim, Tefluthrin, and Thiamethoxam.

Fungicides applied but not published included the following: Metconazole.

Wabasha County

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Acetochlor	30	1.0	0.82	0.82	2,431
Atrazine	9	1.0	0.28	0.28	242
Clopyralid	25	1.0	0.07	0.07	175
Flumetsulam	25	1.0	0.03	0.03	70
Glyphosate	69	1.0	0.86	0.88	5,955
Insecticides					
Lambda-cyhalothrin	3	1.0	0.04	0.04	12

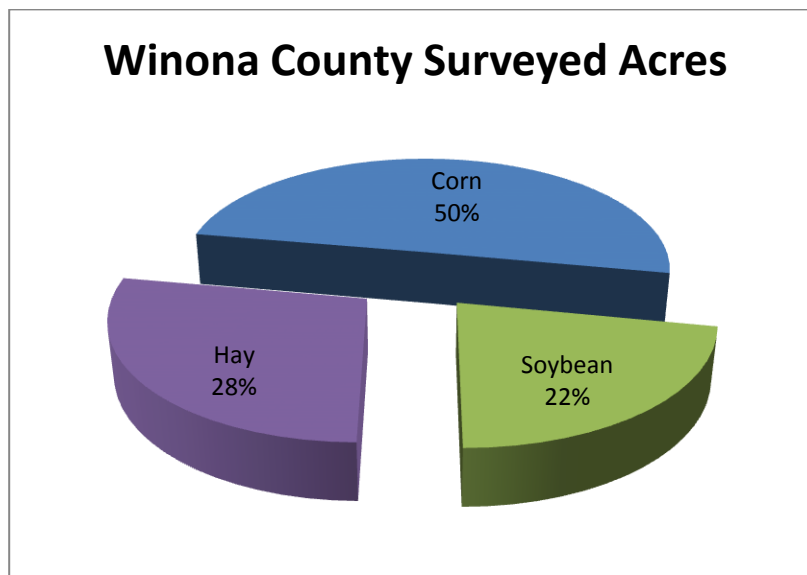
¹ Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2011 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Clethodim, Dicamba, Fluthiacet-methyl, Imazethapyr, Mesotrione, Quizalofop, and S-metolachlor.

Insecticides applied but not published included the following: Bifenthrin, Chlorethoxyfos, Chlorpyrifos, Cyfluthrin, Phostebupirim, and Tefluthrin.

Fungicides applied but not published included the following: Pyraclostrobin.

Winona County

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
Herbicides					
Acetochlor	19	1.0	1.63	1.70	3,239
Atrazine	5	1.0	0.60	0.60	266
Clopyralid	8	1.0	0.08	0.08	62
Dicamba	12	1.0	0.08	0.08	92
Diflufenzopyr	11	1.0	0.03	0.03	32
Flumetsulam	8	1.0	0.03	0.03	25
Glyphosate	61	1.1	0.87	0.97	5,854
Mesotrione	5	1.2	0.12	0.14	73
S-metolachlor	6	1.2	1.49	1.74	974

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Cloransulam, Dimethenamid-p, Halosulfuron, Imazethapyr, Nicosulfuron, Primisulfuron, Rimsulfuron, Saflufenacil, and Sulfentrazone.

Insecticides applied but not published included the following: Cyfluthrin, Lambda-cyhalothrin, Phostebupirim, Tefluthrin, and Terbufos.

Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Pyraclostrobin, and Trifloxystrobin.

PMA 10 County Data

Anoka County

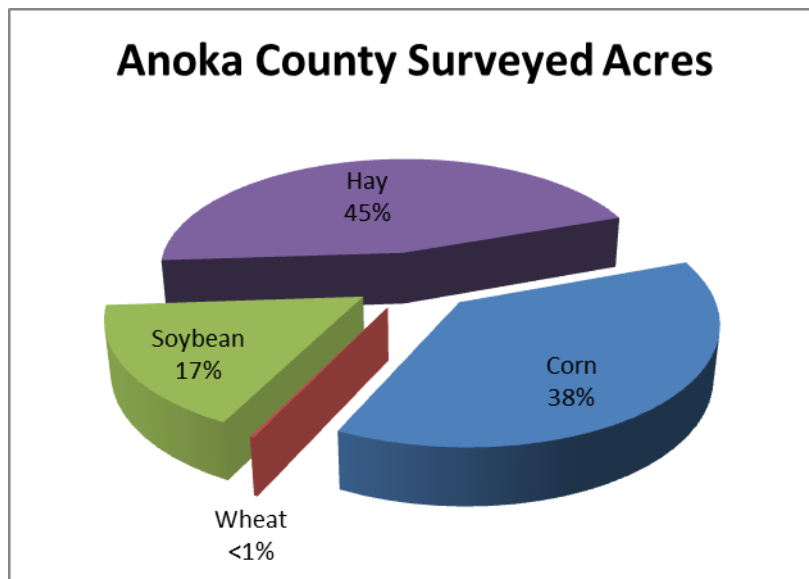


Table 116. Anoka County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Glyphosate	52	1.2	0.83	0.95	3,280

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Acetochlor, Atrazine, Dicamba, Diflufenzopyr, Dimethenamid-p, Glufosinate-ammonium, Imazethapyr, Mesotrione, Pendimethalin, S-metolachlor, and Topramezone.

Carver County

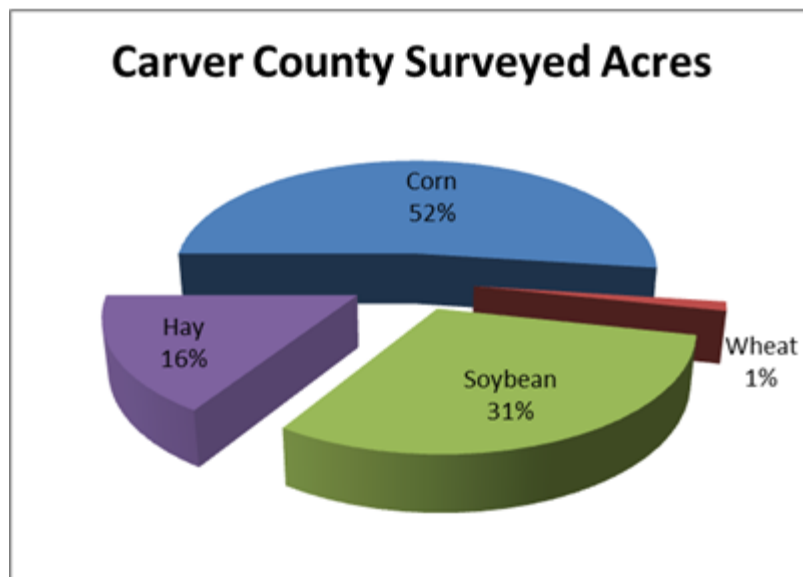


Table 117. Carver County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Acetochlor	16	1.0	1.36	1.36	2,400
Glyphosate	68	1.2	0.84	1.03	7,513
Mesotrione	17	1.0	0.09	0.09	172
Insecticides					
Lambda-cyhalothrin	14	1.0	0.02	0.02	33

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Atrazine, Bromoxynil, Clopyralid, Dicamba, Diflufenzopyr, Dimethenamid-p, Fluazifop, Flumetsulam, Fluthiacet-methyl, Glufosinate-ammonium, Imazethapyr, Nicosulfuron, Pendimethalin, Pyrasulfotole, Rimsulfuron, S-metolachlor, and Saflufenacil.

Insecticides applied but not published included the following: Chlorpyrifos, Tefluthrin, and Thiamethoxam.

Fungicides applied but not published included the following: Pyraclostrobin.

DakotaCounty

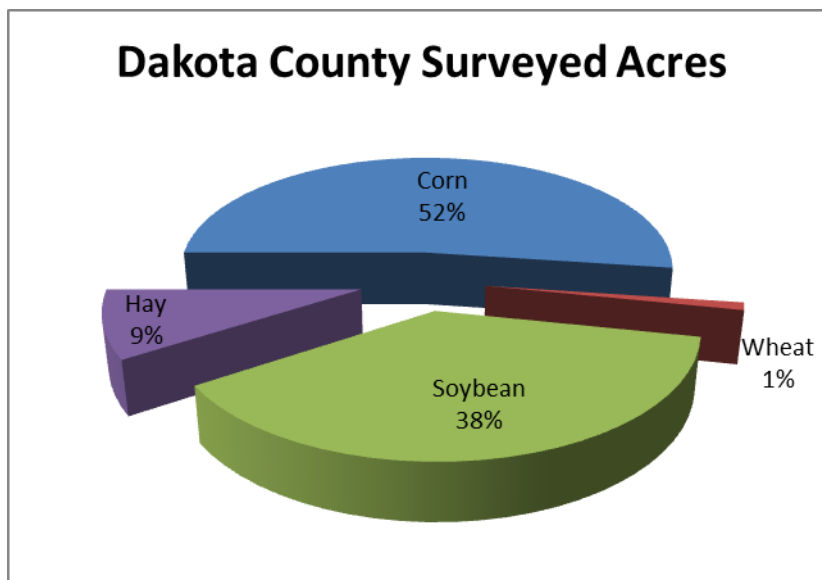


Table 118. Dakota County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Herbicides			<i>(a.i.)</i>	<i>(a.i.)</i>	<i>(a.i.)</i>
Dimethenamid-p	9	1.0	0.54	0.54	594
Glyphosate	85	1.1	0.89	1.00	10,011
Saflufenacil	8	1.0	0.03	0.03	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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2, 4-D, Acetochlor, Atrazine, Bromoxynil, Clopyralid, Dicamba, Diflufenopyr, Fluazifop, Flumetsulam, Imazethapyr, Mesotrione, Nicosulfuron, Primisulfuron, Quizalofop, and S-metolachlor.

Insecticides applied but not published included the following: Chlorpyrifos, Cyfluthrin, Esfenvalerate, Lambda-cyhalothrin, Phostebupirim, and Tefluthrin.

Fungicides applied but not published included the following: Pyraclostrobin.

Scott County

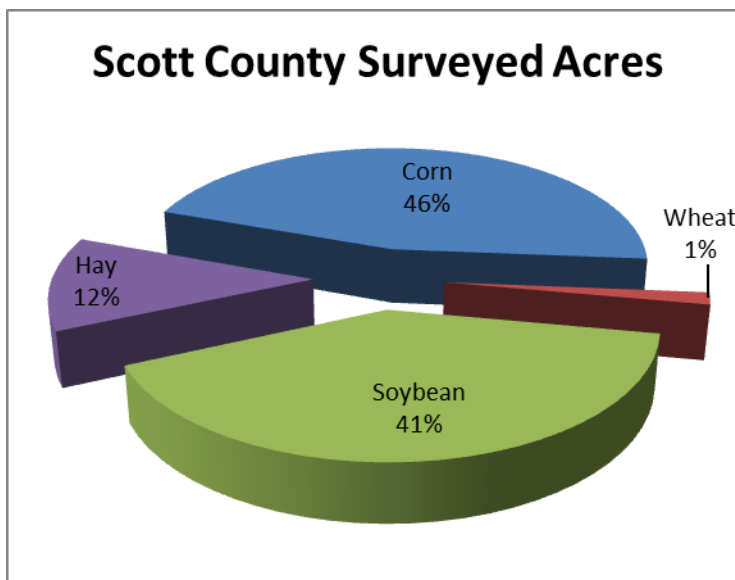


Table 119. Scott County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Herbicides			<i>(a.i.)</i>	<i>(a.i.)</i>	<i>(a.i.)</i>
Acetochlor	33	1.0	1.24	1.24	4,038
Fluthiacet-methyl	23	1.0	0.00	0.00	5
Glyphosate	82	1.3	0.84	1.11	9,037
Mesotrione	14	1.0	0.08	0.08	113

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 2011 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, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Bromoxynil, Chlorimuron, Dicamba, Diflufenzopyr, Fluazifop, Fomesafen, Imazethapyr, MCPA, S-metolachlor, Saflufenacil, Thifensulfuron, and Trifluralin.

Insecticides applied but not published included the following: Chlorpyrifos, Cyfluthrin, Lambda-cyhalothrin, and Phostebupirim.

Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Pyraclostrobin, and Trifloxystrobin.

Washington County

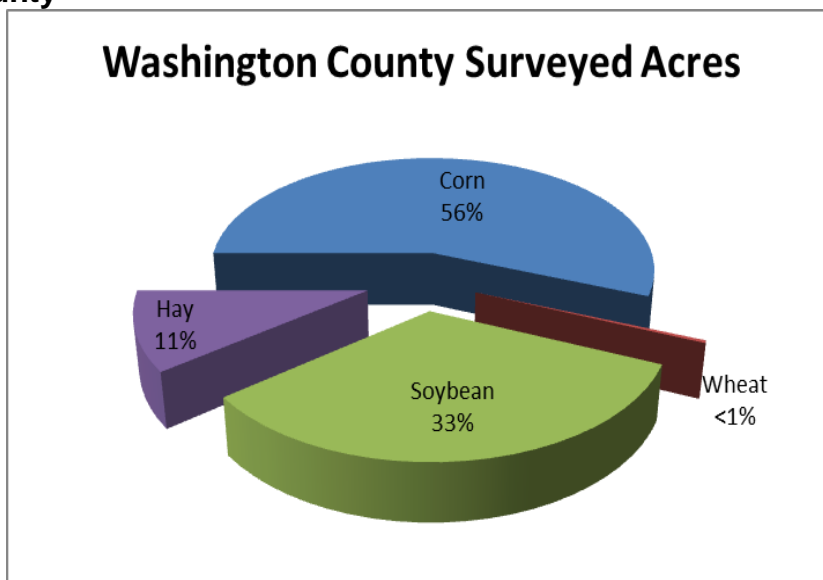


Table 120. Washington County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year ¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Herbicides					
Acetochlor	34	1.0	0.98	0.98	3,002
Dicamba	5	1.0	0.26	0.26	127
Glyphosate	73	1.2	0.85	1.03	6,674
Insecticides					
Lambda-cyhalothrin	11	1.0	0.02	0.02	22

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 2011 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, area or county levels.

Herbicides applied but not published included the following: Atrazine, Chlorimuron, Clethodim, Clopyralid, Diflufenzopyr, Dimethenamid-p, Flumetsulam, Imazethapyr, Mesotrione, S-metolachlor, Tembotrione, Thifensulfuron, Topramezone, and Triencarbazone-methyl.

Insecticides applied but not published included the following: Bifenthrin, Chloethoxyfos, Chlorpyrifos, Tefluthrin, and Thiamethoxam.

Fungicides applied but not published included the following: Pyraclostrobin and Streptomyces lydicus wyec



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 2011 Cropping Year Minnesota Pesticide Use Survey Instrument For 2011 Cropping Year

1. ACREAGE

REPORT FOR THE FARM YOU OPERATE <i>(Include Land Rented From Others, Exclude Land Rented Out)</i>				
2011 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 <i>(Durum, other Spring, Winter)</i>	206	207	208	209
SOYBEANS	211	212	213	214
ALL HAY	216	217	218	219

2. USAGE OF INDIVIDUAL PESTICIDES ON 2011 CROPS - Include applications after September 1, 2010 on crops for 2011 harvest. *(Please report below the acres treated with each individual chemical during 2011 by crop and/or land use. If pesticides were applied in combination, report each separately. Exclude seed treatment and inoculants.)*

NAME OF PESTICIDE USED <i>(Please list chemicals used. If necessary, refer to the enclosed list)</i>	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
	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
NAME OF PESTICIDE USED <i>(Please list chemicals used. If necessary, refer to the enclosed list)</i>	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 <i>(Please list chemicals used. If necessary, refer to the enclosed list)</i>	Office Use	Acres Treated	No. of Applications	Rate	Unit Code: 1 Pounds 12 Gallons 13 Quarts 14 Pints 15 Ounces 30 Grams
SOYBEAN					
	501	502	503	504	505
	506	507	508	509	510
	511	512	513	514	515

	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 <i>(Please list chemicals used. If necessary, refer to the enclosed list)</i>	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

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 2-Spouse 3-Acct/Bkpr 4-Oth 5-Est R 6-Est NR 8-Office Hold 9-Partner	101	2-Tel 3-Int 7-TR 8-IR 9-Inac	910	098	100	987

Appendix 2. 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 USDA National Agricultural Statistics Service (NASS) to enhance and broaden pesticide use monitoring efforts. NASS has a long history of providing statewide crop and production statistics. Over the last decade NASS 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 pilot⁹ was conducted in 2001 by expanding the existing ARMS (Agricultural Resource Management Study) developed by 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, areally-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 USDA North Dakota Field Office and North Dakota State University Extension had already established a strong tradition in collecting statewide pesticide use by using NASS 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 pilot¹⁰ was developed. MDA and NASS 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 (a.i.) 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 NASS 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.

⁹ “*Expanded Minnesota Agricultural Statistics Pesticide Use Data*”, 2003, by MASS and MDA.

¹⁰ Unpublished data. From the September 20, 2003 EPA Report.