



# **2007 Pesticide Usage on Four Major Crops In Minnesota**

**Minnesota Department of Agriculture**

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

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## 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 go to Doug Hartwig and Dan Lofthus, Director and Deputy Director, respectively, of the USDA, NASS, 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.

### 2007 Pesticide Use Summary and Highlights

This report summarizes herbicide, insecticide and fungicide use information reported by approximately 4,000 farmers for the 2007 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, soybeans, wheat, and hay. Collectively these crops account for more than 90% of Minnesota's cropland. This survey collected pesticide information from 1 million acres of cropland in 76 of the state's most intensively agricultural counties. The survey covered 9% to 10% of the state's corn, soybean, and hay acres and 12% of the wheat acres.

The report represents the third survey conducted on pesticide use in Minnesota by the MDA. The first surveys collected information for the 2003 and 2005 crop years and also included corn, soybeans, hay and wheat. Those surveys can be found at: <http://www.mda.state.mn.us/protecting/soilprotection/fanmap.htm>.

*Corn Highlights:* Herbicides, insecticides, and fungicides were applied to 98%, 14%, and 3%, respectively, of the surveyed corn acres. On the 2,500+ farms that reported corn information on approximately 750,000 acres, the top three herbicide products (based on percent acres covered) were glyphosate<sup>1</sup> (73%), acetochlor (23%), and atrazine (22%).

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<sup>1</sup> Including the diammonium salt



*Soybean Highlights:* Herbicides, insecticides, and fungicides were applied to 97%, 33%, and 3%, respectively, on the 625,000 surveyed acres of soybeans. Over 2,000 farms provided pesticide information on this crop.

Glyphosate products<sup>2</sup> were applied to 91% of the acres. No other herbicides were applied on more than 2% of all soybean acres. Lambda-cyhalothrin and chlorpyrifos were the major soybean insecticides used in the survey and were applied on 16% and 14% respectively, of all soybean acres.

*Wheat Highlights:* Herbicides, insecticides, and fungicides were applied to 95%, 17%, and 68%, respectively, of the 212,000 wheat acres. Approximately 700 farms provided information for wheat. The top three herbicide products (based on percent of total acres covered) were MCPA (57%), bromoxynil (39%) and fenoxaprop 35%). The three major fungicide products were tebuconazole, pyraclostrobin, and propiconazole applied on 30%, 23%, and 16% of all wheat acres respectively.

*Hay Highlights:* Herbicides, insecticides, and fungicides were applied to 1%, 10%, and 0%, respectively, of the 171,000 acres of hay. Approximately 2,100 farms provided information on this crop. The three major pesticide products applied were the insecticides lambda-cyhalothrin, chlorpyrifos, and cyfluthrin which were applied on 3%, 2%, and 2%, of all hay acres respectively.

## **Survey Design and Implementation**

Figure 1 shows 10 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.

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<sup>2</sup> Including the diammonium salt

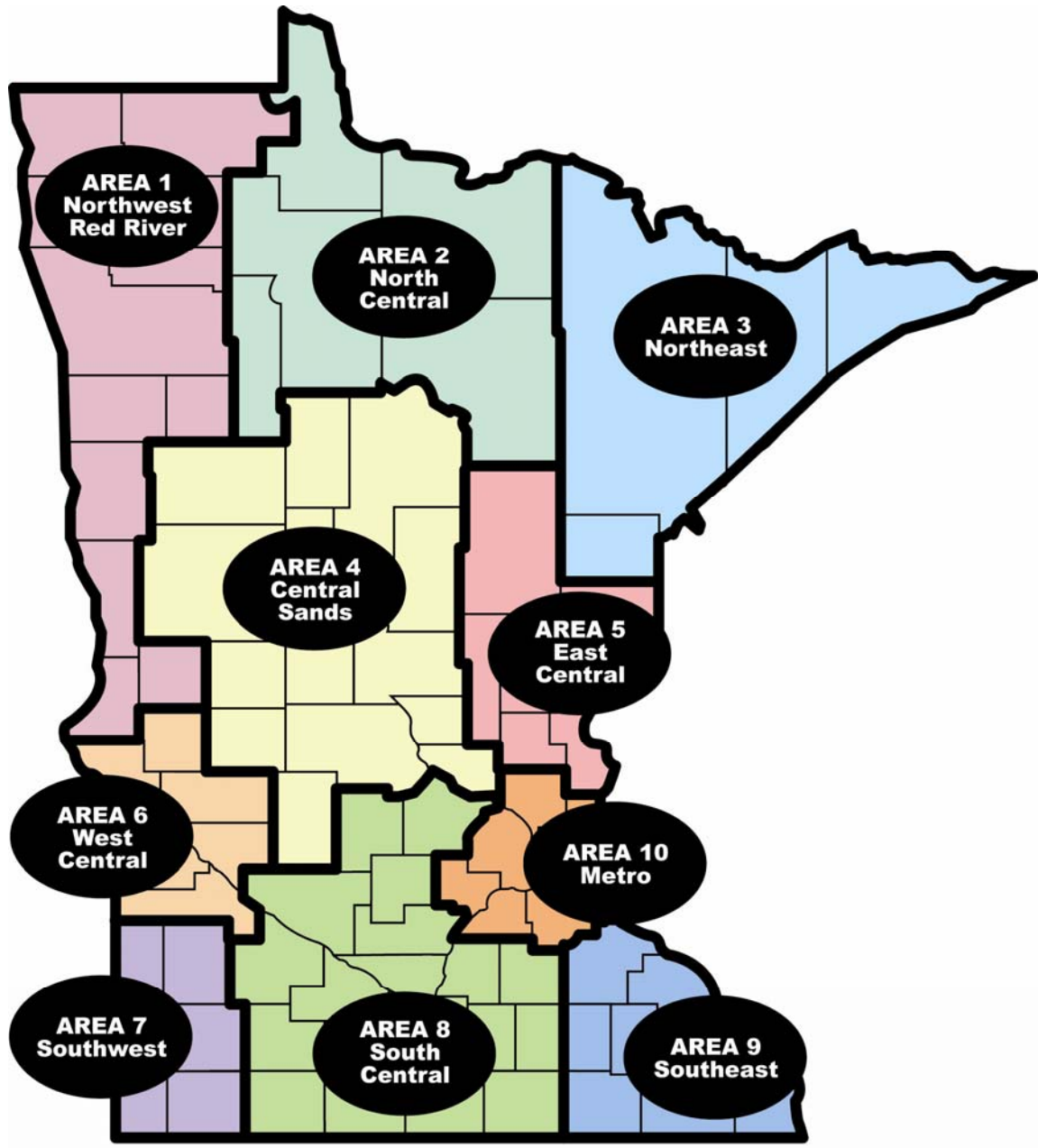


Figure 1. MDA Pesticide Management Areas (PMA)

Some of the challenges of collecting pesticide use data are:

- Unlike fertilizer formulations, which remain very constant, new pesticide products and formulations are released every year;
- Currently there are more than 700 different pesticide products available for use in Minnesota for corn, soybeans, wheat and hay;
- There are multiple product names that use very similar chemicals but frequently have different label rates and use restrictions. For example, Monsanto marketed glyphosate for many years under numerous 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 seventy-six agricultural counties. All farmers from each county who grew any one or more of the target crops (corn, soybeans, wheat and hay) were eligible to be drawn. The selection of 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 50 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 50.

The number of farms that did not want to participate in the survey was small (although the exact number was not documented). Usable data was provided by 3,825 farms. Approximately 600-700 additional farms provided information that was later determined to be incomplete. Respondents were required to have all pesticide applications and rates for a specific crop to be considered for inclusion in the survey. For example, an individual grower may have had good records for corn and soybeans acres but could not find the records for the insecticide applied to the hay crop. In this scenario, the corn and soybean fields would be used and the hay field would eventually be eliminated from the data set.

Calls were also made directly to 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 2008. 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, soybeans, wheat and hay grown in the 2007 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 2007 crop year.**

Crop Acres Surveyed								
Crop	Number of Respondents	Total Surveyed Acres	Herbicide Applied		Insecticide Applied		Fungicide Applied	
			Acres	(%)	Acres	(%)	Acres	(%)
Corn	2,556	759,134	743,259	(98%)	109,153	(14%)	22,454	(3%)
Soybean	2,074	624,963	606,034	(97%)	204,835	(33%)	16,215	(3%)
Wheat	662	212,469	202,312	(95%)	35,155	(17%)	114,361	(68%)
Hay	2,132	155,029	1,899	(1%)	14,775	(10%)	0	(0%)
<b>Totals</b>	<b>3,825<sup>3</sup></b>	<b>1,751,595</b>	<b>1,553,504</b>	<b>(89%)</b>	<b>363,918</b>	<b>(21%)</b>	<b>153,030</b>	<b>(9%)</b>

<sup>3</sup> The total sum of respondents across all crops was 7,424. However since most farmers grew more than one type of major crop, the actual number of participating farms was 3,825.

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

County	PMA	# of Surveyed Farms	Corn	Wheat	Soybean	Hay	Total
			Acres	Acres	Acres	Acres	Acres
CLAY	1	47	8,260	8,705	13,114	3,715	33,794
GRANT	1	50	17,397	5,420	15,023	728	38,568
KITTSOON	1	61	660	34,822	17,435	3,205	56,122
MAHNOMEN	1	56	8,294	8,753	12,005	3,678	32,730
MARSHALL	1	45	1,227	18,615	11,050	5,509	36,401
NORMAN	1	48	4,558	13,372	18,676	3,458	40,064
PENNINGTON	1	48	643	12,615	10,765	4,493	28,516
POLK	1	57	1,995	27,757	16,556	5,507	51,815
RED LAKE	1	53	2,815	15,404	14,218	3,444	35,881
ROSEAU	1	48	2,047	9,936	6,128	5,378	23,489
TRAVERSE	1	48	21,876	3,167	19,838	827	45,708
WILKIN	1	58	13,455	22,727	23,047	879	60,108
BECKER	4	46	4,584	4,942	6,256	2,466	18,248
BENTON	4	53	6,468	218	3,947	2,410	13,043
CASS	4	55	1,552	1,650	1,650	5,501	10,353
CROW WING	4	48	1,130	0	80	6,565	7,775
DOUGLAS	4	50	6,002	2,839	2,840	2,871	14,552
HUBBARD	4	51	1,033	60	540	3,523	5,156
KANDIYOHI	4	48	10,384	520	7,749	1,361	20,014
MORRISON	4	59	4,223	95	566	3,001	7,885
OTTER TAIL	4	48	3,734	1,260	1,866	2,681	9,541
POPE	4	54	15,713	1,651	10,739	1,960	30,063
SHERBURNE	4	52	7,537	47	4,114	1,317	13,015
STEARNS	4	49	6,673	406	2,462	2,486	12,027
TODD	4	59	3,482	447	1,001	3,324	8,254
WADENA	4	52	2,591	55	843	4,483	7,972
AITKIN	5	60	311	0	0	6,823	7,134
CHISAGO	5	55	3,044	103	1,412	2,275	6,834
ISANTI	5	47	2,597	80	2,391	1,567	6,635
KANABEC	5	49	2,467	500	1,042	3,931	7,940
MILLE LACS	5	51	2,891	0	1,280	2,493	6,664
PINE	5	45	1,095	172	404	3,911	5,582
BIG STONE	6	57	21,301	5,667	23,459	261	50,688
CHIPPEWA	6	56	19,853	236	11,103	265	31,457
LAC QUI PARLE	6	51	16,867	819	12,602	1,251	31,539
STEVENS	6	45	22,527	2,197	13,925	157	38,806
SWIFT	6	41	13,860	1,120	9,037	1,316	25,333
YELLOW MED.	6	51	18,142	825	15,292	722	34,981
LINCOLN	7	43	8,692	951	7,676	1,309	18,628
LYON	7	42	11,949	186	8,678	769	21,582
MURRAY	7	60	17,279	4	12,757	734	30,774
NOBLES	7	48	12,312	0	10,472	394	23,178
PIPESTONE	7	49	12,625	574	7,967	1,950	23,116
ROCK	7	54	16,433	0	11,803	780	29,016
BLUE EARTH	8	43	17,779	45	14,251	104	32,179
BROWN	8	46	8,842	199	6,592	603	16,236
COTTONWOOD	8	53	22,693	171	15,910	827	39,601
FARIBAULT	8	55	21,046	63	17,152	452	38,713
FREEBORN	8	36	12,832	0	9,156	155	22,143
JACKSON	8	50	14,506	40	11,078	412	26,036

County	PMA	# of Surveyed Farms	Corn	Wheat	Soybean	Hay	Total
			Acres	Acres	Acres	Acres	Acres
LESUEUR	8	56	25,243	214	5,708	1,252	32,417
MARTIN	8	49	16,638	0	11,852	87	28,577
MCLEOD	8	58	16,326	283	8,067	724	25,400
MEEKER	8	53	13,050	369	9,661	2,877	25,957
NICOLLET	8	46	18,207	151	6,031	448	24,837
REDWOOD	8	48	15,527	169	13,159	708	29,563
RENVILLE	8	53	21,094	405	13,913	600	36,012
RICE	8	51	8,567	17	5,185	1,453	15,222
SIBLEY	8	58	19,825	74	11,447	485	31,831
STEELE	8	38	9,995	0	6,626	624	17,245
WASECA	8	62	12,387	245	9,343	714	22,689
WATONWAN	8	45	18,743	133	13,091	289	32,256
WRIGHT	8	41	3,905	152	3,065	1,527	8,649
DODGE	9	49	13,601	17	10,698	1,220	25,536
FILLMORE	9	46	8,683	50	4,220	2,097	15,050
GOODHUE	9	50	6,041	125	4,294	1,667	12,127
HOUSTON	9	52	4,600	0	2,946	3,315	10,861
MOWER	9	47	12,995	0	8,759	516	22,270
OLMSTED	9	47	6,078	0	3,934	1,377	11,389
WABASHA	9	50	9,867	0	3,769	2,669	16,305
WINONA	9	54	6,102	0	3,016	3,629	12,747
ANOKA	10	42	2,158	0	851	2,096	5,105
CARVER	10	52	9,206	490	5,898	1,657	17,251
DAKOTA	10	51	7,557	105	5,279	805	13,746
SCOTT	10	43	3,541	35	3,009	1,957	8,542
WASHINGTON	10	54	5,283	0	3,195	2,005	10,483

## 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 “weighting” the data to account for sample size, county size and crop acreage, etc. Such strategies can be very expensive and are not without their own limitations.<sup>4</sup> As previously mentioned, approximately 50 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

<sup>4</sup> 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](http://www.nass.usda.gov/Education_and_Outreach/Understanding_Statistics/index.asp) and consult “Statistical Aspects of Surveys.” For more specific facts about agricultural chemical use surveys, consult the “Survey and Estimation Procedures” section of NASS “Agricultural Chemical Usage - Field Crops” reports available at <http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1560>

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 33% of the corn acres and mesotrione (Callisto) was reported on 13% 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 FieldMaster applied to a 60-acre subset of the same field. Both products contain atrazine but because two different products were used, the additive total of the atrazine (active ingredient) on the entire cropland would not be captured.

On individual fields, this survey indicates that the use of different brand name products containing the same active ingredients is infrequent. The average number of applications for most products was 1.0 application per year. Glyphosate is one of the exceptions for both corn and soybeans. In this survey, there were 1.2 applications of glyphosate per year on corn (73% of all surveyed corn acres at a rate of 0.85 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://state.ceris.purdue.edu/doc/mn/statemn.html>, then enter the database, submit “active ingredient” as the search option, enter the name of the active ingredient, click “submit,” check the appropriate boxes, and “submit” to obtain a list of all registered products containing the active ingredient.



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

A \* denotes data is not publishable due to limited use (less than 5 respondents)

Active Ingredient	Published	Active Ingredient	Published
<b>Herbicides</b>		<b>Insecticides</b>	
2,4-D	P	Bifenthrin	P
Acetamide	*	Carbofuran	*
Acetochlor	P	Chlorethoxyfos	P
Alachlor	*	Chlorpyrifos	P
Atrazine	P	Cyfluthrin	P
Bentazon	*	Fipronil	P
Bromoxynil	P	Lambda-cyhalothrin	P
Carfentrazone-ethyl	*	Phorate	*
Chlorimuron-ethyl	*	Tebupirimphos	P
Clethodim	*	Tefluthrin	P
Clopyralid	P	Terbufos	P
Dicamba	P	Zeta-cypermethrin	*
Cloransulam-methyl	*		
Dicamba, Dimet. salt	P	<b>Fungicides</b>	
Dicamba, Pot. salt	P	Azoxystrobin	P
Dicamba, Sodium salt	P	Chlorothalonil	*
Diflufenzopyr-sodium	P	Propiconazole	P
Dimethenamid	*	Pyraclostrobin	P
Dimethenamid-P	P		
EPTC	*		
Flumetsulam	P		
Foramsulfuron	P		
Glufosinate-ammonium	P		
Glyphosate	P		
Halosulfuron	P		
Imazapyr	*		
Imazethapyr	P		
Mesotrione	P		
Metolachlor	*		
Nicosulfuron	P		
Pendimethalin	P		
Primisulfuron	P		
Quizalofop-p-ethyl	*		
Rimsulfuron	P		
S-Metolachlor	P		
Sethoxydim	*		
Thifensulfuron	*		
Topramezone	P		

A statewide summary of corn pesticide applications is provided in Table 4. Nine percent (9%) of all Minnesota corn acres were surveyed for the 2007 season. Herbicides were applied to 98% of all surveyed corn acres. Insecticides were applied to 14% of all acres and 3% of surveyed acres received fungicides.

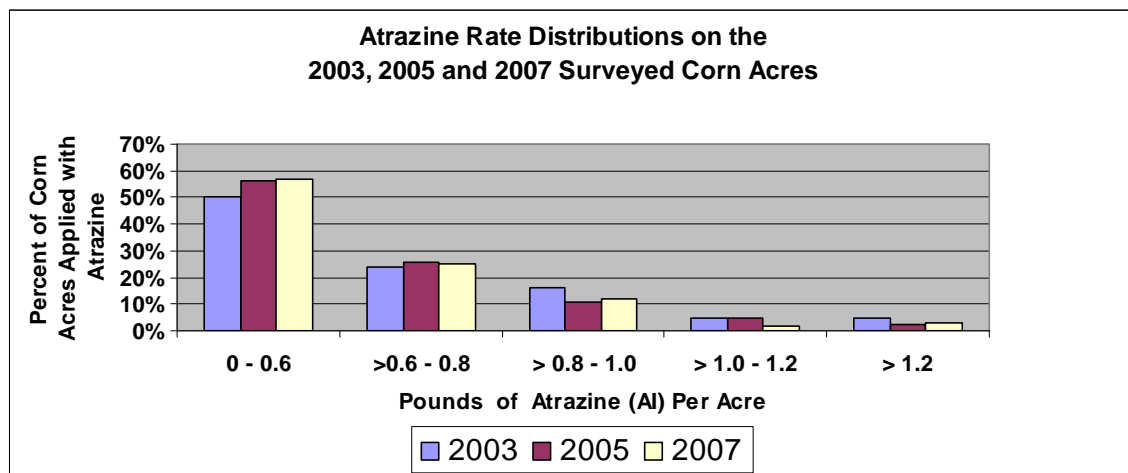
<sup>5</sup> Excludes any products with five or less responses.

**Table 4. Pesticide applications and rates by active ingredient (a.i.) for corn statewide<sup>6</sup>.**

<b>Agricultural Chemical</b>	<b>Surveyed Area Applied</b>	<b>Average Applications</b>	<b>Average Rate Per Application</b>	<b>Average Rate Per Crop Year</b>	<b>Total Applied Crop Year</b>
	<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>
<b>Active Ingredient</b>	<b>Percent applied</b>	<b>Apps per year</b>	<b>Per app</b>	<b>Per year</b>	<b>AI Pounds</b>
<b>Herbicides</b>					
2,4-D	0	1.0	0.44	0.44	1,162
Acetochlor	23	1.0	1.34	1.35	237,199
Atrazine	22	1.0	0.56	0.57	96,416
Bromoxynil	0	1.0	0.29	0.30	290
Clopyralid	2	1.0	0.12	0.12	1,499
Dicamba	3	1.0	0.26	0.26	5,233
Dicamba, Dimet. salt	1	1.0	0.09	0.09	975
Dicamba, Pot. salt	1	1.0	0.41	0.41	1,935
Dicamba, Sodium salt	0	1.0	0.13	0.13	227
Diflufenzopyr-sodium	2	1.0	0.04	0.04	409
Dimethenamid-P	4	1.0	0.59	0.59	16,347
Flumetsulam	2	1.0	0.04	0.04	555
Foramsulfuron	0	1.0	0.04	0.04	91
Glufosinate-ammonium	6	1.0	0.36	0.37	17,700
Glyphosate	73	1.2	0.73	0.85	471,383
Halosulfuron	0	1.0	0.03	0.03	8
Imazethapyr	0	1.0	0.01	0.01	16
Mesotrione	12	1.0	0.11	0.11	10,293
Metolachlor	0	1.0	1.17	1.17	1,911
Nicosulfuron	3	1.0	0.02	0.02	516
Pendimethalin	1	1.0	0.89	0.89	3,502
Primisulfuron	0	1.0	0.02	0.02	54
Rimsulfuron	3	1.0	0.01	0.01	229
S-Metolachlor	8	1.0	1.42	1.42	89,363
Topramezone	0	1.0	0.04	0.04	68
<b>Insecticides</b>					
Bifenthrin	1	1.0	0.07	0.07	725
Chlorethoxyfos	0	1.0	0.09	0.09	218
Chlorpyrifos	2	1.0	1.00	1.00	13,913
Cyfluthrin	2	1.0	0.01	0.01	109
Fipronil	3	1.0	0.12	0.12	2,289
Lambda-cyhalothrin	0	1.0	0.02	0.02	50
Tebupirimphos	2	1.0	0.14	0.14	2,178
Tefluthrin	3	1.0	0.12	0.12	2,247
Terbufos	0	1.0	0.99	0.99	872
<b>Fungicides</b>					
Azoxystrobin	0	1.0	0.06	0.06	98
Propiconazole	0	1.0	0.07	0.07	75
Pyraclostrobin	2	1.0	0.10	0.10	1,621

<sup>6</sup> Excludes any products with less than 5 responses.

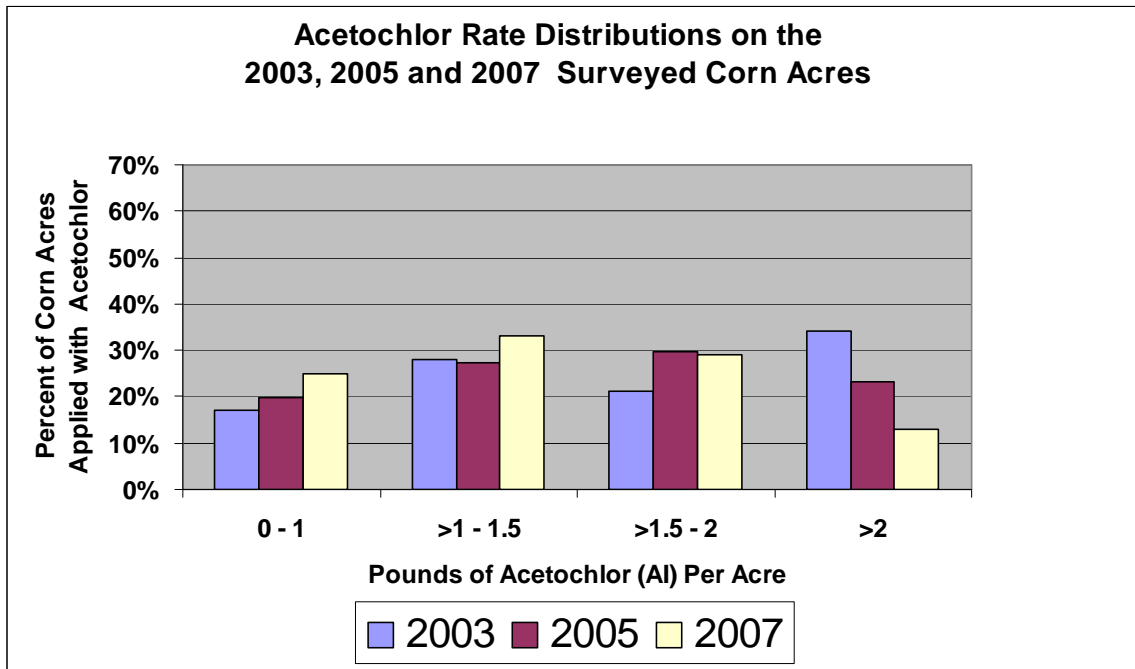
Acetochlor, atrazine and s-metolachlor are three commonly used herbicides for which the Minnesota Department of Agriculture has developed specific voluntary Best Management Practices to protect groundwater and surface water resources. Because of the additional concerns regarding the use of these products,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



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

Atrazine use in Minnesota, at 22% of all corn acres, was down 2% when compared to 2005 and down by 8% when compared to the 2003 pesticide use survey. The application rate has fallen from 0.67 pounds a.i. per acre in 2003 to 0.59 pounds a.i. per acre in 2005 and 0.57 pounds a.i. per acre in 2007. One possible explanation for the reductions may be an increase in Roundup-ready acres where glyphosate was often the only product applied.

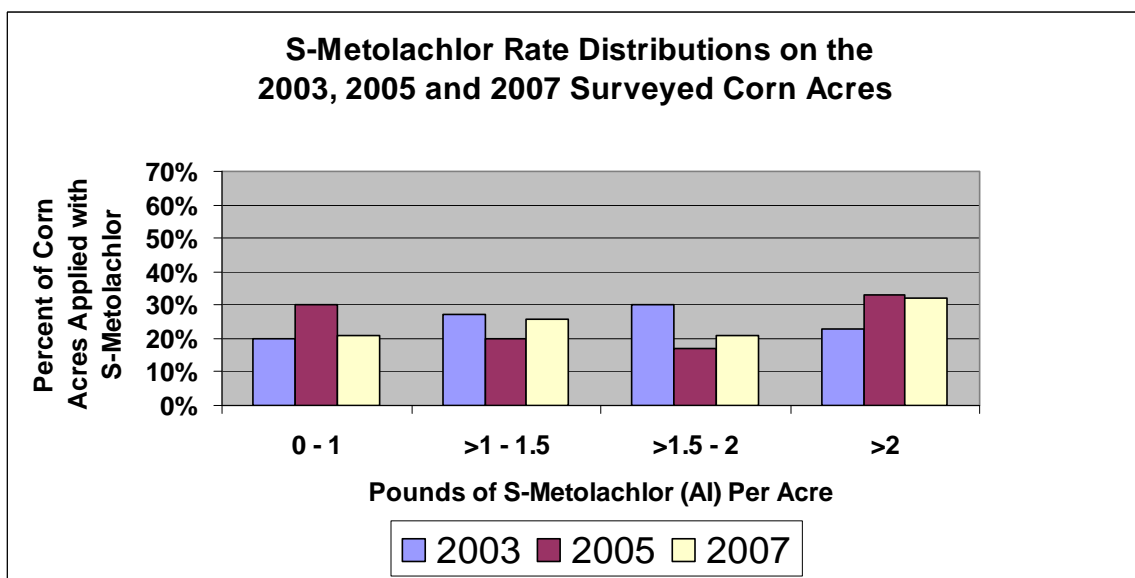
Acetochlor use in Minnesota is detailed in Figure 3, which illustrates the range of acetochlor rates reported for use in the 2003, 2005 and 2007 crop years.



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

Minnesota’s acetochlor use dropped by 2% in 2007 when compared to 2005. The number of acres treated for acetochlor in 2003 and 2005 were 25% in both years. The application rate of acetochlor dropped from 1.63 pounds a.i. per acre in 2003 and 1.61 pounds a.i. per acre in 2005 to 1.35 pounds a.i. per acre in 2007.

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 and 2007 crop years.



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

In 2007, S-metolachlor was used on 8% of all corn acres compared to 7% in 2003 and 8% of all corn acres in 2005. The application rate fell slightly from 1.67 pounds a.i. per acre in 2003 to 1.44 pounds a.i. per acre in 2005 and 1.42 pounds a.i. per acre in 2007.

#### **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 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 2007 MDA survey.

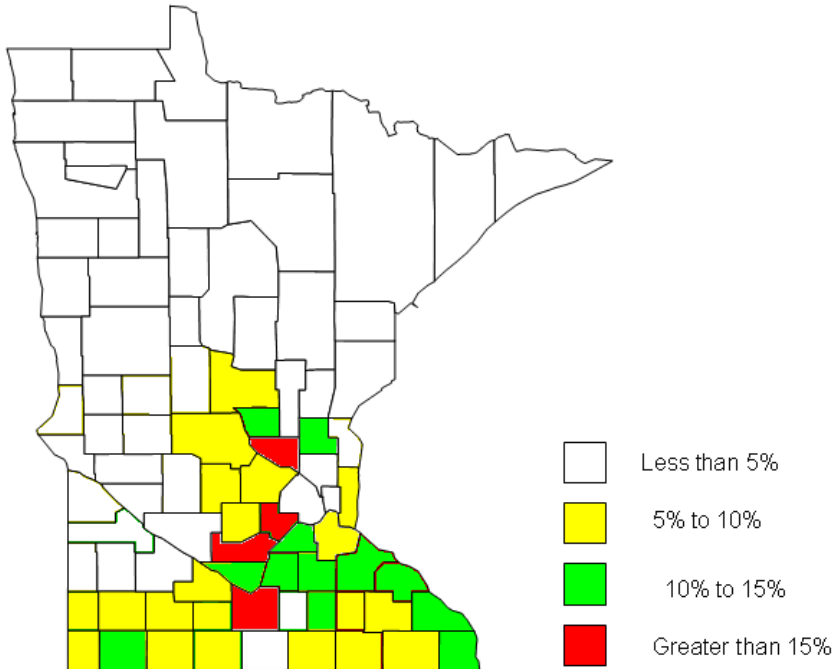
Figure 5 is constructed as follows: The percentage of surveyed crop acres receiving atrazine was multiplied by the number of crop acres in each county (a summation of corn, soybeans, wheat and hay acres) as reported by the National Agricultural Statistics Service (NASS). This value was then divided by 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, soybeans, 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 50 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, soybean, 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 is an attempt to adjust the survey's raw data using the assumption that the approximately 50 producers surveyed in a county are representative of county-level farm sizes and practices associated with corn, soybean, 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**

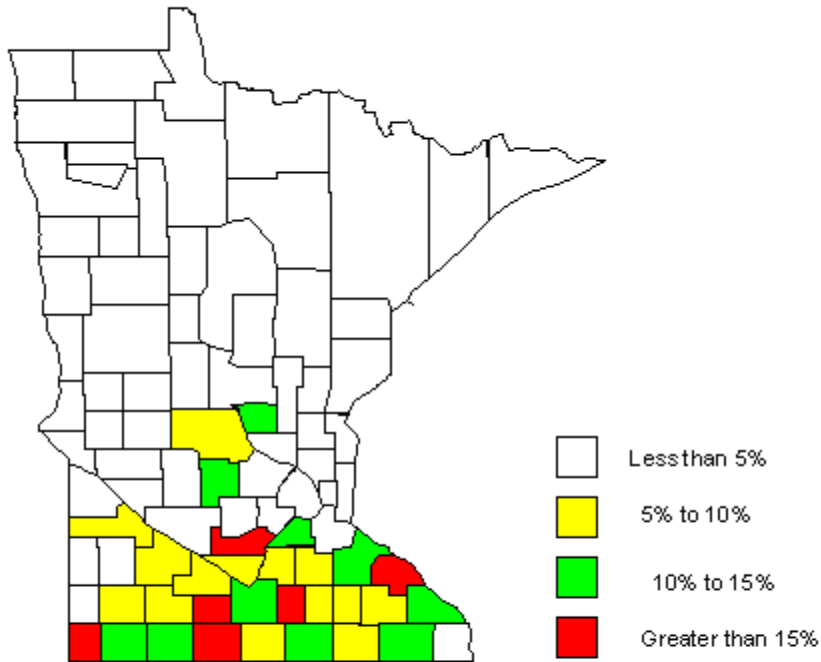


**Percent of atrazine acres applied by county was calculated by:**

**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 2007 crop year.**

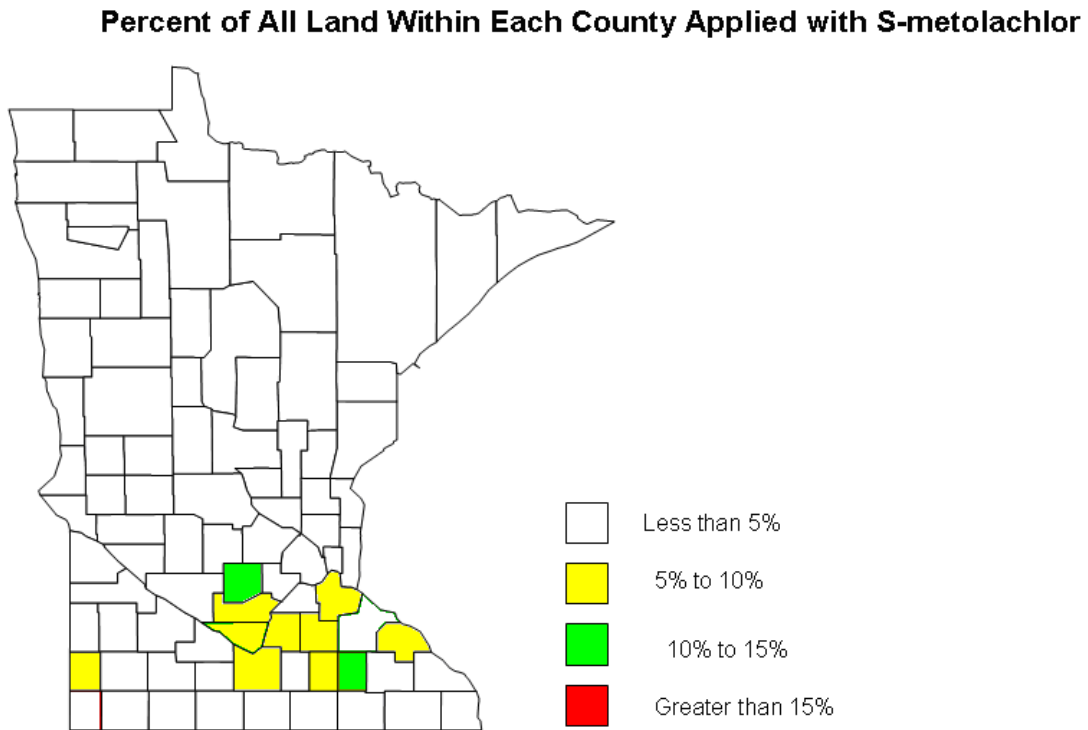
**Percent of All Land Within Each County Applied with Acetochlor**



**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 2007 crop year.**



**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 2007 crop year.**



## Pesticide Applications On Corn By Pesticide Management Areas

Table 5 details the number of 2007 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.**

<b>PMA</b>	<b>Number of Respondents</b>	<b>Corn Acres</b>	<b>Herbicide Acres</b>	<b>Insecticide Acres</b>	<b>Fungicide Acres</b>
1	249	83,227	81,710	1,736	1,180
4	387	75,106	72,920	2,590	877
5	120	12,405	11,999	460	0
6	264	112,550	110,600	13,980	1,390
7	258	79,290	77,931	10,546	1,785
8	824	297,205	292,142	56,712	14,875
9	312	71,606	69,212	18,372	1,907
10	142	27,745	26,745	4,757	440
<b>Totals</b>	<b>2,556</b>	<b>759,134</b>	<b>743,259</b>	<b>109,153</b>	<b>22,454</b>

**Table 6. Pesticide applications and rates for corn – PMA 1<sup>7</sup>**

<b>Agricultural Chemical (a.i.)</b>	<b>Surveyed Area Applied</b>	<b>Average Applications</b>	<b>Average Rate Per Application</b>	<b>Average Rate Per Crop Year</b>	<b>Total Applied Crop Year<sup>1</sup></b>
	<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>
<b>Herbicides</b>					
Acetochlor	8%	1.0	1.28	1.28	8,454
Atrazine	16%	1.0	0.39	0.39	5,222
Dicamba, Dimet. salt	1%	1.0	0.08	0.08	72
Diflufenzopyr-sodium	1%	1.0	0.04	0.04	48
Dimethenamid-P	1%	1.0	0.70	0.70	710
Foramsulfuron	1%	1.0	0.03	0.03	26
Glufosinate-ammonium	4%	1.0	0.30	0.30	966
Glyphosate	81%	1.1	0.74	0.83	56,438
Mesotrione	9%	1.0	0.08	0.08	635
Nicosulfuron	4%	1.0	0.02	0.02	82
Rimsulfuron	4%	1.0	0.01	0.01	35
S-Metolachlor	2%	1.0	1.09	1.09	1,441
<b>Insecticides</b>					
Lambda-cyhalothrin	1%	1.0	0.02	0.02	23
<b>Fungicides</b>					
Pyraclostrobin	1%	1.0	0.09	0.09	110

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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.

**Pesticides applied but not published included the following:** 2,4-D Bentazon, Clethodim, Dicamba, Dicamba, Sodium salt, Imazapyr, Imazethapyr, Topramezone

**Insecticides applied but not published included the following:** Chlorethoxyfos,

**Fungicides applied but not published included the following:** Propiconazole

<sup>7</sup> PMA abbreviation for Pesticide Management Area (see Figure 1)

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

<b>Agricultural Chemical (a.i.)</b>	<b>Surveyed Area Applied</b>	<b>Average Applications</b>	<b>Average Rate Per Application</b>	<b>Average Rate Per Crop Year</b>	<b>Total Applied Crop Year<sup>1</sup></b>
	<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>
<b>Herbicides</b>					
2,4-D	1	1.0	0.28	0.28	110
Acetochlor	18	1.0	1.33	1.33	17,691
Atrazine	28	1.0	0.65	0.65	13,895
Clopyralid	2	1.0	0.12	0.12	138
Dicamba	6	1.0	0.22	0.22	1,014
Dicamba, Dimet. salt	4	1.0	0.07	0.07	228
Diflufenzopyr-sodium	4	1.0	0.03	0.03	89
Flumetsulam	2	1.0	0.04	0.04	54
Foramsulfuron	1	1.0	0.05	0.05	38
Glufosinate-ammonium	3	1.1	0.30	0.31	743
Glyphosate	70	1.1	0.62	0.75	47,925
Mesotrione	10	1.0	0.13	0.13	921
Nicosulfuron	3	1.0	0.02	0.02	54
Pendimethalin	1	1.0	0.81	0.81	741
Rimsulfuron	3	1.0	0.01	0.01	28
S-Metolachlor	7	1.0	1.42	1.42	7,420

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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:** Bentazon, Chlorimuron-ethyl, Dicamba, Pot. Salt, Dicamba, Sodium salt, Dimethenamid, Dimethenamid-P, Imazethapyr, Metolachlor, Primisulfuron, Sethoxydim, Thifensulfuron, Topramezone

**Insecticides applied but not published included the following:** Bifenthrin, Chlorpyrifos, Cyfluthrin, Lambda-cyhalothrin, Tebupirimphos

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

<b>Agricultural Chemical (a.i.)</b>	<b>Surveyed Area Applied</b>	<b>Average Applications</b>	<b>Average Rate Per Application</b>	<b>Average Rate Per Crop Year</b>	<b>Total Applied Crop Year<sup>1</sup></b>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
			(a.i.)	(a.i.)	(a.i.)
<b>Herbicides</b>					
Acetochlor	17	1	1.52	1.52	3,114
Atrazine	36	1	0.70	0.71	3,143
Clopyralid	4	1	0.15	0.15	76
Flumetsulam	4	1	0.06	0.06	28
Glufosinate-ammonium	4	1	0.33	0.33	147
Glyphosate	63	1	0.77	0.79	5,998
Mesotrione	6	1	0.18	0.18	125
Pendimethalin	3	1	0.94	0.94	305
S-Metolachlor	7	1	1.57	1.57	1,336

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Dicamba, Dicamba, Dimet. Salt, Dicamba, Sodium salt, Halosulfuron, Imazapyr, Imazethapyr, Nicosulfuron, Primisulfuron, Rimsulfuron

**Insecticides applied but not published included the following:** Chlorpyrifos, Zeta-cypermethrin

**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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
2,4-D	0	1	0.40	0.40	97
Acetochlor	12	1	1.27	1.35	18,862
Atrazine	13	1	0.40	0.41	6,144
Dicamba, Dimet. salt	1	1	0.10	0.10	55
Diflufenzopyr-sodium	1	1	0.04	0.04	22
Dimethenamid-P	4	1	0.62	0.62	2,629
Glufosinate-ammonium	6	1	0.41	0.41	2,903
Glyphosate	85	1.2	0.75	0.89	85,264
Mesotrione	12	1	0.10	0.10	1,352
Nicosulfuron	2	1	0.02	0.02	48
Rimsulfuron	2	1	0.01	0.01	22
S-Metolachlor	4	1	1.04	1.04	4,473
<b>Insecticides</b>					
Chlorpyrifos	3	1	1.18	1.18	3,627
Cyfluthrin	2	1	0.01	0.01	11
Fipronil	4	1	0.13	0.13	503
Tebupirimphos	2	1	0.13	0.13	223
Tefluthrin	2	1	0.11	0.11	224

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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** Metribuzin, Bromoxynil, Clopyralid, Cloransulam-methyl, Dimethenamid, Dicamba, EPTC, Flumetsulam, Foramsulfuron, Metolachlor, Quizalofop-P-ethyl

**Insecticides applied but not published included the following:** Bifenthrin, Carbofuran, Chlorethoxyfos, Lambda-cyhalothrin, Terbufos

**Fungicides applied but not published included the following:** Pyraclostrobin

**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 Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
Acetochlor	23%	1.0	1.31	1.31	23,731
Atrazine	21%	1.0	0.63	0.63	10,696
Dicamba	2%	1.0	0.25	0.25	312
Dimethenamid-P	3%	1.0	0.45	0.45	1,036
Glufosinate-ammonium	3%	1.1	0.35	0.39	968
Glyphosate	81%	1.2	0.74	0.84	54,102
Imazethapyr	0%	1.0	0.01	0.01	3
Mesotrione	11%	1.0	0.11	0.11	943
Nicosulfuron	2%	1.0	0.02	0.02	27
Rimsulfuron	1%	1.0	0.01	0.01	13
S-Metolachlor	6%	1.0	1.54	1.54	7,551
<b>Insecticides</b>					
Bifenthrin	2%	1.0	0.09	0.09	139
Chlorpyrifos	3%	1.0	1.08	1.08	2,198
Cyfluthrin	4%	1.0	0.01	0.01	21
Tebupirimphos	4%	1.0	0.14	0.14	416
Tefluthrin	2%	1.0	0.09	0.09	130
Pyraclostrobin	2%	1.0	0.09	0.09	122
<b>Fungicides</b>					
Pyraclostrobin	2%	1.0	0.09	0.09	122

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Carfentrazone-ethyl, Clethodim, Clopyralid, Dicamba, Dimet. Salt, Dicamba, Pot. Salt, Dicamba, Sodium salt, Diflufenzopyr-sodium, EPTC, Flumetsulam, Foramsulfuron, Primisulfuron, Topramezone

**Insecticides applied but not published included the following:** Chlorethoxyfos, Fipronil, Lambda-cyhalothrin, Phorate, Terbufos

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli- cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	Percent	Number	<i>Pounds per Acre</i> (a.i.)	<i>Pounds per Acre</i> (a.i.)	<i>Total Pounds</i> (a.i.)
<b>Herbicides</b>					
2,4-D	0%	1.0	0.42	0.42	514
Acetochlor	33%	1.0	1.35	1.35	131,128
Atrazine	23%	1.0	0.55	0.55	37,318
Clopyralid	1%	1.0	0.11	0.11	383
Dicamba	3%	1.0	0.34	0.34	2,792
Dicamba, Dimet. salt	1%	1.0	0.11	0.11	218
Dicamba, Pot. salt	1%	1.0	0.43	0.43	1,218
Dicamba, Sodium salt	0%	1.0	0.13	0.13	94
Diflufenzopyr-sodium	1%	1.0	0.05	0.05	113
Dimethenamid-P	5%	1.0	0.56	0.56	8,788
Flumetsulam	1%	1.0	0.04	0.04	133
Glufosinate-ammonium	8%	1.0	0.34	0.35	8,290
Glyphosate	67%	1.2	0.71	0.86	172,192
Mesotrione	13%	1.0	0.11	0.11	4,172
Nicosulfuron	2%	1.0	0.02	0.02	132
Primisulfuron	0%	1.0	0.01	0.01	19
Rimsulfuron	1%	1.0	0.01	0.01	53
S-Metolachlor	11%	1.0	1.44	1.44	45,917
<b>Insecticides</b>					
Bifenthrin	2%	1.0	0.07	0.07	425
Chlorpyrifos	2%	1.0	0.91	0.91	6,405
Cyfluthrin	3%	1.0	0.01	0.01	62
Fipronil	3%	1.0	0.12	0.12	1,108
Tebupirimphos	3%	1.0	0.14	0.14	1,240
Tefluthrin	3%	1.0	0.12	0.12	1,140
<b>Fungicides</b>					
Azoxystrobin	0%	1.0	0.06	0.06	80
Pyraclostrobin	3%	1.0	0.11	0.11	1,082

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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:** Alachlor, Bentazon, Bromoxynil, Carfentrazone-ethyl, Dimethenamid, Foramsulfuron, Halosulfuron, Imazapyr, Imazethapyr, Metolachlor, Pendimethalin, Sethoxydim, Thifensulfuron, Topramezone

**Insecticides applied but not published included the following:** Carbofuran, Chlorethoxyfos, Lambda-cyhalothrin, Terbufos, Zeta-cypermethrin

**Insecticides applied but not published included the following:** Propiconazole

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

<b>Agricultural Chemical (a.i.)</b>	<b>Surveyed Area Applied</b>	<b>Average Applications</b>	<b>Average Rate Per Application</b>	<b>Average Rate Per Crop Year</b>	<b>Total Applied Crop Year<sup>1</sup></b>
	<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>
<b>Herbicides</b>					
2,4-D	1%	1.0	0.28	0.28	122
Acetochlor	29%	1.0	1.41	1.41	29,242
Atrazine	31%	1.0	0.58	0.59	12,995
Clopyralid	9%	1.0	0.12	0.12	777
Dicamba	4%	1.0	0.18	0.18	585
Dicamba, Dimet. salt	4%	1.0	0.08	0.08	266
Dicamba, Pot. salt	1%	1.0	0.48	0.48	434
Diflufenzopyr-sodium	4%	1.0	0.03	0.03	96
Dimethenamid-P	4%	1.0	0.62	0.62	1,881
Flumetsulam	9%	1.0	0.04	0.04	276
Glufosinate-ammonium	8%	1.1	0.36	0.37	2,075
Glyphosate	67%	1.1	0.73	0.79	37,752
Mesotrione	16%	1.0	0.12	0.12	1,405
Nicosulfuron	9%	1.0	0.02	0.02	127
Pendimethalin	0%	1.0	0.91	0.91	185
Rimsulfuron	7%	1.0	0.01	0.01	60
S-Metolachlor	14%	1.0	1.49	1.49	14,951
<b>Insecticide</b>					
Cyfluthrin	2%	1.0	0.01	0.01	8
Fipronil	8%	1.0	0.11	0.11	633
Tebupirimphos	2%	1.0	0.14	0.14	162
Tefluthrin	6%	1.0	0.12	0.12	524
<b>Fungicide</b>					
Pyraclostrobin	2%	1.0	0.10	0.10	159

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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:** Dicamba, Sodium salt, Metolachlor, Primisulfuron, Thifensulfuron, Topramezone

**Insecticides applied but not published included the following:** Bifenthrin, Carbofuran, Chlorethoxyfos, Chlorpyrifos, Lambda-cyhalothrin, Phorate, Terbufos

**Fungicides applied but not published included the following:** Azoxystrobin, Propiconazole



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

<b>Agricultural Chemical (a.i.)</b>	<b>Surveyed Area Applied</b>	<b>Average Applications</b>	<b>Average Rate Per Application</b>	<b>Average Rate Per Crop Year</b>	<b>Total Applied Crop Year<sup>1</sup></b>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
			(a.i.)	(a.i.)	(a.i.)
<b>Herbicides</b>					
Acetochlor	13%	1.0	1.31	1.34	4,977
Atrazine	32%	1.0	0.61	0.61	5,503
Clopyralid	2%	1.0	0.10	0.10	44
Dicamba, Pot. salt	1%	1.0	0.34	0.34	116
Dimethenamid-P	2%	1.0	0.72	0.72	368
Flumetsulam	1%	1.0	0.04	0.04	15
Glufosinate-ammonium	11%	1.0	0.36	0.36	1,136
Glyphosate	56%	1.1	0.76	0.77	12,010
Mesotrione	21%	1.0	0.13	0.13	749
Nicosulfuron	7%	1.0	0.02	0.02	45
Pendimethalin	1%	1.0	0.95	0.95	376
Rimsulfuron	5%	1.0	0.01	0.01	18
S-Metolachlor	15%	1.0	1.52	1.52	6,273
<b>Insecticides</b>					
Tefluthrin	7%	1.0	0.11	0.11	229

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Dicamba, Dicamba, Dimet. Salt, Dicamba, Sodium salt, Diflufenzopyr-sodium, Halosulfuron, Primisulfuron, Topramezone

**Insecticides applied but not published included the following:** Chlorethoxyfos, Chlorpyrifos, Cyfluthrin, Fipronil, Tebupirimphos

**Fungicides applied but not published included the following:** Azoxystrobin, Pyraclostrobin

## Statewide Pesticide Applications – Soybeans

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

To obtain a list of products (brand names) registered in Minnesota and containing the active ingredients listed below, visit

<http://state.ceris.purdue.edu/doc/mn/statemn.html>, enter the database, submit “active ingredient” as the search option, enter the name of the active ingredient, click “submit,” check the appropriate boxes, and “submit” to obtain a list of all registered products containing the active ingredient.

**Table 14. Publication status for soybean pesticide active ingredients**  
**A \* denotes data is not publishable due to use by < 5 respondents**

Active Ingredient	Published	Active Ingredient	Published
<b>Herbicides</b>		<b>Insecticide</b>	
2,4-D	P	Aldicarb	*
Acifluorfen	*	Carbofuran	P
Alachlor	*	Chlorethoxyfos	*
Bentazon	*	Chlorpyrifos	P
Bromixynil	*	Cyfluthrin	*
Chlorimuron-ethyl	P	Dimethoate	*
Clethodim	P	Esfenvalerate	P
Cloransulam-methyl	P	Fipronil	*
Dicamba	*	Gamma-cyhalothrin	P
Dimethenamid	*	Lambda-cyhalothrin	P
Ethalfuralin	*	Permethrin	*
Fenoxaprop	P	Zeta-cypermethrin	*
Fluazifop-P-butyl	P		
Flumetsulam	*	<b>Fungicide</b>	
Flumiclorac-pentyl	*	Azoxystrobin	P
Flumioxazin	P	Pyraclostrobin	P
Fomesafen	P		
Glyphosate	P		
Imazamox	P		
Imazethapyr	P		
Lactofen	*		
MPCA	*		
Metribuzin	P		
Pendimethalin	P		
Quizalofop-P-ethyl	P		
S-Metolachlor	P		
Sethoxydim	*		
Thifensulfuron	P		
Tribenuron-methyl	*		
Trifluralin	P		

A statewide summary of soybean pesticide applications is provided in Table 15. Ten percent (10%) of all Minnesota soybean acres were surveyed for the 2007 season. Herbicides were applied to 97% of all surveyed soybean acres. Insecticides were applied to 33% of all acres and 3% of surveyed acres received fungicides.

**Table 15. Pesticide applications and rates by active ingredient (a.i.) for soybeans statewide<sup>8</sup>.**

<b>Agricultural Chemical (a.i.)</b>	<b>Surveyed Area Applied</b>	<b>Average Applications</b>	<b>Average Rate Per Application</b>	<b>Average Rate Per Crop Year</b>	<b>Total Applied Crop Year<sup>1</sup></b>
	<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>
<b>Herbicides</b>					
2,4-D	0	1.0	0.43	0.43	667
Carfentrazone-ethyl	0	1.0	0.01	0.01	13
Clethodim	2	1.0	0.08	0.08	888
Cloransulam-methyl	0	1.0	0.07	0.07	88
Fenoxaprop	0	1.0	0.07	0.07	101
Fluazifop-P-butyl	1	1.0	0.09	0.09	401
Flumioxazin	1	1.0	0.07	0.07	395
Fomesafen	1	1.0	0.20	0.20	1,581
Glyphosate	91	1.6	0.73	1.19	672,019
Imazamox	1	1.0	0.03	0.03	110
Imazethapyr	1	1.0	0.05	0.05	289
Metribuzin	0	1.0	0.16	0.16	209
Pendimethalin	1	1.0	0.90	0.90	7,571
Quizalofop-P-ethyl	0	1.0	0.03	0.03	47
S-Metolachlor	0	1.0	0.61	0.61	430
Thifensulfuron	1	1.0	0.02	0.02	80
Trifluralin	2	1.0	0.76	0.76	10,672
<b>Insecticides</b>					
Carbofuran	0	1.0	0.11	0.11	112
Chlorpyrifos	14	1.0	0.51	0.52	46,842
Esfenvalerate	3	1.0	0.03	0.03	651
Gamma-cyhalothrin	0	1.0	0.01	0.01	15
Lambda-cyhalothrin	16	1.0	0.02	0.02	2,332
<b>Fungicides</b>					
Azoxystrobin	0	1.0	0.11	0.11	143
Pyraclostrobin	2	1.0	0.08	0.08	1,122

<sup>8</sup> Excludes any products with less than 5 responses.

## Area Pesticide Applications – Soybeans

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**

<b>PMA</b>	<b>Number of Respondents</b>	<b>Soybean Acres</b>	<b>Herbicide Acres</b>	<b>Insecticide Acres</b>	<b>Fungicide Acres</b>
1	365	177,855	172,995	19,115	3,385
4	188	44,653	43,970	15,252	205
5	49	6,529	5,902	247	0
6	231	85,418	83,550	28,051	1,440
7	226	59,353	57,606	26,847	1,146
8	695	191,287	183,749	85,239	7,977
9	219	41,636	40,707	20,029	1,867
10	101	18,232	17,555	10,055	195
<b>Totals</b>	<b>2,074</b>	<b>624,963</b>	<b>606,034</b>	<b>204,835</b>	<b>16,215</b>

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

<b>Agricultural Chemical (a.i.)</b>	<b>Surveyed Area Applied</b>	<b>Average Applications</b>	<b>Average Rate Per Application</b>	<b>Average Rate Per Crop Year</b>	<b>Total Applied Crop Year<sup>1</sup></b>
	<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>
<b>Herbicides</b>					
Fomesafen	1	1.0	0.19	0.19	255
Glyphosate	90	1.5	0.75	1.15	183,681
Imazamox	2	1.0	0.03	0.03	94
Pendimethalin	1	1.0	1.04	1.04	1,350
Trifluralin	1	1.0	0.94	0.94	1,043
<b>Insecticides</b>					
Chlorpyrifos	2	1.0	0.47	0.47	1,283
Esfenvalerate	2	1.0	0.03	0.03	128
Lambda-cyhalothrin	6	1.0	0.02	0.02	275
<b>Fungicides</b>					
Pyraclostrobin	2	1.0	0.08	0.08	277

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Clethodim, Flumiclorac-pentyl, Flumioxazin, Imazethapyr, MCPA, Metribuzin, Quizalofop-P-ethyl, Sethoxydim, Thifensulfuron

**Insecticides applied but not published included the following:** Aldicarb, Gamma-cyhalothrin

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

<b>Agricultural Chemical (a.i.)</b>	<b>Surveyed Area Applied</b>	<b>Average Applications</b>	<b>Average Rate Per Application</b>	<b>Average Rate Per Crop Year</b>	<b>Total Applied Crop Year<sup>1</sup></b>
	<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>
<b>Herbicides</b>					
Glyphosate	94	1.6	0.74	1.17	48,785
<b>Insecticides</b>					
Chlorpyrifos	5	1.0	0.46	0.46	1,110
Esfenvalerate	14	1.0	0.04	0.04	234
Lambda-cyhalothrin	16	1.0	0.02	0.02	160

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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:** Carfentrazone-ethyl, Clethodim, Cloransulam-methyl, Fenoxaprop, Fluazifop-P-butyl, Flumioxazin, Fomesafen, Imazethapyr, Metribuzin, Pendimethalin, Quizalofop-P-ethy, Thifensulfuron

**Insecticides applied but not published included the following:** Carbofuran

**Fungicides applied but not published included the following:** Pyraclostrobin

**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 Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
Glyphosate	86	1.1	0.79	0.85	4,771

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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:** Clethodim, Metribuzin, Pendimethalin,

**Insecticides applied but not published included the following:** Gamma-cyhalothrin, Lambda-cyhalothrin, Permethrin

**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 Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
Flumioxazin	1	1.0	0.06	0.06	62
Glyphosate	94	1.7	0.74	1.27	102,612
Trifluralin	2	1.0	0.62	0.62	1,142
<b>Insecticides</b>					
Chlorpyrifos	17	1.0	0.56	0.56	8,303
Esfenvalerate	2	1.0	0.04	0.04	49
Lambda-cyhalothrin	17	1.0	0.02	0.02	322
<b>Fungicides</b>					
Pyraclostrobin	2	1.0	0.07	0.07	96

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Clethodim, Fluazifop-P-butyl, Flumetsulam, Fomesafen, Quizalofop-P-ethyl, Thifensulfuron

**Insecticides applied but not published included the following:** Chlorethoxyfos



**Table 21. Pesticide applications and rates for soybean – PMA 7****Pesticide Applications And Rates By Active Ingredient  
For Soybeans, Area 7**

<b>Agricultural Chemical (a.i.)</b>	<b>Surveyed Area Applied</b>	<b>Average Applications</b>	<b>Average Rate Per Application</b>	<b>Average Rate Per Crop Year</b>	<b>Total Applied Crop Year<sup>1</sup></b>
	<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>
<b>Herbicides</b>					
Clethodim	2	1.0	0.06	0.06	92
Glyphosate	88	1.6	0.73	1.16	60,426
Pendimethalin	3	1.0	0.84	0.84	1,665
Trifluralin	6	1.0	0.77	0.77	2,613
<b>Insecticides</b>					
Chlorpyrifos	28	1.0	0.55	0.55	9,259
Lambda-cyhalothrin	15	1.0	0.02	0.02	221
<b>Fungicides</b>					
Pyraclostrobin	2	1.0	0.07	0.07	77

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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:** Fenoxaprop, Fluazifop-P-butyl, Fomesafen

**Insecticides applied but not published included the following:** Dimethoate, Zeta-cypermethrin

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli- cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
Clethodim	3	1.0	0.08	0.08	443
Fenoxaprop	1	1.0	0.07	0.07	90
Fluazifop-P-butyl	2	1.0	0.09	0.09	345
Flumioxazin	1	1.0	0.07	0.07	100
Fomesafen	3	1.0	0.20	0.20	985
Glyphosate	89	1.7	0.71	1.23	209,042
Imazethapyr	1	1.0	0.06	0.06	106
Metribuzin	0	1.0	0.14	0.14	95
Pendimethalin	2	1.0	0.91	0.91	3,664
S-Metolachlor	0	1.0	0.59	0.59	399
Thifensulfuron	1	1.0	0.01	0.01	15
Trifluralin	3	1.0	0.77	0.77	5,040
<b>Insecticides</b>					
Chlorpyrifos	24	1.0	0.50	0.51	23,123
Esfenvalerate	3	1.0	0.03	0.03	214
Gamma-cyhalothrin	0	1.0	0.01	0.01	4
Lambda-cyhalothrin	19	1.0	0.02	0.02	865
<b>Fungicides</b>					
Pyraclostrobin	3	1.0	0.08	0.08	539

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Alachlor, Bentazon, Carfentrazone-ethyl, Cloransulam-methyl, Dicamba, Ethalfluralin, Flumetsulam, Imazamox, Lactofen, Quizalofop-P-ethyl, Sethoxydim, Tribenuron-methyl

**Insecticides applied but not published included the following:** Carbofuran, Fipronil

**Fungicides applied but not published included the following:** Azoxystrobin

**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 Crop Year <sup>1</sup>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
<b>Herbicides</b>			(a.i.)	(a.i.)	(a.i.)
Fenoxaprop	2	1.0	0.10	0.10	113
Fluazifop-P-butyl	3	1.0	0.04	0.04	61
Fomesafen	3	1.0	0.19	0.19	221
Glyphosate	92	1.3	0.73	0.97	41,594
Imazethapyr	4	1.0	0.06	0.06	110
Metribuzin	1	1.0	0.27	0.27	176
S-Metolachlor	1	1.0	1.12	1.12	761
Trifluralin	3	1.0	0.84	0.84	1,035
<b>Insecticides</b>					
Chlorpyrifos	6	1.0	0.50	0.50	1,273
Lambda-cyhalothrin	24	1.0	0.02	0.02	255
<b>Fungicides</b>					
Pyraclostrobin	4	1.0	0.07	0.07	127

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Acifluorfen, Bentazon, Carfentrazone-ethyl, Chlorimuron-ethyl, Cloransulam-methyl, Dicamba, Fluazifop-P-butyl, Flumioxazin, Fomesafen, Imazamox, Metribuzin, S-Metolachlor, Trifluralin

**Insecticides applied but not published included the following:** Carbofuran, Esfenvalerate, Gamma-cyhalothrin, Permethrin

**Fungicides applied but not published included the following:** Azoxystrobin

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

<b>Agricultural Chemical (a.i.)</b>	<b>Surveyed Area Applied</b>	<b>Average Applications</b>	<b>Average Rate Per Application</b>	<b>Average Rate Per Crop Year</b>	<b>Total Applied Crop Year<sup>1</sup></b>
	<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>
<b>Herbicides</b>					
Glyphosate	89	1.3	0.71	0.94	15,249
<b>Insecticides</b>					
Chlorpyrifos	26	1.0	0.40	0.40	1,908
Lambda-cyhalothrin	34	1.0	0.02	0.02	143

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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:** Carfentrazone-ethyl Clethodim Dicamba Dimethenamid Fenoxaprop Fluazifop-P-butyl Flumioxazin Fomesafen, Imazethapyr, Metribuzin, Pendimethalin, Thifensulfuron, Trifluralin

**Insecticides applied but not published included the following:** Carbofuran, Gamma-cyhalothrin

**Fungicides applied but not published included the following:** Azoxystrobin

## Statewide Pesticide Applications – Wheat

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

To obtain a list of products (brand names) registered in Minnesota and containing the active ingredients listed below, visit

<http://state.ceris.purdue.edu/doc/mn/statemn.html>, enter the database, submit “active ingredient” as the search option, enter the name of the active ingredient, click “submit,” check the appropriate boxes, and “submit” to obtain a list of all registered products containing the active ingredient.

**Table 25. Publication status for wheat pesticide active ingredients**  
A \* denotes data is not publishable due to use by < 5 respondents

Active Ingredient	Published	Active Ingredient	Published
<b>Herbicides</b>		<b>Insecticides</b>	
2,4-D	P	Chlorpyrifos	P
Bromoxynil	P	Dimethoate	*
Clodinafop-propargil	P	Lambda-cyhalothrin	P
Clopyralid	P	Methyl parathion	P
Dicamba	P	Phorate	*
Dicamba, Dimet. salt	*	Zeta-cypermethrin	*
Fenoxaprop	P		
Flucarbazone-sodium	*	<b>Fungicides</b>	
Fluroxypyr	P	Azoxystrobin	P
Glyphosate	P	Propiconazole	P
MCPA	P	Pyraclostrobin	P
Mesosulfuron-methyl	P	Tebuconazole	P
Pinoxaden	*	Trifloxystrobin	P
Sethoxydim	P		
Thifensulfuron	P		
Tribenuron-methyl	P		
Trifluralin	*		

A statewide summary of wheat pesticide applications is provided in Table 26. Thirteen percent (13%) of all Minnesota wheat acres were surveyed for the 2007 season. Herbicides were applied to 95% of all surveyed wheat acres. Insecticides were applied to 17% of all acres and 68% of surveyed acres received fungicides.

**Table 26. Pesticide applications and rates by active ingredient (a.i.) for wheat statewide<sup>9</sup>**

<b>Agricultural Chemical (a.i.)</b>	<b>Surveyed Area Applied</b>	<b>Average Applications</b>	<b>Average Rate Per Application</b>	<b>Average Rate Per Crop Year</b>	<b>Total Applied Crop Year<sup>1</sup></b>
	<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>
<b>Herbicides</b>					
2,4-D	13	1.0	0.40	0.40	11,362
Bromoxynil	39	1.0	0.31	0.31	26,102
Clodinafop-propargyl	3	1.0	0.08	0.08	544
Clopyralid	2	1.0	0.10	0.10	515
Dicamba	2	1.0	0.17	0.17	822
Fenoxaprop	35	1.0	0.06	0.06	4,814
Fluroxypyr	4	1.0	0.07	0.07	616
Glyphosate	4	1.0	0.73	0.75	6,121
MCPA	57	1.0	0.34	0.34	41,233
Mesosulfuron-methyl	7	1.0	0.00	0.00	35
Sethoxydim	0	1.0	0.02	0.02	13
Thifensulfuron	10	1.0	0.01	0.01	281
Tribenuron-methyl	7	1.0	0.01	0.01	75
<b>Insecticides</b>					
Chlorpyrifos	3	1.0	0.41	0.41	2,278
Lambda-cyhalothrin	4	1.0	0.02	0.02	179
Methyl parathion	12	1.0	0.26	0.26	6,799
<b>Fungicides</b>					
Azoxystrobin	0	1.0	0.03	0.03	12
Propiconazole	16	1.0	0.07	0.07	2,454
Pyraclostrobin	23	1.0	0.05	0.06	2,703
Tebuconazole	30	1.0	0.10	0.10	6,495
Trifloxystrobin	3	1.0	0.04	0.04	299

<sup>9</sup> Excludes any products with less than 5 responses.

## 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**

<b>PMA</b>	<b>Number of Respondents</b>	<b>Wheat Acres</b>	<b>Herbicide Acres</b>	<b>Insecticide Acres</b>	<b>Fungicide Acres</b>
1	353	181,293	99,370	174,937	32,901
4	88	14,190	6,797	13,151	813
5	8	855	0	730	0
6	98	10,864	6,454	9,664	1,341
7	25	1,715	539	1,350	100
8	68	2,730	1,054	1,933	0
9	6	192	40	90	0
10	16	630	107	457	0
<b>Totals</b>	<b>662</b>	<b>212,469</b>	<b>114,361</b>	<b>202,312</b>	<b>35,155</b>

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

<b>Agricultural Chemical (a.i.)</b>	<b>Surveyed Area Applied</b>	<b>Average Applications</b>	<b>Average Rate Per Application</b>	<b>Average Rate Per Crop Year</b>	<b>Total Applied Crop Year<sup>1</sup></b>
	<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>
<b>Herbicides</b>					
2,4-D	10	1.0	0.41	0.41	7,116
Bromoxynil	42	1.0	0.31	0.31	23,563
Clodinafop-propargyl	4	1.0	0.08	0.08	544
Clopyralid	2	1.0	0.10	0.10	408
Dicamba	2	1.0	0.18	0.18	702
Fenoxaprop	36	1.0	0.06	0.06	4,205
Fluroxypyr	5	1.0	0.07	0.07	587
Glyphosate	4	1.0	0.76	0.77	5,689
MCPA	61	1.0	0.34	0.34	37,264
Mesosulfuron-methyl	9	1.0	0.00	0.00	35
Thifensulfuron	11	1.0	0.01	0.01	247
Tribenuron-methyl	8	1.0	0.01	0.01	73
<b>Insecticides</b>					
Chlorpyrifos	3	1.0	0.41	0.41	1,894
Lambda-cyhalothrin	4	1.0	0.02	0.02	143
Methyl parathion	14	1.0	0.26	0.26	6,756
<b>Fungicides</b>					
Propiconazole	17	1.0	0.07	0.07	2,288
Pyraclostrobin	21	1.0	0.05	0.05	1,975
Tebuconazole	34	1.0	0.10	0.10	6,243
Trifloxystrobin	3	1.0	0.04	0.04	253

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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:** Flucarbazone-sodium, Pinoxaden, Sethoxydim

**Insecticides applied but not published included the following:** Dimethoate, Phorate, Zeta-cypermethrin



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

<b>Agricultural Chemical (a.i.)</b>	<b>Surveyed Area Applied</b>	<b>Average Applications</b>	<b>Average Rate Per Application</b>	<b>Average Rate Per Crop Year</b>	<b>Total Applied Crop Year<sup>1</sup></b>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
			(a.i.)	(a.i.)	(a.i.)
<b>Herbicides</b>					
2,4-D	31	1.0	0.30	0.30	1,307
Bromoxynil	36	1.0	0.28	0.28	1,431
Fenoxaprop	40	1.0	0.07	0.07	381
Glyphosate	5	1.0	0.53	0.53	347
MCPA	38	1.0	0.31	0.31	1,661
<b>Fungicides</b>					
Pyraclostrobin	38	1.0	0.07	0.07	373

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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:** Clopyralid, Dicamba, Dicamba Pot Salt, Fluroxypyr, Thifensulfuron, Tribenuron-methyl, Trifluralin

**Insecticides applied but not published included the following:** Chlorpyrifos, Lambda-cyhalothrin

**Fungicides applied but not published included the following:** Propiconazole, Tebuconazole, Trifloxystrobin

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

<b>No data was publishable for wheat in PMA 5</b>
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**Herbicides applied but not published included the following:** 2,4-D, Bromoxynil, Fenoxaprop, MCPA

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

<b>Agricultural Chemical (a.i.)</b>	<b>Surveyed Area Applied</b>	<b>Average Applications</b>	<b>Average Rate Per Application</b>	<b>Average Rate Per Crop Year</b>	<b>Total Applied Crop Year<sup>1</sup></b>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
			(a.i.)	(a.i.)	(a.i.)
<b>Herbicides</b>					
2,4-D	33	1.0	0.47	0.49	1,716
Bromoxynil	23	1.0	0.33	0.33	829
Dicamba	7	1.0	0.11	0.11	77
Fenoxaprop	17	1.0	0.06	0.06	104
MCPA	41	1.0	0.42	0.42	1,865
<b>Fungicides</b>					
Propiconazole	9	1.0	0.07	0.07	72
Pyraclostrobin	42	1.0	0.06	0.06	264

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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:** Clopyralid, Fluroxypyr, Glyphosate, Sethoxydim, Thifensulfuron

**Insecticides applied but not published included the following:** Chlorpyrifos, Lambda-cyhalothrin, Methyl parathion

**Fungicides applied but not published included the following:** Azoxystrobin, Trifloxystrobin

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

<b>Agricultural Chemical</b>	<b>Surveyed Area Applied</b>	<b>Average Applications</b>	<b>Average Rate Per Application</b>	<b>Average Rate Per Crop Year</b>	<b>Total Applied Crop Year<sup>1</sup></b>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
<b>Herbicides</b>					
2,4-D	46	1.0	0.29	0.29	226
Bromoxynil	18	1.0	0.31	0.31	96
MCPA	37	1.0	0.34	0.34	218
<b>Fungicides</b>					
Pyraclostrobin	31	1.0	0.06	0.06	32

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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:** Clopyralid and Dicamba, Fenoxaprop, Thifensulfuron, Tribenuron-methyl

**Fungicides applied but not published included the following:** Tebuconazole

**Insecticides applied but not published included the following:** Chlorpyrifos

**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 Crop Year <sup>1</sup>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
<b>Herbicides</b>			(a.i.)	(a.i.)	(a.i.)
2,4-D	57	1.0	0.50	0.50	773
Fenoxaprop	9	1.0	0.05	0.05	13
MCPA	13	1.0	0.37	0.37	131
<b>Fungicides</b>					
Propiconazole	11	1.2	0.07	0.08	25
Pyraclostrobin	25	1.0	0.07	0.08	53

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Glyphosate, Sethoxydim

**Insecticides applied but not published included the following:** Chlorpyrifos, Dimethoate

**Fungicides applied but not published included the following:** Azoxystrobin, Tebuconazole

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

<b>No data was publishable for wheat in Area 9</b>
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**Herbicides applied but not published included the following:** 2,4-D, MCPA

**Fungicides applied but not published included the following:** Pyraclostrobin

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

Agricultural Chemical	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
<b>Herbicides</b>					
2,4-D	39	1.0	0.43	0.43	106

Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Fenoxaprop, MCPA, Thifensulfuron,

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

## Statewide Pesticide Applications – Hay

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

To obtain a list of products (brand names) registered in Minnesota and containing the active ingredients listed below, visit

<http://state.ceris.purdue.edu/doc/mn/statemn.html>, enter the database, submit “active ingredient” as the search option, enter the name of the active ingredient, click “submit,” check the appropriate boxes, and “submit” to obtain a list of all registered products containing the active ingredient.

**Table 36. Publication status for hay pesticide active ingredients**  
**A \* denotes data is not publishable due to use by < 5 respondents**

Active Ingredient	Published
<b>Herbicides</b>	
2,4-D	P
Acetic Acid	*
Aminopyralid	*
Bromoxynil	*
Carfentrazine-ethyl	*
Clethodim	*
Clomazone	*
Clopyralid	P
Glyphosate	P
Imazamox	P
Imazethapyr	*
Pendimethalin	*
Picloram	*
Trifluralin	*
<b>Insecticides</b>	
Carbofuran	*
Chlorpyrifos	P
Cyfluthrin	P
Dimethoate	*
Esfenvalerate	P
Gamma-cyhalothrin	*
Lambda-cyhalothrin	P
Permethrin	P
Zeta-cypermethrin	P

A statewide summary of hay pesticide applications is provided in Table 37. Nine percent (9%) of all Minnesota hay acres were surveyed for the 2007 season. Herbicides were applied to 1% of all surveyed hay acres. Insecticides were applied to 10% of all acres and less than 1% of surveyed acres received fungicides.

**Table 37. Pesticide applications and rates by active ingredient (a.i.) for hay statewide<sup>10</sup>.**

<b>Agricultural Chemical (a.i.)</b>	<b>Surveyed Area Applied</b>	<b>Average Applications</b>	<b>Average Rate Per Application</b>	<b>Average Rate Per Crop Year</b>	<b>Total Applied Crop Year<sup>1</sup></b>
	<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>
<b>Herbicides</b>					
2,4-D	0	1.0	0.49	0.49	227
Clopyralid	0	1.0	0.07	0.07	12
Glyphosate	0	1.0	0.64	0.64	135
Imazamox	0	1.0	0.02	0.02	17
<b>Insecticides</b>					
Chlorpyrifos	2	1.1	0.67	0.74	2,136
Cyfluthrin	2	1.2	0.03	0.04	101
Lambda-cyhalothrin	3	1.3	0.02	0.03	137
Permethrin	1	1.4	0.09	0.13	137
Zeta-cypermethrin	0	1.1	0.03	0.03	18

<sup>10</sup> 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**

<b>PMA</b>	<b>Number of Respondents</b>	<b>Hay Acres</b>	<b>Herbicide Acres</b>	<b>Insecticide Acres</b>	<b>Fungicide Acres</b>
1	281	40,821	275	325	0
4	575	43,949	1,071	2,681	0
5	275	21,000	18	104	0
6	83	3,972	5	347	0
7	142	5,936	99	1,063	0
8	340	14,341	190	3,365	0
9	258	16,490	10	4,931	0
10	178	8,520	231	1,959	0
<b>Totals</b>	<b>2,132</b>	<b>155,029</b>	<b>1,899</b>	<b>14,775</b>	<b>0</b>

**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, Acetic acid, Glyphosate, Imazamox  
**Insecticides applied but not published included the following:** Chlorpyrifos, Cyfluthrin, Lambda-cyhalothrin, Zeta-cypermethrin

**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 <sup>1</sup>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
<b>Herbicides</b>					
2,4-D	0	1.0	0.50	0.50	105
<b>Insecticides</b>					
Chlorpyrifos	2	1.0	0.89	0.89	859

**Herbicides applied but not published included the following:** 2,4-D, Acetic acid, Bromoxynil, Clopyralid, Glyphosate, Imazamox, Picloram, Trifluralin  
**Insecticides applied but not published included the following:** Carbofuran, Cyfluthrin, Dimethoate, Lambda-cyhalothrin, Gamma-cyhalothrin, Permethrin, 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  
**Insecticides applied but not published included the following:** Chlorpyrifos Cyfluthrin, Esfenvalerate

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

No data is publishable for hay in Area 6.

**Herbicides applied but not published included the following:** 2,4-D, Clopyralid  
**Insecticides applied but not published included the following:** Chlorpyrifos, Cyfluthrin, Lambda-cyhalothrin



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

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
<b>Herbicides</b>					
2,4-D	1	1.0	0.71	0.71	61
<b>Insecticides</b>					
Lambda-cyhalothrin	13	1.2	0.02	0.03	19

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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:** Clethodim, Clopyralid, Imazamox, Picloram

**Insecticides applied but not published included the following:** Chlorpyrifos, Carbofuran, Cyfluthrin

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	<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>
<b>Insecticides</b>					
Chlorpyrifos	4	1.2	0.52	0.60	352
Cyfluthrin	3	1.2	0.03	0.03	14
Lambda-cyhalothrin	12	1.4	0.02	0.03	52
Permethrin	2	2.0	0.09	0.18	59

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Bromoxynil, Glyphosate, Imazamox, Imazethapyr, Pendimethalin

**Insecticides applied but not published included the following:** Esfenvalerate, Gamma-cyhalothrin, Zeta-cypermethrin

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
<b>Insecticides</b>					
Cyfluthrin	9	1.3	0.02	0.03	47
Lambda-cyhalothrin	8	1.1	0.02	0.02	30
Permethrin	3	1.2	0.10	0.12	67

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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:** Clomazone, Glyphosate, Imazamox

**Insecticides applied but not published included the following:** Chlorpyrifos, Esfenvalerate, Zeta-cypermethrin

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	<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>
<b>Insecticides</b>					
Chlorpyrifos	5	1.4	0.66	0.91	383
Lambda-cyhalothrin	10	1.6	0.02	0.03	21

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Carfentrazone-ethyl, Glyphosate, Imazamox, Imazethapyr

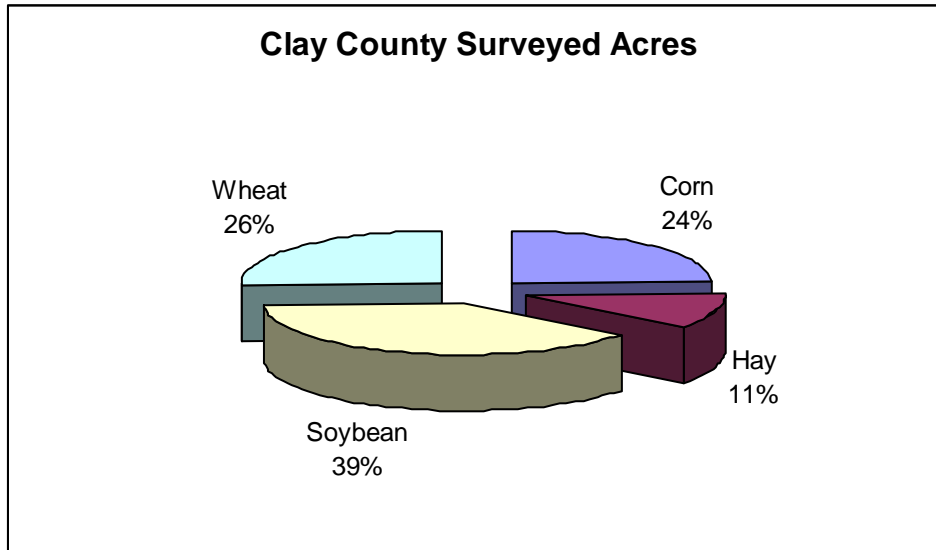
**Insecticides applied but not published included the following:** Cyfluthrin, Zeta-cypermethrin

## County Pesticide Applications

Tables 47 through 122 detail the percent of total surveyed acres receiving herbicides, insecticides and fungicides and the corresponding rates<sup>11</sup>.

### 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 Crop Year <sup>1</sup>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
			(a.i.)	(a.i.)	(a.i.)
<b>Herbicides</b>					
Bromoxynil	12	1.0	0.34	0.34	1,444
Fenoxaprop	18	1.1	0.06	0.06	364
Glyphosate	55	1.2	0.76	0.88	16,285
MCPA	15	1.0	0.37	0.37	1,943
<b>Fungicides</b>					
Pyraclostrobin	3	1.0	0.04	0.04	41

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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.

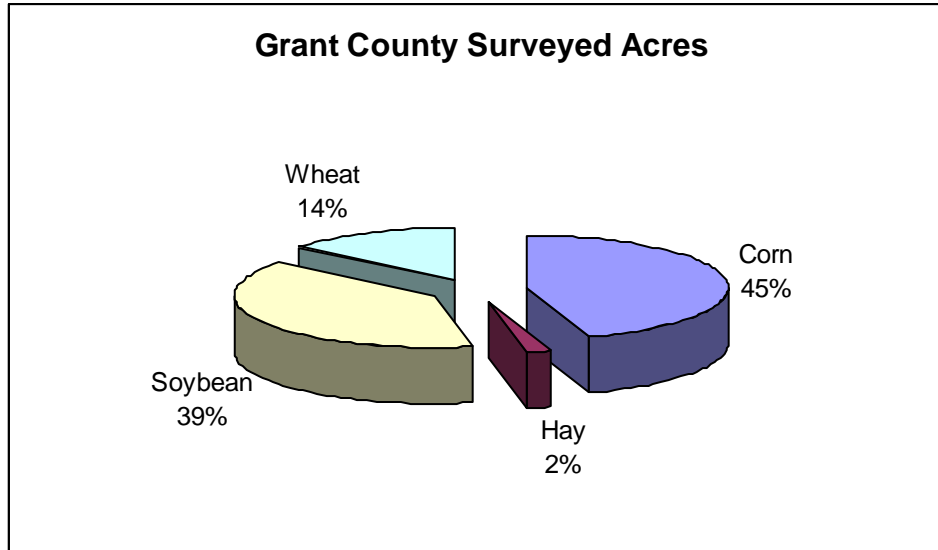
**Herbicides applied but not published included the following:** 2,4-D, Atrazine, Clodinafop-propargil, Clopyralid, Dicamba, Dicamba, Dimet. Salt, Diflufenzopyr-sodium, Fluroxypyr, Fomesafen, Foramsulfuron, Glufosinate-ammonium, Imazamox, Imeazethapyr, Nicosulfuron, Rimsulfuron

**Insecticides applied but not published included the following:** Chlorpyrifos, Lambda-cyhalothrin

**Fungicides applied but not published included the following:** Tebuconazole

<sup>11</sup> Excludes any products with less than 5 responses.

**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 Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
2,4-D	4	1.0	0.50	0.50	857
Atrazine	5	1.0	0.36	0.36	655
Bromoxynil	7	1.0	0.29	0.29	816
Fenoxaprop	5	1.0	0.05	0.05	96
Glyphosate	77	1.3	0.74	0.97	28,845
MCPA	7	1.0	0.31	0.31	873
Mesotrione	4	1.0	0.09	0.09	143
<b>Insecticides</b>					
Lambda-cyhalothrin	9	1.1	0.02	0.03	86
Pyraclostrobin	7	1.0	0.07	0.07	185
Tebuconazole	3	1.0	0.09	0.09	97
<b>Fungicides</b>					
Pyraclostrobin	7	1.0	0.07	0.07	185
Tebuconazole	3	1.0	0.09	0.09	97

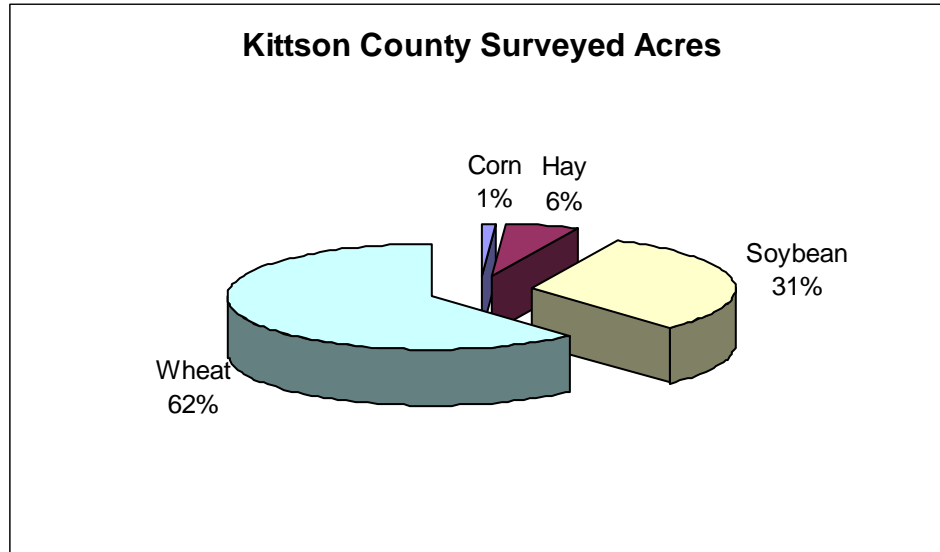
<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically “weighted” in any fashion. 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, Dicamba, Dicamba, Dimet. Salt, Diflufenzopyr-sodium, Dimethenamid P, Glufosinate-ammonium, Nicosulfuron, Rimsulfuron, Sethoxydim, S-Metolachlor, Thifensulfuron, Topramezone

**Insecticides applied but not published included the following:** Aldicarb, Chlorpyrifos, Dimethoate, Esfenzalerate, Gamma-cyhalothrin,

**Fungicides applied but not published included the following:** Propiconazole, Tebuconazole, Trifloxstrobilin

### Kittson County



**Table 49. Kittson County pesticide applications and rates**  
**Pesticide Applications And Rates By Active Ingredient**  
**Kittson County**

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
2,4-D	4	1.0	0.41	0.41	1,042
Bromoxynil	17	1.0	0.26	0.26	2,465
Clodinafop-propargyl	9	1.0	0.05	0.05	256
Fenoxaprop	24	1.0	0.07	0.07	975
Fluroxypyr	11	1.0	0.06	0.06	415
Glyphosate	34	1.3	0.81	1.06	20,352
MCPA	32	1.0	0.35	0.35	6,153
Mesosulfuron-methyl	15	1.0	0.00	0.00	19
<b>Fungicides</b>					
Propiconazole	19	1.0	0.06	0.06	588
Pyraclostrobin	19	1.0	0.05	0.05	547
Tebuconazole	28	1.0	0.11	0.11	1,785

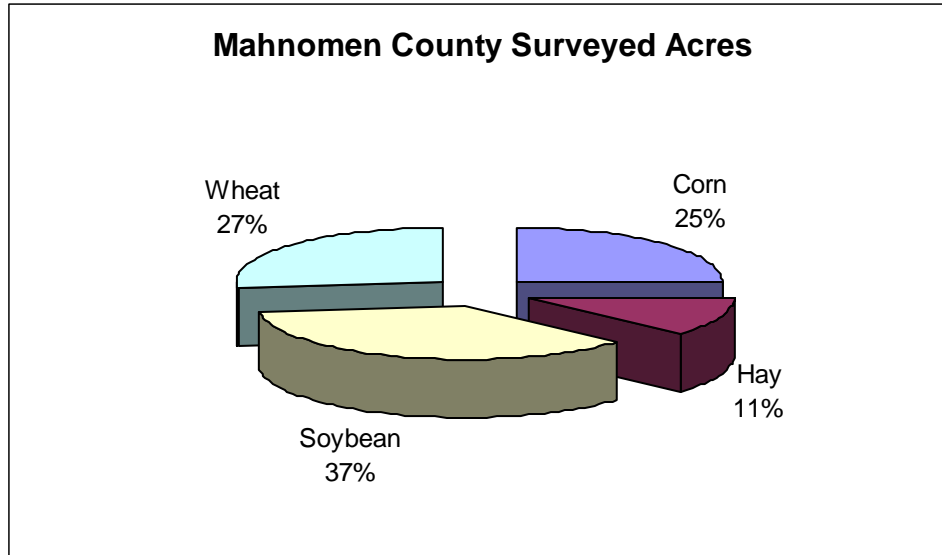
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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-sodium, Pinoxaden, Thifensulfuron, Tribenuron-methyl

**Insecticides applied but not published included the following:** Chlorpyrifos, Esfenvalerate, Lambda-cyhalothrin, Methyl parathion

**Fungicides applied but not published included the following:** Trifloxystrobin

## Mahnomen County



**Table 50. Mahnomen 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 Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
Atrazine	8	1.0	0.34	0.34	922
Bromoxynil	19	1.0	0.28	0.28	1,750
Fenoxaprop	15	1.1	0.06	0.06	310
Glyphosate	53	1.5	0.74	1.13	19,747
MCPA	17	1.0	0.31	0.31	1,725
Mesotrione	8	1.0	0.07	0.07	182
<b>Fungicides</b>					
Pyraclostrobin	13	1.0	0.05	0.05	234
Tebuconazole	13	1.0	0.09	0.09	382

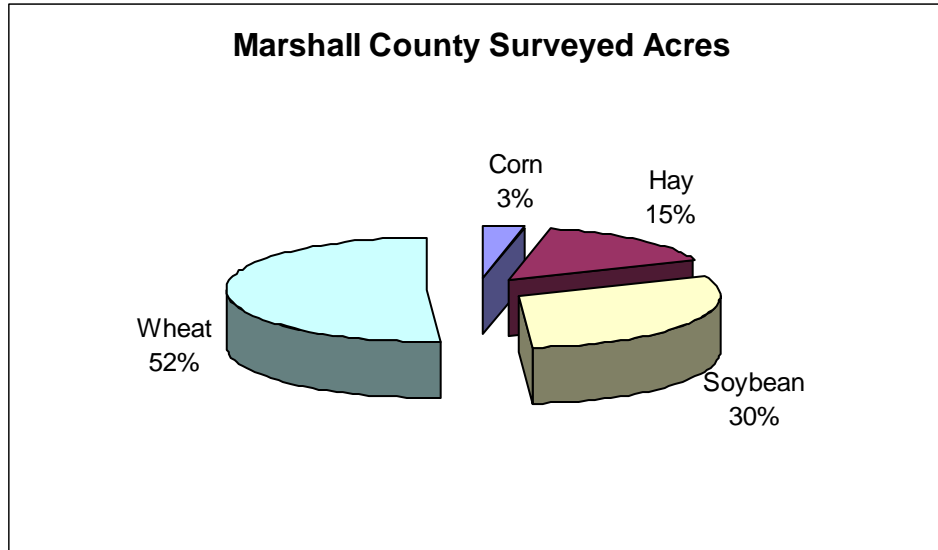
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Clodinafop-propargil, Clopyralid, Dicamba, Dimet. Salt, Diflufenzopyr-sodium, Glufosinate-ammonium, Imazamox, Nicosulfuron, Pendimethalin, Quizalofop-P-ethyl, Rimsulfuron, S-Metolachlor

**Insecticides applied but not published included the following:** Lambda-cyhalothrin, Methyl parathion

**Fungicides applied but not published included the following:** Trifloxystrobin

### Marshall County



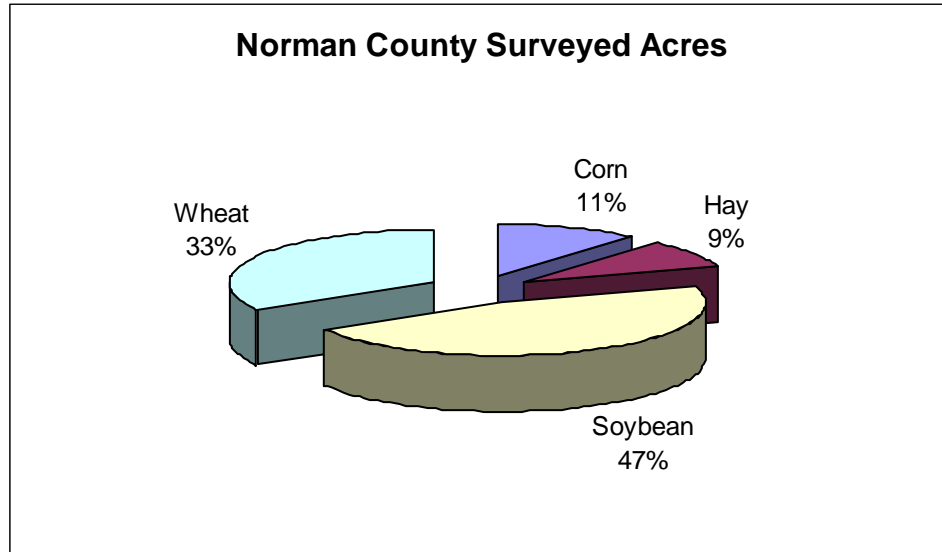
**Table 51. Marshall County pesticide applications and rates**

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
2,4-D	7	1.0	0.27	0.27	688
Bromoxynil	15	1.0	0.28	0.28	1,536
Fenoxaprop	4	1.0	0.09	0.09	135
Glyphosate	28	1.4	0.74	1.01	10,388
MCPA	37	1.0	0.28	0.28	3,686
Thifensulfuron	9	1.0	0.01	0.01	45
<b>Insecticides</b>					
Methyl parathion	15	1.0	0.26	0.26	1,446
<b>Fungicides</b>					
Propiconazole	12	1.1	0.12	0.14	604
Pyraclostrobin	19	1.0	0.05	0.05	369
Tebuconazole	15	1.0	0.09	0.09	498

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Clopyralid, Dicamba, Dicamba, Sodium salt, Diflufenzopyr-sodium, Fluroxypyr, Foramsulfuron, Imazamox, Imazapyr, Imazethapyr, Lactofen, Nicosulfuron, Pinoxaden, Tribenuron-methyl  
**Insecticides applied but not published included the following:** Lambda-cyhalothrin, Zeta-cypermethrin

**Norman County**



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

<b>Agricultural Chemical (a.i.)</b>	<b>Surveyed Area Applied</b>	<b>Average Applications</b>	<b>Average Rate Per Application</b>	<b>Average Rate Per Crop Year</b>	<b>Total Applied Crop Year<sup>1</sup></b>
	<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>
<b>Herbicides</b>					
Bromoxynil	16	1.0	0.29	0.29	1,831
Fenoxaprop	16	1.0	0.06	0.06	407
Glyphosate	58	1.6	0.80	1.25	29,306
MCPA	16	1.0	0.32	0.32	2,018
Thifensulfuron	5	1.0	0.01	0.01	26
<b>Fungicide</b>					
Propiconazole	10	1.0	0.08	0.08	327

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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.

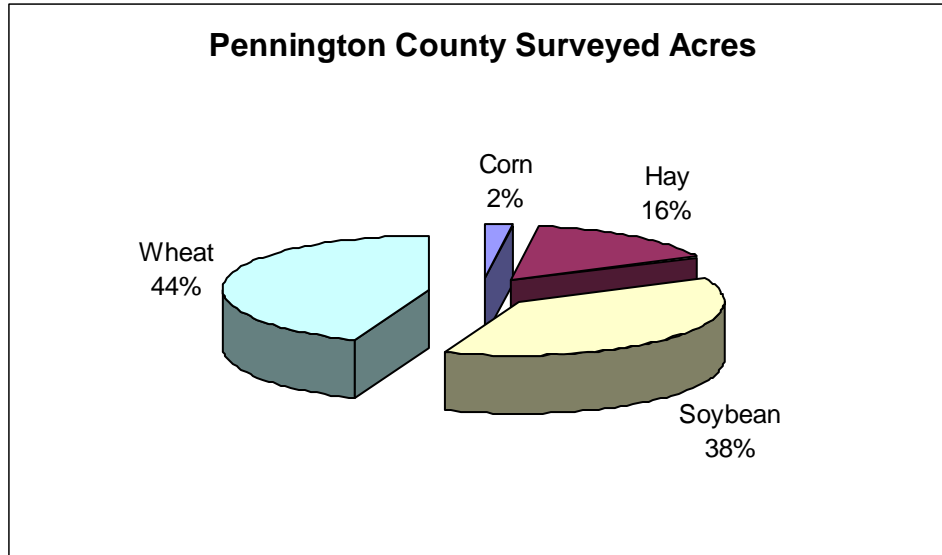
**Herbicides applied but not published included the following:** 2,4-D, Atrazine, Clethodim, Clodinafop-propargyl, Dicamba, Dimethenamid-P, Flumiclorac-pentyl, Foramsulfuron, Glufosinate-ammonium, Imazamox, Mesosulfuron-methyl, Tribenuron-methyl

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

**Fungicides:** Pyraclostrobin, Tebuconazole, Trifloxystrobin



## Pennington County



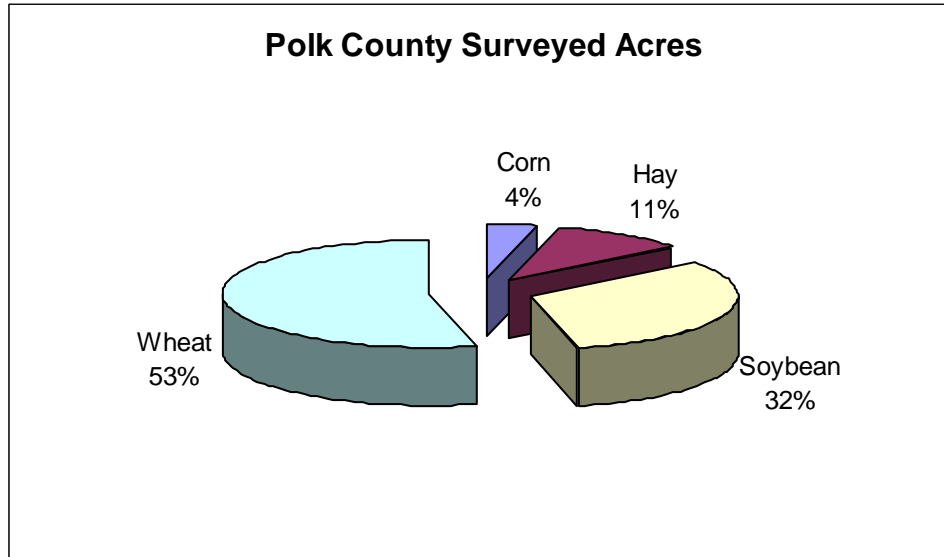
**Table 53. Pennington County pesticide applications and rates**

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
Bromoxynil	16	1.0	0.29	0.29	1,831
Fenoxaprop	16	1.0	0.06	0.06	407
Glyphosate	58	1.6	0.80	1.25	29,306
MCPA	16	1.0	0.32	0.32	2,018
Thifensulfuron	5	1.0	0.01	0.01	26

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Clopyralid, Flumioxazin, Glufosinate-ammonium, Imazamox, Imazethapyr, Thifensulfuron, Tribenuron-methyl, Trifluralin  
**Insecticides applied but not published included the following** Dimethoate, Methyl parathion  
**Fungicides applied but not published included the following:** Propiconazole, Pyraclostrobin, Tebuconazole

**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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
2,4-D	2	1.0	0.46	0.46	487
Bromoxynil	29	1.0	0.31	0.31	4,636
Fenoxaprop	13	1.0	0.06	0.06	374
Glyphosate	32	1.6	0.68	1.07	17,501
MCPA	38	1.0	0.36	0.36	7,071
Thifensulfuron	4	1.0	0.01	0.01	20
<b>Insecticides</b>					
Methyl parathion	18	1.0	0.28	0.28	2,580
<b>Fungicides</b>					
Pyraclostrobin	9	1.0	0.06	0.06	275
Tebuconazole	32	1.0	0.09	0.09	1,491

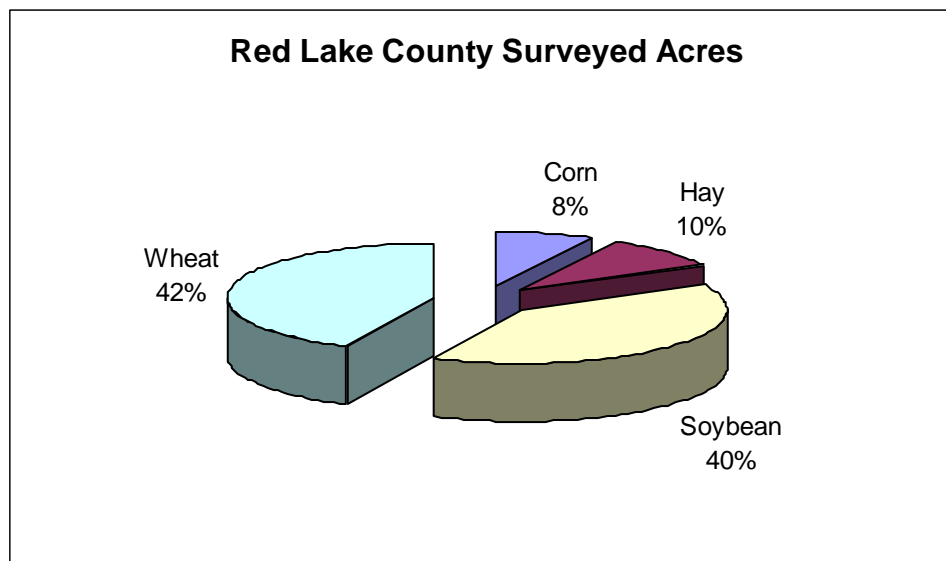
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Dicamba, Dicamba, Sodium salt, Diflufenzopyr-sodium, Fluroxypyr, Imazamox, Mesosulfuron-methyl, Nicosulfuron, Sethoxydim, Tribenuron-methyl, Trifluralin

**Insecticides applied but not published included the following:** Dimethoate, Lambda-cyhalothrin

**Fungicides applied but not published included the following:** Propiconazole

## Red Lake County



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

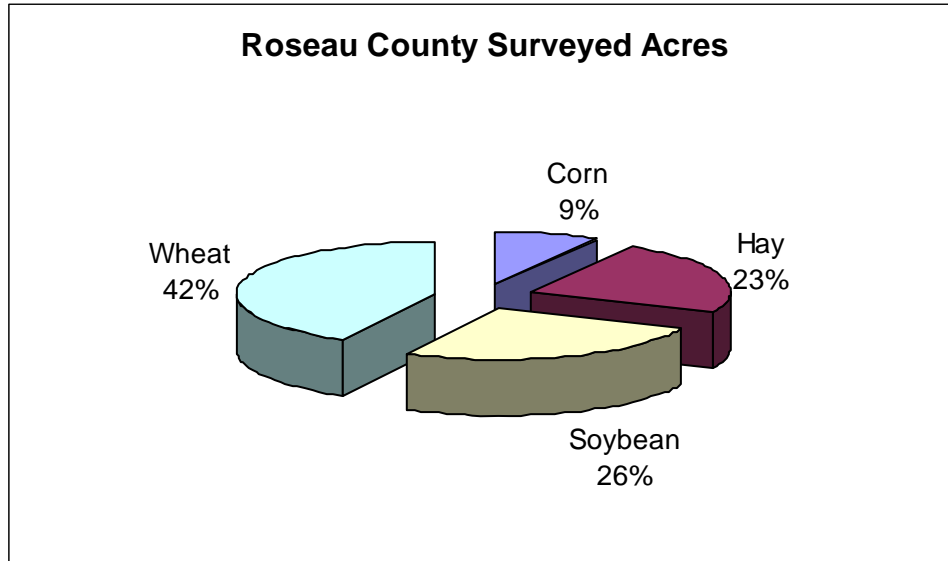
Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
2,4-D	2	1.0	0.43	0.43	242
Bromoxynil	25	1.0	0.34	0.34	3,041
Fenoxaprop	18	1.0	0.08	0.08	504
Glyphosate	49	1.4	0.71	0.96	17,621
MCPA	33	1.0	0.38	0.38	4,564
<b>Fungicides</b>					
Propiconazole	14	1.0	0.06	0.06	287
Pyraclostrobin	18	1.0	0.05	0.05	356
Tebuconazole	19	1.0	0.09	0.09	632
Trifloxystrobin	5	1.0	0.03	0.03	63

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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:** Acetic acid, Atrazine, Clodinafop-propargil, Clopyralid, Dicamba, Thifensulfuron, Tribenuron-methyl

**Insecticides applied but not published included the following:** Chlorpyrifos, Cyfluthrin, Lambda-cyhalothrin, Methyl parathion, Phorate

**Roseau County**



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

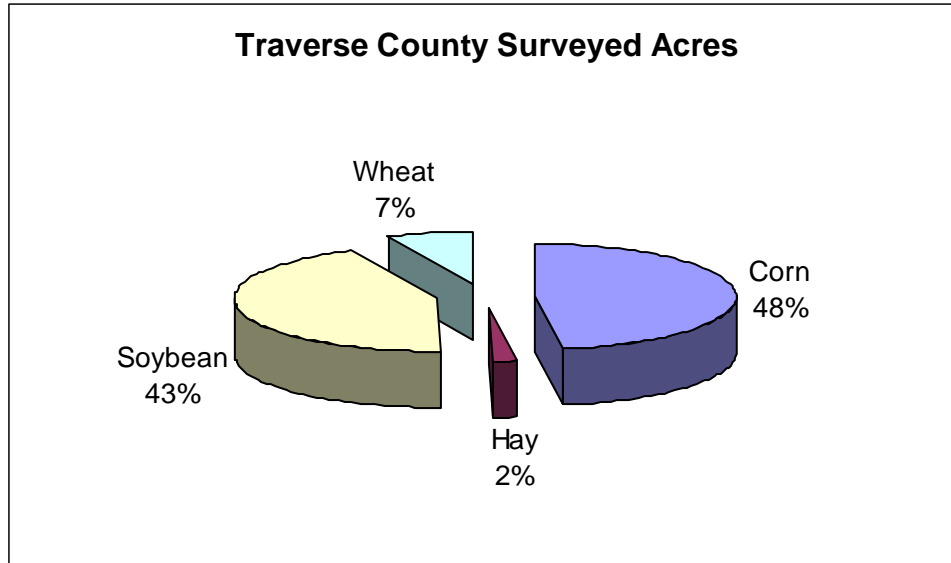
Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
Bromoxynil	11	1.0	0.28	0.28	749
Fenoxaprop	12	1.0	0.07	0.07	196
Glyphosate	33	1.3	0.57	0.76	5,839
MCPA	17	1.0	0.31	0.31	1,264
<b>Insecticides</b>					
Methyl parathion	21	1.0	0.30	0.30	1,445
<b>Fungicides</b>					
Propiconazole	7	1.0	0.09	0.09	156
Pyraclostrobin	6	1.0	0.07	0.07	106
Tebuconazole	14	1.0	0.11	0.11	381

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Clodinafop-propargyl, Dicamba, Mesosulfuron-methyl, Mesotrione, Pendimethalin, Pinoxaden, Thifensulfuron, Tribenuron-methyl

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

### 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 Crop Year <sup>1</sup>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
<b>Herbicides</b>			(a.i.)	(a.i.)	(a.i.)
2,4-D	3	1.0	0.54	0.54	658
Atrazine	8	1.0	0.33	0.33	1,234
Bromoxynil	3	1.0	0.52	0.52	732
Glyphosate	78	1.4	0.73	1.04	37,054
MCPA	3	1.0	0.55	0.55	857
<b>Insecticides</b>					
Lambda-cyhalothrin	10	1.0	0.02	0.02	99
<b>Fungicides</b>					
Pyraclostrobin	1	1.0	0.05	0.05	20

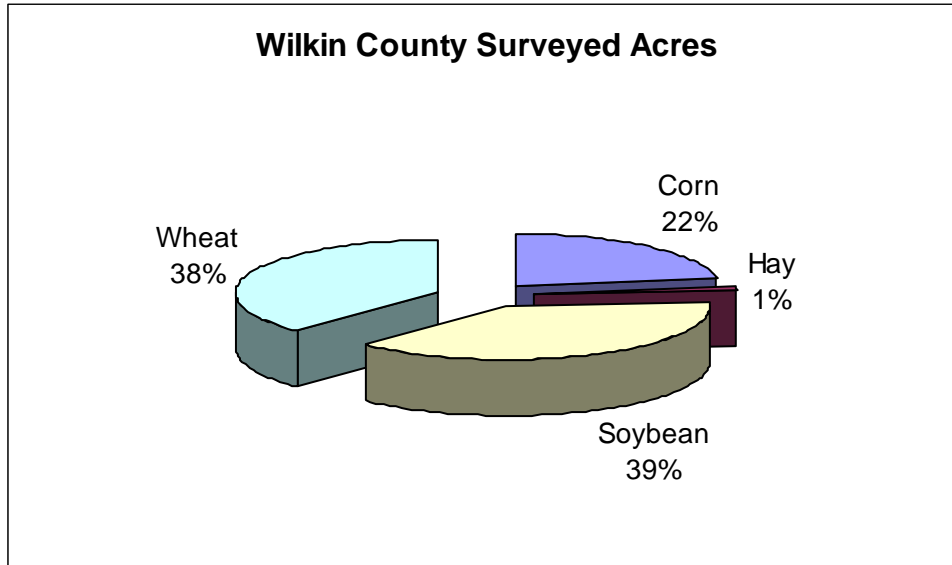
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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 Dimet. salt, Dicamba, Sodium salt, Diflufenzopyr-sodium, Fenoxaprop, Flumioxazin, Fomesafen, Foramsulfuron, Glufosinate-ammonium, Mesotrione, Metribuzin, Nicosulfuron, Rimsulfuron, Thifensulfuron, Topramezone

**Insecticides applied but not published included the following:** Clothianidin, Esfenvalerate, Methyl parathion

**Fungicides applied but not published included the following:** Chlorethoxyfos, Chlorpyrifos, Esfenvalerate, Gamma-cyhalothrin

## 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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
2,4-D	7	1.0	0.43	0.43	1,721
Atrazine	6	1.0	0.51	0.51	1,846
Bromoxynil	20	1.0	0.33	0.33	3,946
Fenoxaprop	10	1.0	0.07	0.07	420
Glufosinate-ammonium	3	1.0	0.33	0.33	633
Glyphosate	49	1.5	0.70	1.04	30,727
MCPA	23	1.0	0.36	0.36	4,818
<b>Insecticides</b>					
Lambda-cyhalothrin	3	1.0	0.02	0.02	47
<b>Fungicides</b>					
Lambda-cyhalothrin	4	1.0	0.02	0.02	61

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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.

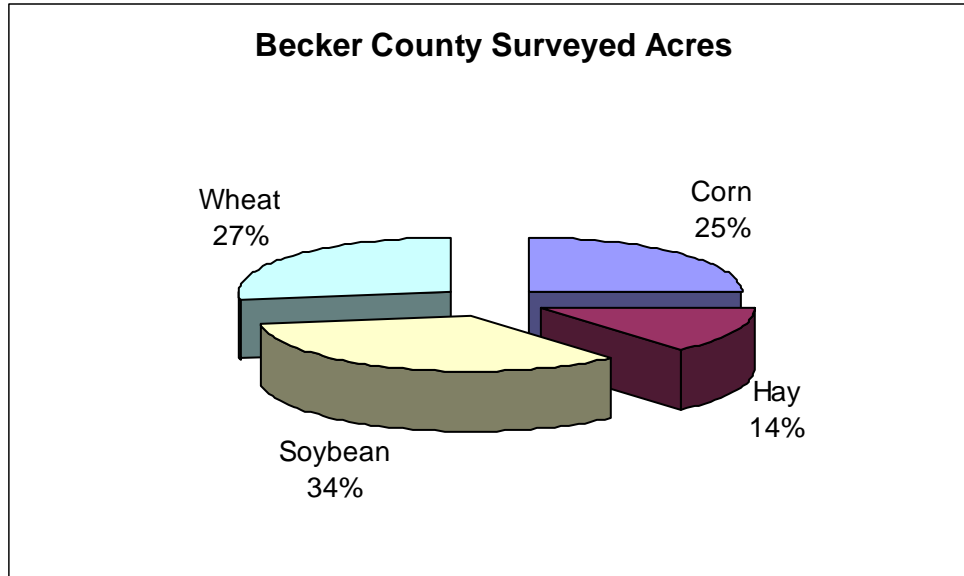
**Herbicides applied but not published included the following:** Acetochlor, Dicamba, Dicamba Dimet. Salt, Diflufenzopyr-sodium, Dimethenamid-P, Flumioxazin, Fluroxypyr, Fomesafen, Foramsulfuron, Imazamox, Imazethapyr, Mesosulfuron-methyl, Mesotrione, Nicosulfuron, Pendimethalin, Rimsulfuron, Sethoxydim, Thifensulfuron, Tribenuron-methyl, Trifluralin

**Insecticides applied but not published included the following:** Chlorpyrifos, Esfenvalerate

**Fungicides applied but not published included the following:** Propiconazole, Tebuconazole, 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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
Bromoxynil	20	1.0	0.28	0.28	1,038
Fenoxaprop	24	1.0	0.07	0.07	312
Glyphosate	52	1.7	0.62	1.04	9,878
MCPA	18	1.0	0.31	0.31	1,008

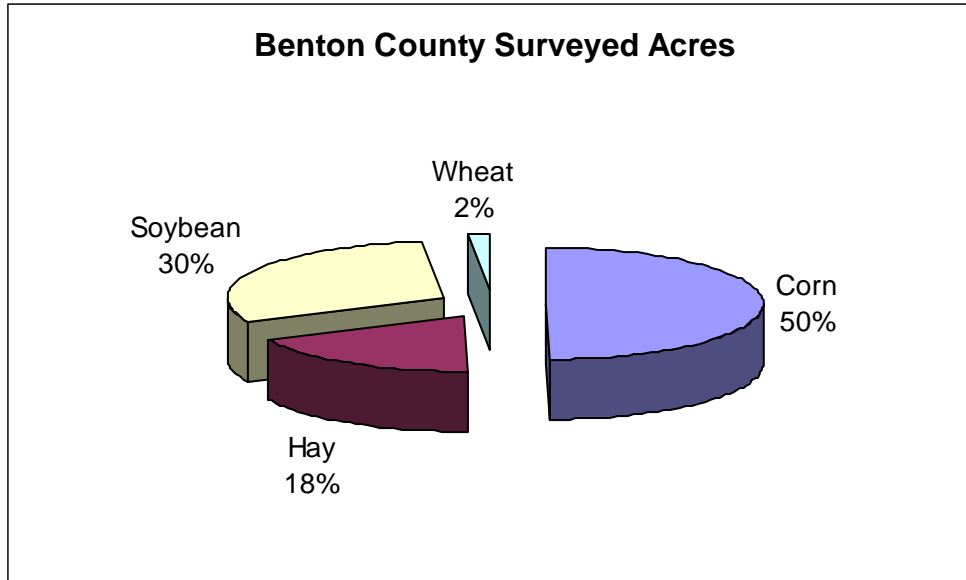
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Clopyralid, Dimet. salt, Diflufenzopyr-sodium, Flumioxazin, Fluroxypyr,

**Insecticides applied but not published included the following:** Chlorpyrifos, Esfenvalerate, Lambda-cyhalothrin Dimethoate

**Fungicides applied but not published included the following:** Propiconazole, Pyraclostrobin Tebuconazole, 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 Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
Acetochlor	25	1.0	1.28	1.28	4,201
Atrazine	30	1.0	0.86	0.86	3,359
Glyphosate	65	1.3	0.80	1.03	8,711

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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.

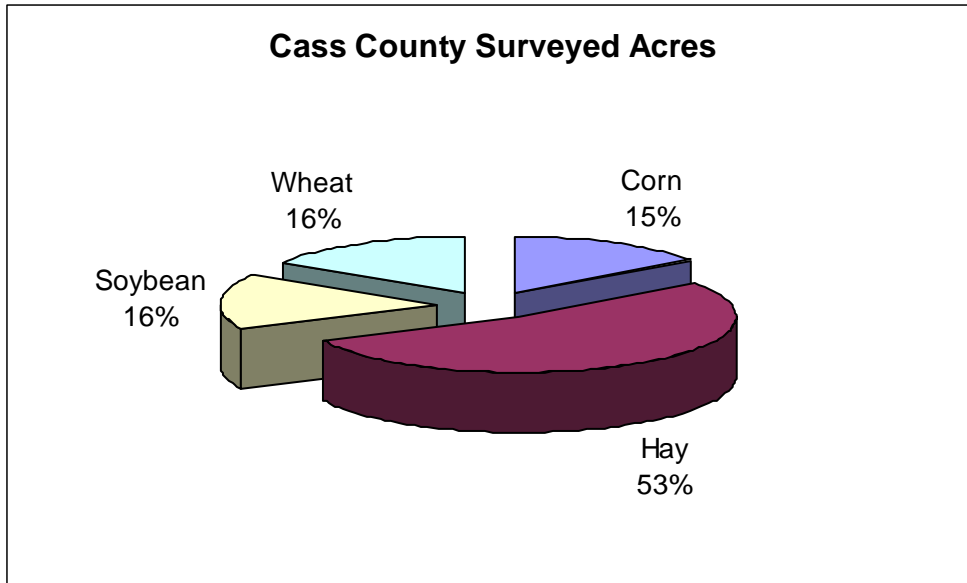
**Herbicides applied but not published included the following:** 2,4-D, Clopyralid, Dicamba, Dimet. Salt, Dicamba, Dimethenamid-P, Glufosinate-ammonium, Imazethapyr, Mesotrione, Nicosulfuron, Pendimethalin, Rimsulfuron, S-Metolachlor

**Insecticides applied but not published included the following:** Chlorpyrifos, Lambda-cyhalothrin, Permethrin

**Fungicides applied but not published included the following:** Chlorothalonil, Pyraclostrobin



**Cass County**



**Table 61. Cass 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 Crop Year <sup>1</sup>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
<b>Herbicides</b>			(a.i.)	(a.i.)	(a.i.)
Glyphosate	18	1.0	0.96	0.96	1,841

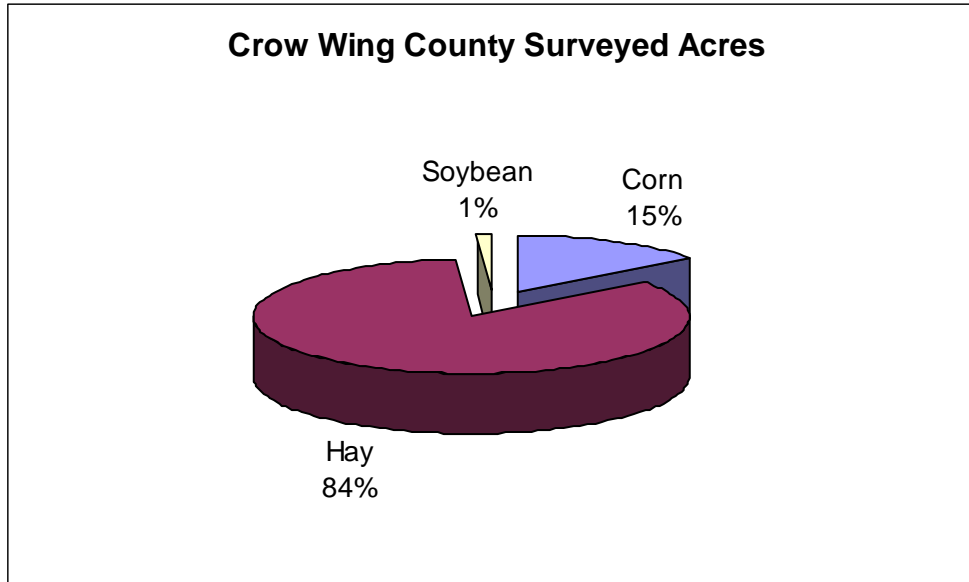
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Mesotrione, S-Metolachlor

**Insecticides applied but not published included the following:** Chlorpyrifos, Lambda-cyhalothrin, Permethrin

**Fungicides applied but not published included the following:** Pyraclostrobin

### Crow Wing County



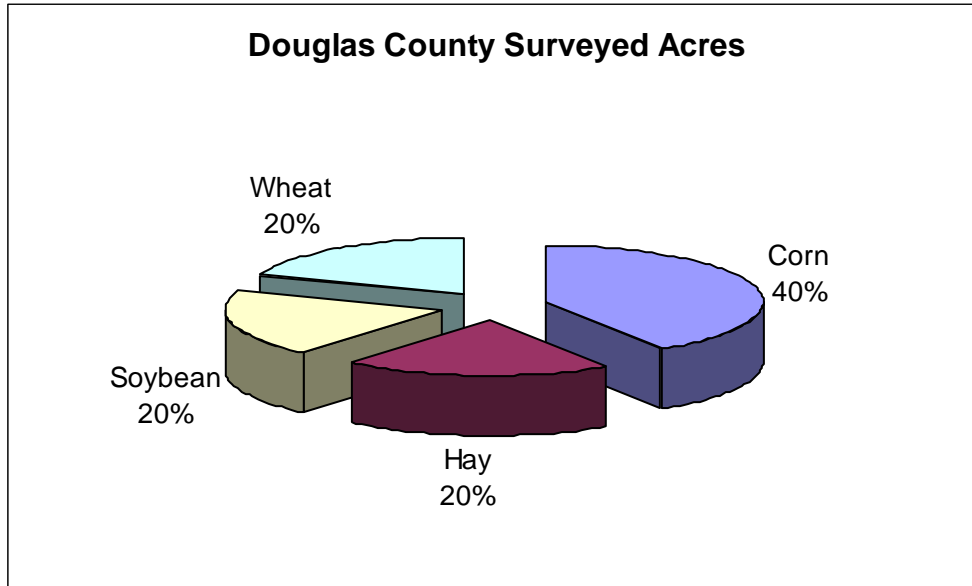
**Table 62. Crow Wing County pesticide applications and rates**

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
Atrazine	5	1.0	0.57	0.57	231
Glyphosate	10	1.0	0.70	0.73	586

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Clopyralid, Flumetsulam, Mesotrione, S-Metolachlor

## Douglas County



**Table 63. 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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
2,4-D	5	1.0	0.34	0.34	271
Acetochlor	13	1.0	1.54	1.54	2,822
Atrazine	5	1.0	0.50	0.50	403
Glyphosate	45	1.1	0.79	0.91	5,929
MCPA	3	1.0	0.33	0.33	150

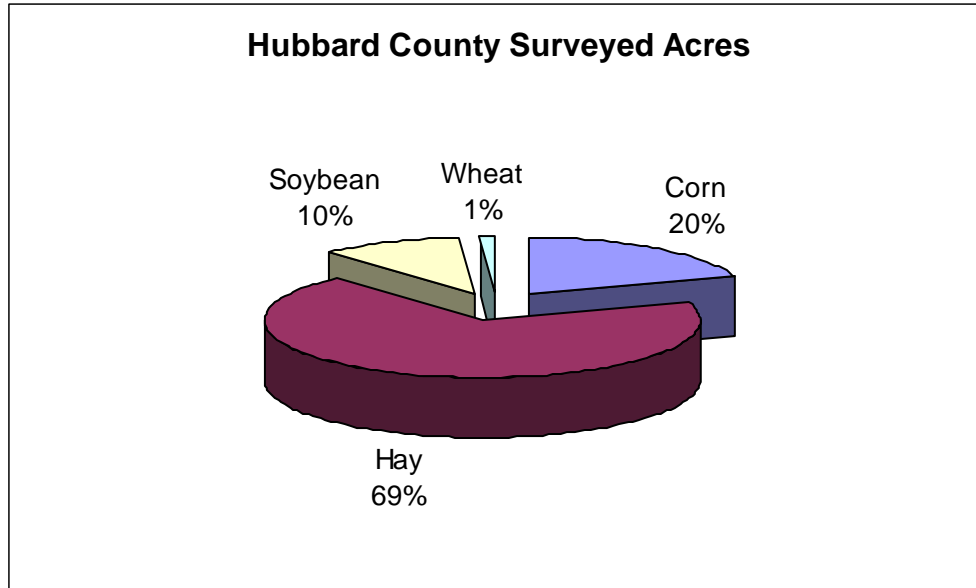
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Clopyralid, Dicamba, Dicamba, Dimet. Salt, Dicamba, Pot. Salt, Diflufenzopyr-sodium, Fenoxaprop, Flumetsulam, Glufosinate-ammonium, Imazamox, Imazethapyr, Mesotrione, Nicosulfuron, Pendimethalin, Rimsulfuron, S-Metolachlor, Thifensulfuron

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

**Fungicides applied but not published included the following:** Pyraclostrobin

**Hubbard County**



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

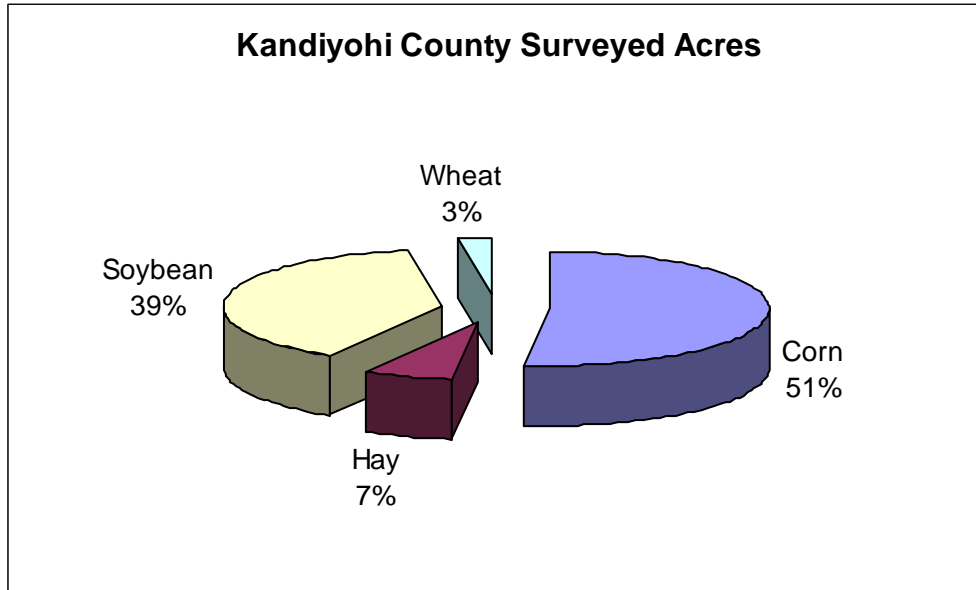
<b>Agricultural Chemical (a.i.)</b>	<b>Surveyed Area Applied</b>	<b>Average Applications</b>	<b>Average Rate Per Application</b>	<b>Average Rate Per Crop Year</b>	<b>Total Applied Crop Year<sup>1</sup></b>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
<b>Herbicides</b>					
Glyphosate	24	1.2	0.78	0.91	1,145

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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-ethyl, Clopyralid, Dicamba, Dimet. Salt, Diflufenzopyr-sodium, Dimethenamid-P, Fenoxaprop Foramsulfuron, Tribenuron-methyl, Thifensulfuron

**Insecticides applied but not published included the following:** Esfenvalerate

## Kandiyohi County



**Table 65. 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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
Acetochlor	8	1.0	1.15	1.15	1,815
Atrazine	7	1.0	0.45	0.45	634
Glufosinate-ammonium	5	1.0	0.33	0.33	305
Glyphosate	78	1.5	0.74	1.11	17,306
Nicosulfuron	5	1.0	0.02	0.02	17
Rimsulfuron	5	1.0	0.01	0.01	9
<b>Insecticides</b>					
Chlorpyrifos	4	1.0	0.69	0.69	574
Lambda-cyhalothrin	8	1.0	0.02	0.02	39

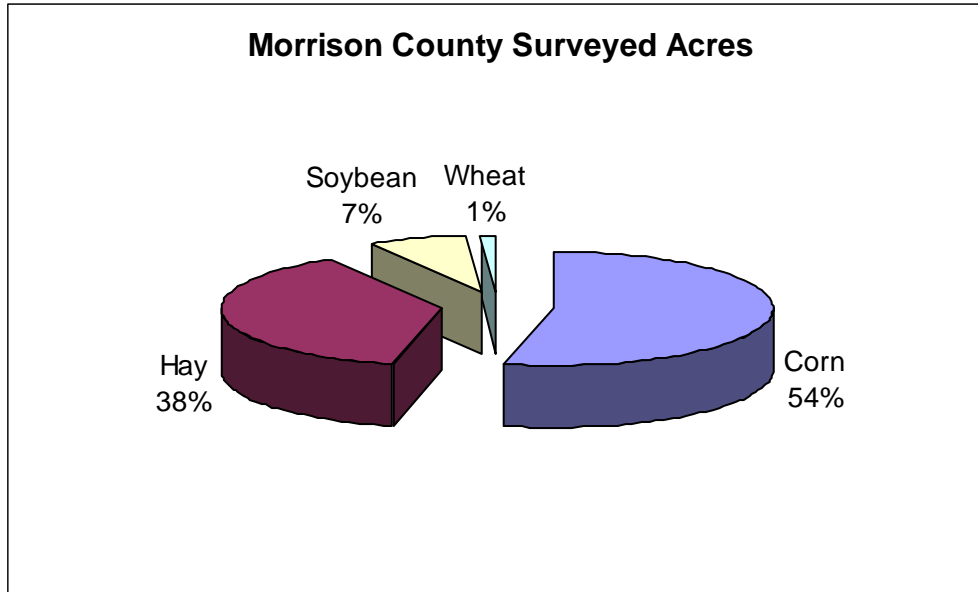
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Dicamba, Dimet. salt, Dicamba, Pot. salt, Diflufenzopyr-sodium, Dimethenamid-P, Fenoxaprop, Foramsulfuron, MCPA, Mesotrione, Pendimethalin, Primisulfuron, S-Metolachlor,

**Insecticides applied but not published included the following:** Chlorpyrifos, Cyfluthrin, Gamma-cyhalothrin

**Fungicides applied but not published included the following:** Pyraclostrobin

### Morrison County



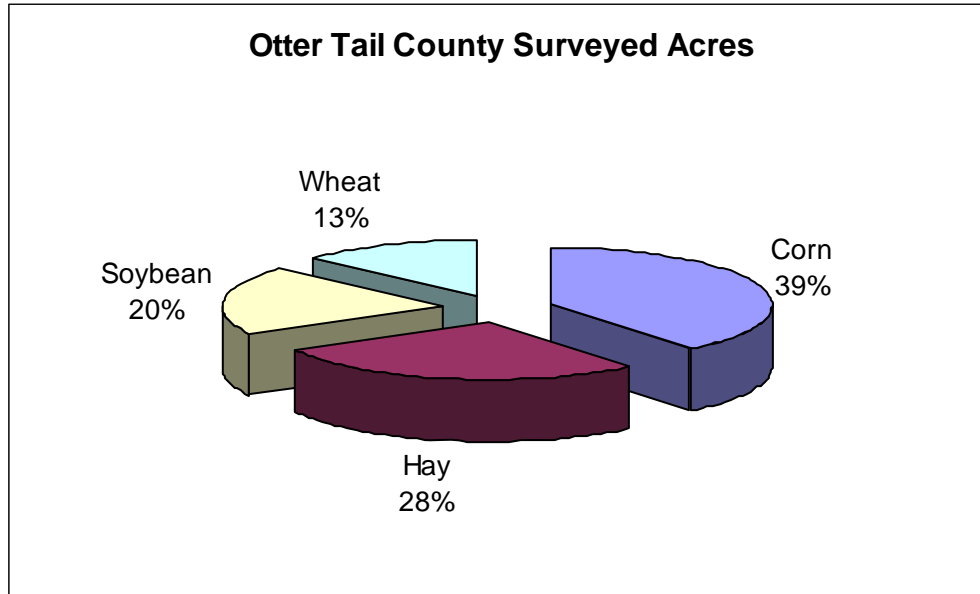
**Table 66. Morrison County pesticide applications and rates**

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
Acetochlor	14	1.0	1.64	1.64	1,771
Atrazine	19	1.0	0.72	0.72	1,066
Clopyralid	3	1.0	0.11	0.11	25
Flumetsulam	4	1.0	0.04	0.04	12
Glyphosate	36	1.3	0.73	0.96	2,713
Mesotrione	9	1.0	0.16	0.16	113
S-Metolachlor	7	1.0	1.90	1.90	1,070

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Bentazon, Bromoxynil, Dicamba, Fluroxypyr, Foramsulfuron, Nicosulfuron, Pendimethalin, Primisulfuron, Rimsulfuron, Sethoxydim

**Otter Tail County**



**Table 67. 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 Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
2,4-D	4	1.0	0.58	0.58	241
Glyphosate	49	1.1	0.78	0.89	4,204

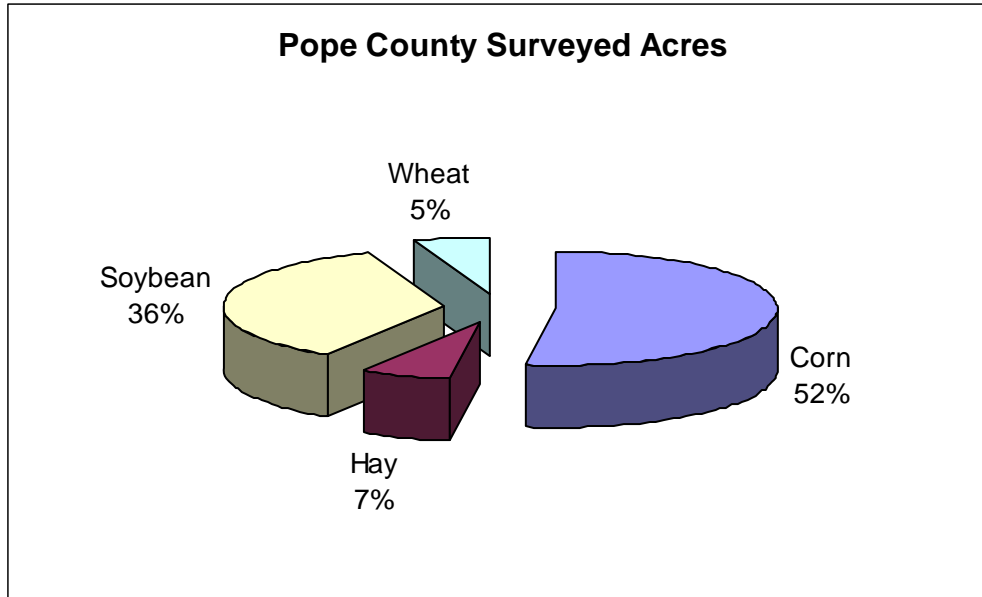
<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically “weighted” in any fashion. 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, Alachlor, Atrazine, Bromoxynil, Clethodim, Clopyralid, Dicamba, Dicamba, Dimet. salt, Diflufenzopyr-sodium, Fenoxaprop, Foramsulfuron, Glufosinate-ammonium, MCPA, Mesotrione Nicosulfuron, Rimsulfuron, Thifensulfuron

**Insecticides applied but not published included the following:** Carbofuran, Chlorpyrifos, Lambda-cyhalothrin

**Fungicides applied but not published included the following:** Pyraclostrobin

## Pope County



**Table 68. 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 Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
2,4-D	2	1.0	0.40	0.40	258
Atrazine	5	1.0	0.54	0.54	804
Bromoxynil	1	1.0	0.28	0.28	84
Fenoxaprop	1	1.0	0.03	0.03	10
Glyphosate	77	1.4	0.75	1.05	24,098
MCPA	2	1.0	0.26	0.26	177
Mesotrione	5	1.0	0.12	0.12	193
<b>Insecticides</b>					
Lambda-cyhalothrin	14	1.0	0.02	0.02	82
<b>Fungicides</b>					
Pyraclostrobin	2	1.0	0.07	0.07	51

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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.

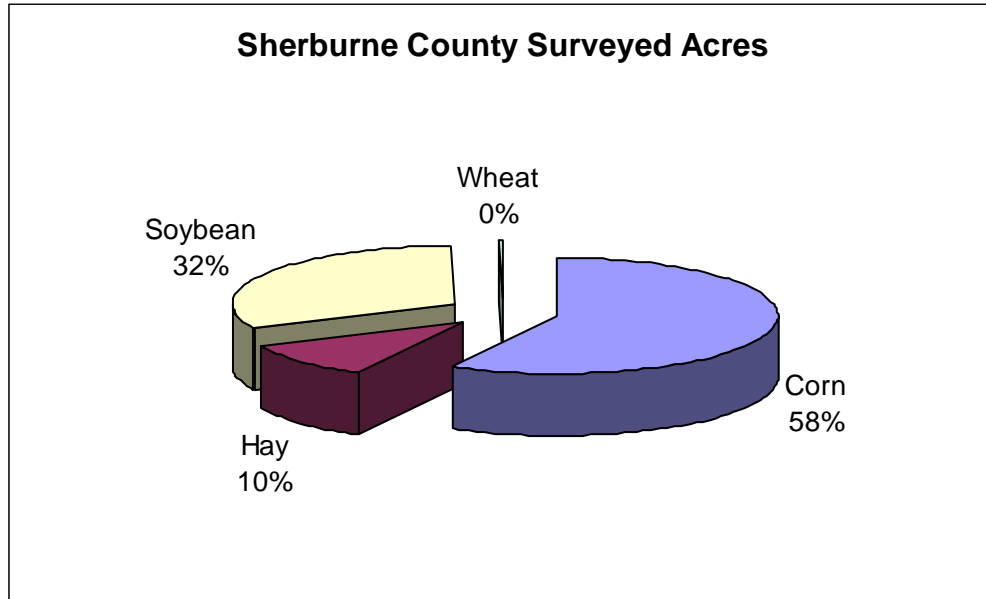
**Herbicides applied but not published included the following:** Acetochlor, Clopyralid, Dicamba, Dicamba, Dimet. salt, Dicamba, Pot. salt, Dicamba, Sodium salt Diflufenzopyr-sodium, Flumetsulam, Foramsulfuron, Glufosinate-ammonium, Imazamox, Imazethapyr, Metribuzin, Nicosulfuron, Quinalofop-P-ethyl, Rimsulfuron S-Metolachlor, Thifensulfuron, Topramezone

**Insecticides applied but not published included the following:** Chlorpyrifos, Esfenvalerate, Zeta-cypermethrin

**Fungicides applied but not published included the following:** Propiconazole



**Sherburne County**



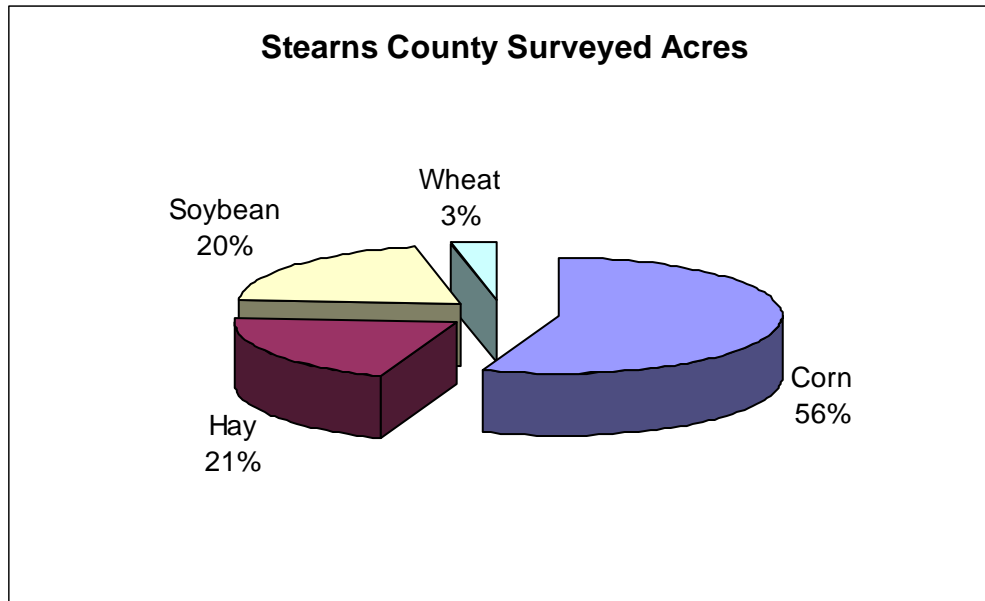
**Table 69. Sherburne County pesticide applications and rates**

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
Atrazine	37	1.0	0.62	0.62	2,982
Glyphosate	70	1.3	0.73	0.93	8,468

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Clopyralid, Cloransulam-methyl, Dicamba, Dicamba, Dimet. Salt, Dicamba, Pot. salt, Diflufenzopyr-sodium, Dimethenamid, Flumetsulam, Foramsulfuron, Glufosinate-ammonium, MCPA, Mesotrione, Metolachlor, Nicosulfuron, Pendimethalin, Rimsulfuron, S-Metolachlor, Thifensulfuron  
**Insecticides applied but not published included the following:** Bifenthrin, Cyfluthrin, Tebupirimphos

## Stearns County



**Table 70. 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 Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
Acetochlor	14	1.0	1.45	1.45	2,395
Atrazine	12	1.1	0.66	0.75	1,088
Dicamba, Dimet. salt	6	1.0	0.08	0.08	57
Diflufenzopyr-sodium	5	1.0	0.03	0.03	21
Glyphosate	50	1.5	0.77	1.18	7,157

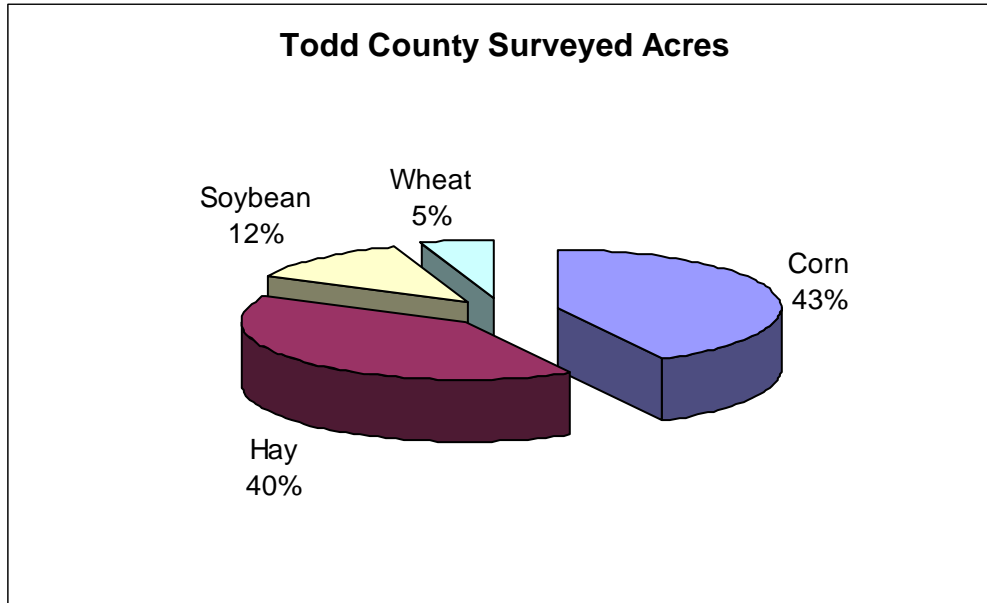
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Acetic acid, Bromoxynil Clopyralid, Dicamba, Dicamba Pot. salt, Dimethenamid-P, Fenoxaprop, Fluazifop-P-butyl, Flumetsulam, Fomesafen, Foramsulfuron, Imazethapyr, MCPA, Mesotrione, Metolachlor, Nicosulfuron, Pendimethalin, Picloram, Primisulfuron, Quizalofop-P-ethyl, Rimsulfuron, S-Metolachlor, Thifensulfuron, Trifluralin

**Insecticides applied but not published included the following:** Chlorpyrifos, Cyfluthrin, Lambda-cyhalothrin

**Fungicides applied but not published included the following:** Propiconazole

**Todd County**



**Table 71. 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 Crop Year <sup>1</sup>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
<b>Herbicides</b>			(a.i.)	(a.i.)	(a.i.)
Acetochlor	19	1.0	1.17	1.17	1,792
Atrazine	8	1.0	0.84	0.84	559
Glyphosate	38	1.3	0.81	1.02	3,176

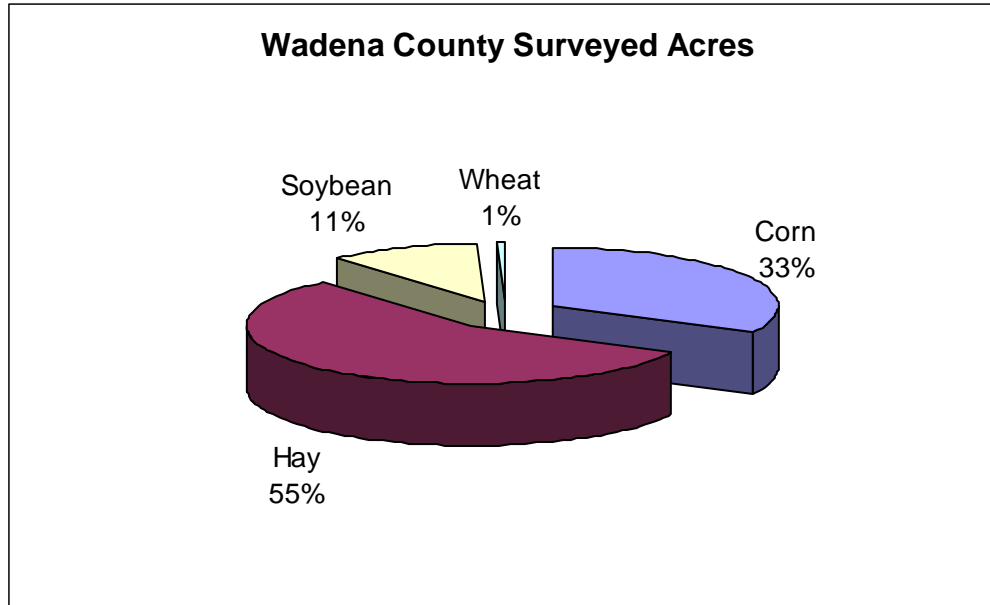
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Carfentrazone-ethyl, Dimet. salt, Diflufenzopyr-sodium, Fenoxaprop, Foramsulfuron, Glufosinate-ammonium, MCPA, Mesotrione, Nicosulfuron, Quizalofop-P-ethyl, Rimsulfuron, Topramezone

**Insecticides applied but not published included the following:** Bifenthrin Chlorpyrifos

**Fungicides applied but not published included the following:** Pyraclostrobin

### Wadena County



**Table 72. 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 Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
Atrazine	13	1.0	0.68	0.68	679
Glyphosate	29	1.2	0.66	0.80	1,876

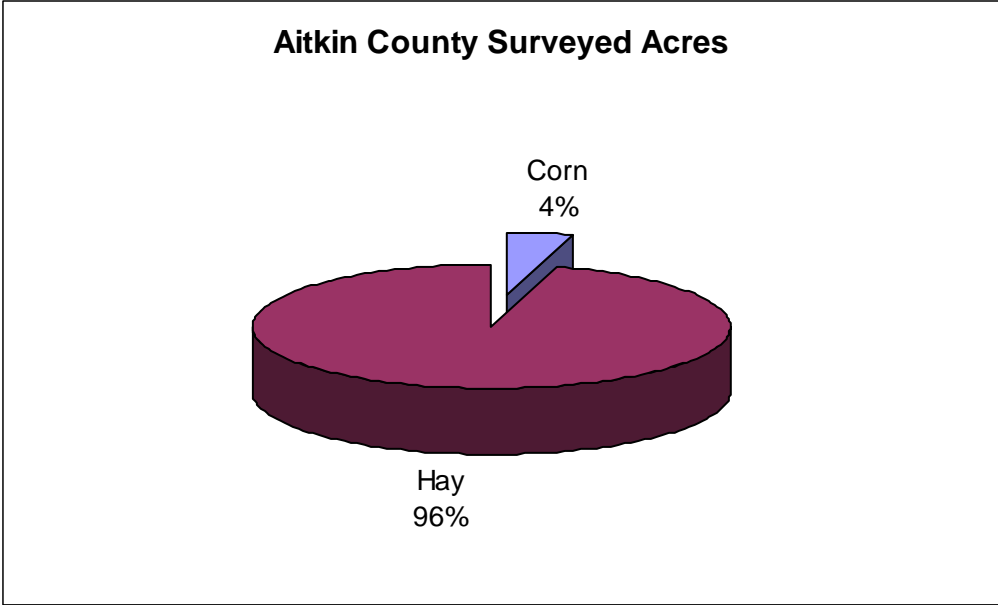
<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically “weighted” in any fashion. 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 MCPA Mesotrione Nicosulfuron, Rimsulfuron, S-Metolachlor, Topramezone

**Insecticides applied but not published included the following:** Carbofuran, Dimethoate,

### PMA 5 County Data

#### Aitkin County

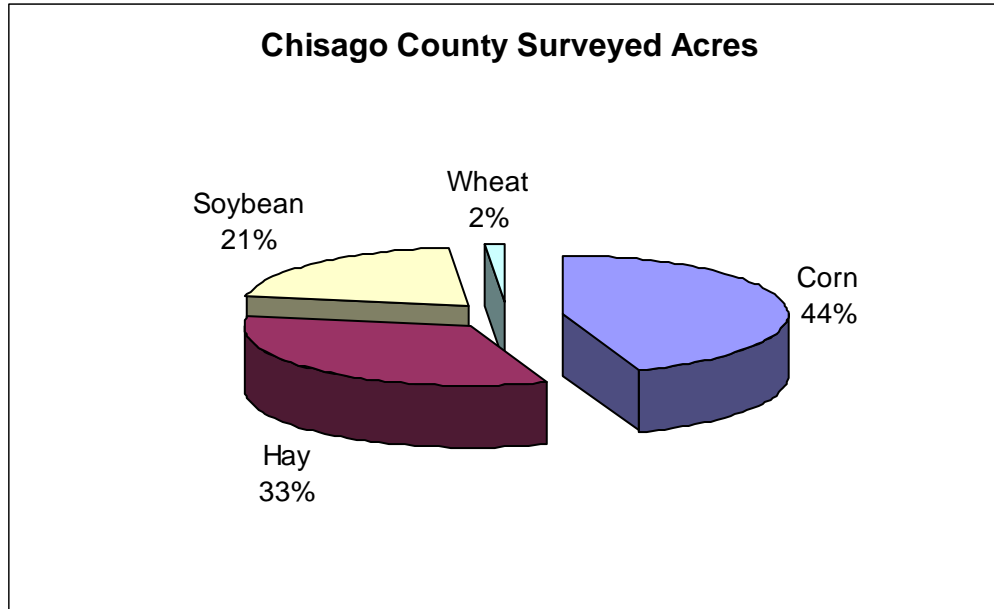


**Table 73. Aitkin County pesticide applications and rates**

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

Herbicides applied but not published included the following: 2,4-D, Atrazine, Mesotrione, Primisulfuron, S-Metolachlor

### Chisago County



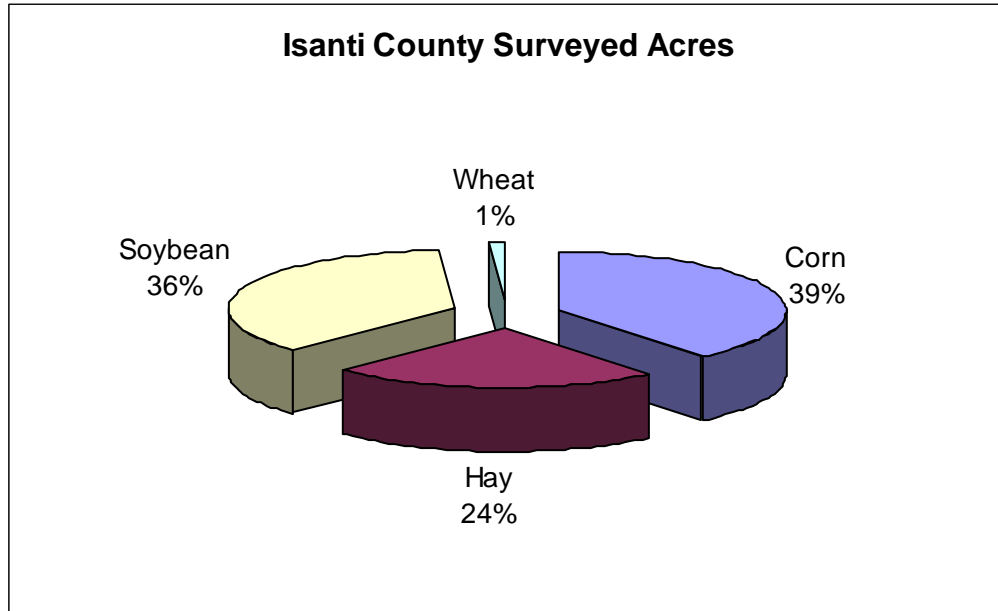
**Table 74. Chisago County pesticide applications and rates**

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
			(a.i.)	(a.i.)	(a.i.)
<b>Herbicides</b>					
Acetochlor	10	1.0	1.00	1.00	675
Atrazine	12	1.0	0.93	0.93	753
Glyphosate	44	1.0	0.78	0.79	2,405

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Gufosinate-ammonium, MCPA, Mesotrione, Nicosulfuron Pendimethalin, Rimsulfuron S-Metolachlor  
**Insecticides applied but not published included the following:** Chlorpyrifos

**Isanti County**



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

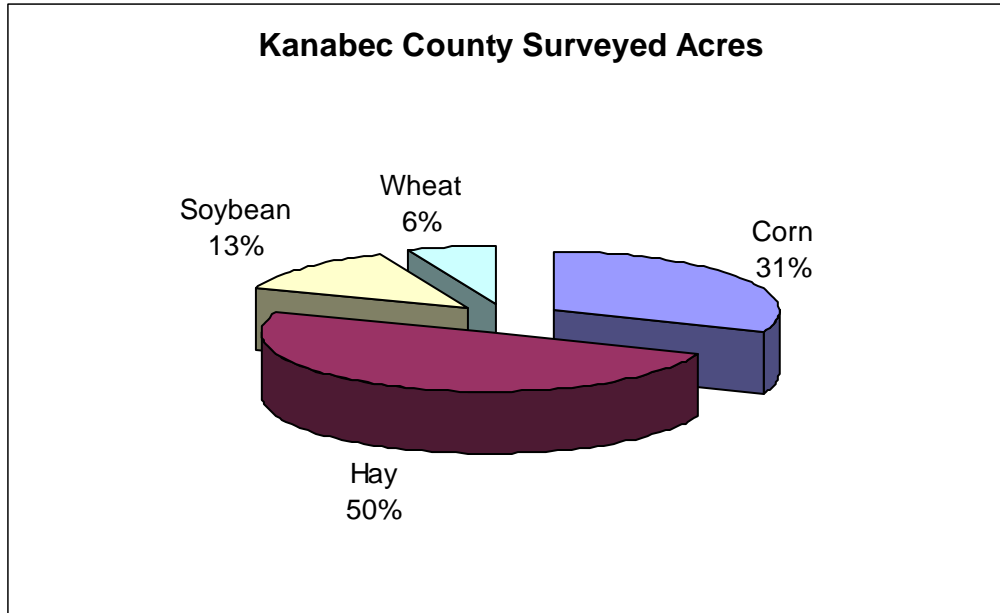
Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
<b>Herbicides</b>			(a.i.)	(a.i.)	(a.i.)
Acetochlor	2	1.0	1.71	1.71	204
Atrazine	31	1.0	0.58	0.58	1,188
Glyphosate	53	1.0	0.67	0.70	2,466

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Glufosinate-ammonium, Imazapyr, Imazethapyr, Mesotrione, Metribuzin, Pendimethalin, S-Metolachlor

**Insecticides applied but not published included the following:** Cyfluthrin, Zeta-cypermethrin

**Kanabec County**



**Table 76. 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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
Atrazine	9	1.0	0.67	0.67	484
Glyphosate	37	1.0	0.76	0.77	2,281

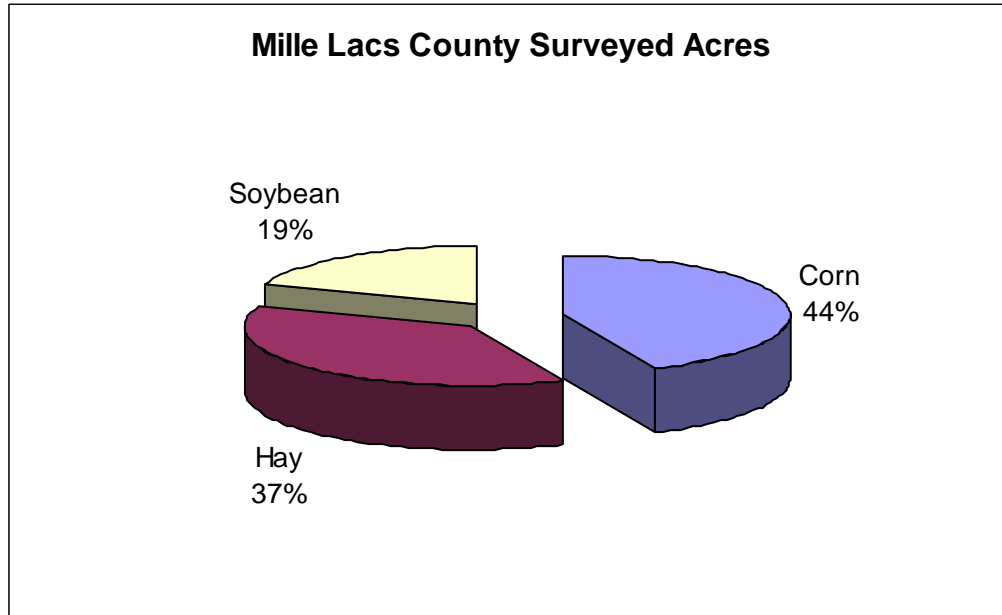
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Clethodim, Dicamba, Fenoxaprop, Glufosinate-ammonium, MCPA, Mesotrione, Nicosulfuron, Pendimethalin, Rimsulfuron, S-Metolachlor

**Insecticides applied but not published included the following:** Gamma-cyhalothrin, Lambda-cyhalothrin, Permethrin



**Mille Lacs County**



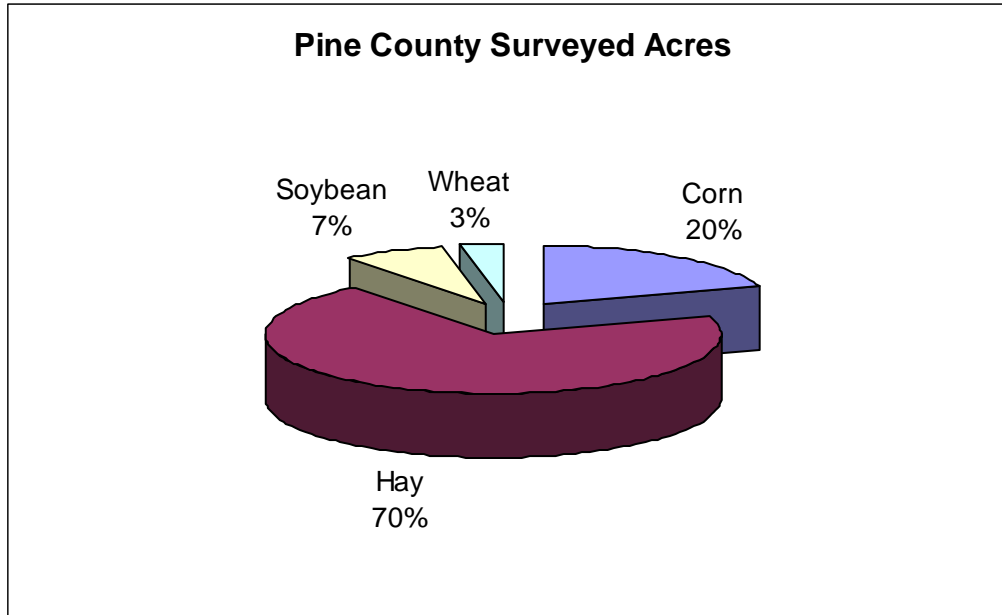
**Table 77. Mille Lacs pesticide applications and rates**

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
Acetochlor	14	1.0	2.01	2.01	1,811
Atrazine	8	1.0	0.63	0.63	316
Glyphosate	45	1.1	0.82	0.88	2,634

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Dicamba, Dimet. Salt., Dicamba, Sodium salt, Flumetsulam, Halosulfuron, Mesotrione, Pendimethalin, S-Metolachlor  
**Insecticides applied but not published included the following:** Chlorpyrifos,

**Pine County**



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

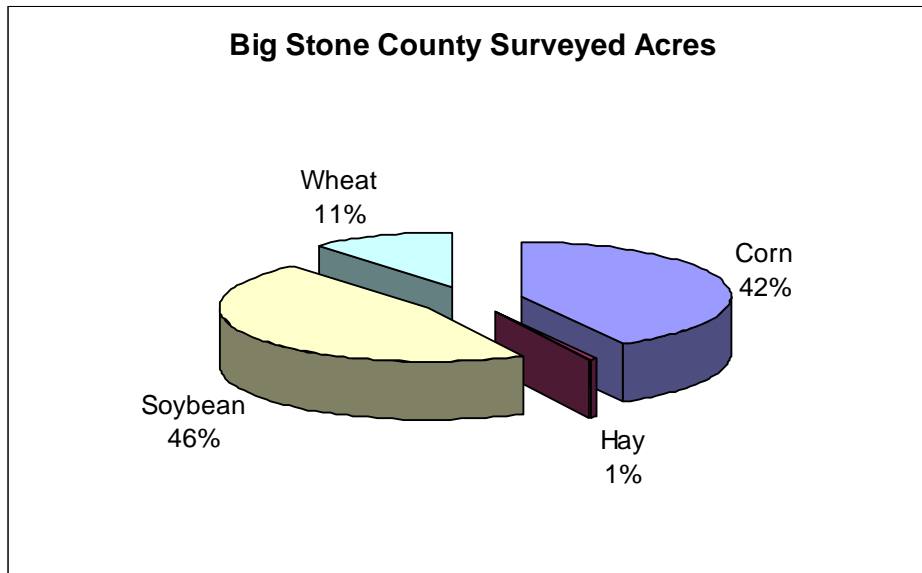
Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
<b>Herbicides</b>					
Acetochlor	4	1.0	1.09	1.09	271
Atrazine	9	1.0	0.59	0.59	285
Glyphosate	17	1.0	0.71	0.73	693

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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 Clopyralid Dicamba, Dimet. salt Flumetsulam Glufosinate-ammonium, Pendimethalin

### PMA 6 County Data

#### Big Stone County



**Table 79. 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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
2,4-D	4	1.0	0.47	0.47	918
Acetochlor	4	1.3	1.26	1.62	3,616
Atrazine	8	1.0	0.39	0.39	1,529
Bromoxynil	3	1.0	0.43	0.43	568
Fenoxaprop	2	1.0	0.05	0.05	53
Glufosinate-ammonium	9	1.0	0.41	0.41	1,811
Glyphosate	74	1.5	0.75	1.15	43,111
MCPA	3	1.0	0.42	0.42	750
Mesotrione	10	1.0	0.10	0.10	476
S-Metolachlor	3	1.0	1.15	1.15	1,805
<b>Insecticides</b>					
Chlorpyrifos	7	1.0	0.50	0.50	1,784
Lambda-cyhalothrin	13	1.0	0.02	0.02	160
<b>Fungicides</b>					
Pyraclostrobin	7	1.0	0.06	0.06	204

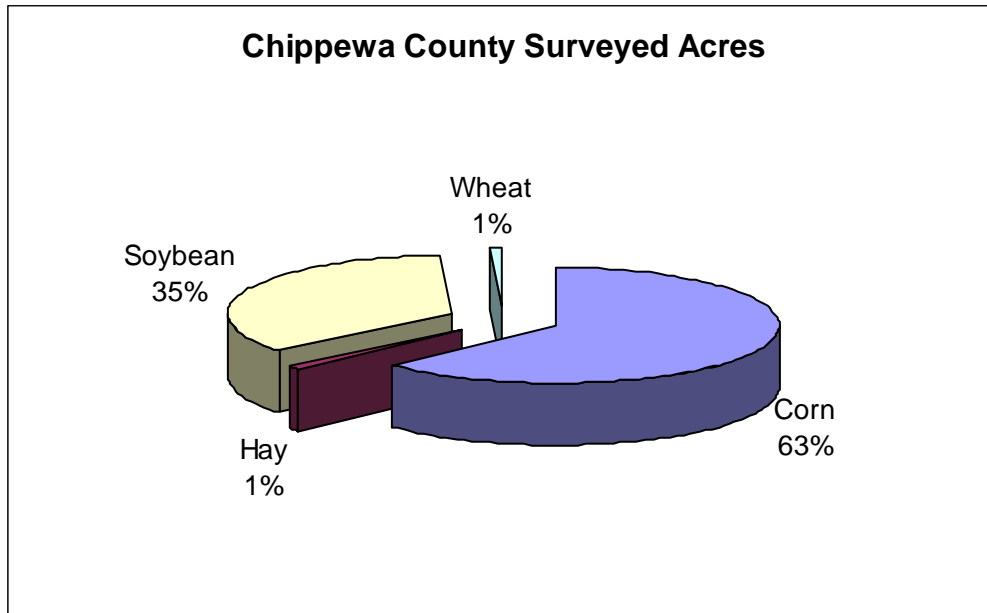
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Dicamba, Dimet. Salt, Dimethenamid-P, Flumetsulam, Flumioxazin, Fluroxypyr, Fomesafen, Mesosulfuron-methyl, Metolachlor, Nicosulfuron, Rimsulfuron, S-Metolachlor, Thifensulfuron, Trifluralin

**Insecticide applied but not published included the following:** Fipronil, Methyl parathion

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

### Chippewa County



**Table 80. 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 Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
Dimethenamid-P	10	1.0	0.55	0.55	1,785
Glyphosate	88	1.4	0.72	1.03	28,586
<b>Insecticides</b>					
Chlorpyrifos	11	1.0	0.74	0.74	2,536

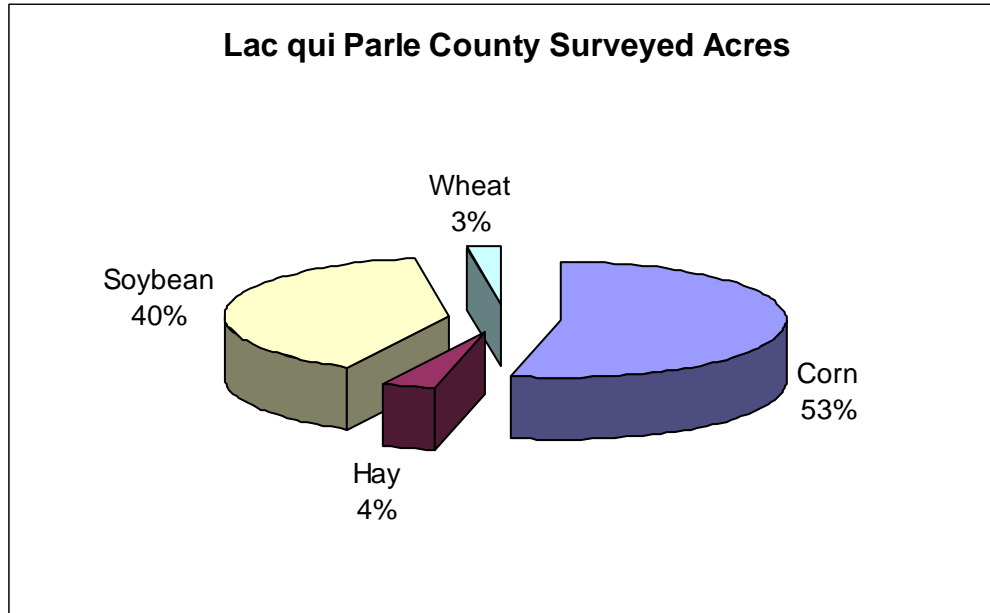
<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically “weighted” in any fashion. 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, Dimet salt, Diflufenzopyr-sodium, Flumetsulam, Foramsulfuron, MCPA, Quizalofop-P-ethyl, Thifensulfuron, Trifluralin

**Insecticides applied but not published included the following:** Chlorethoxyfos, Cyfluthrin, Esfenvalerate, Lambda-cyhalothrin, Tebupirimphos, Tefluthrin, Terbufos

**Fungicides applied but not published included the following:** Propiconazole, Pyraclostrobin, Tebuconazole

### Lac Qui Parle County



**Table 81. 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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
2,4-D	1	1.2	0.48	0.59	265
Acetochlor	6	1.0	1.39	1.39	2,740
Atrazine	5	1.0	0.29	0.29	411
Glyphosate	86	1.4	0.75	1.02	27,725
MCPA	1	1.0	0.47	0.47	177
<b>Insecticides</b>					
Chlorpyrifos	14	1.0	0.79	0.79	3,543
Lambda-cyhalothrin	8	1.0	0.02	0.02	61
<b>Fungicides</b>					
Pyraclostrobin	1	1.0	0.05	0.05	19

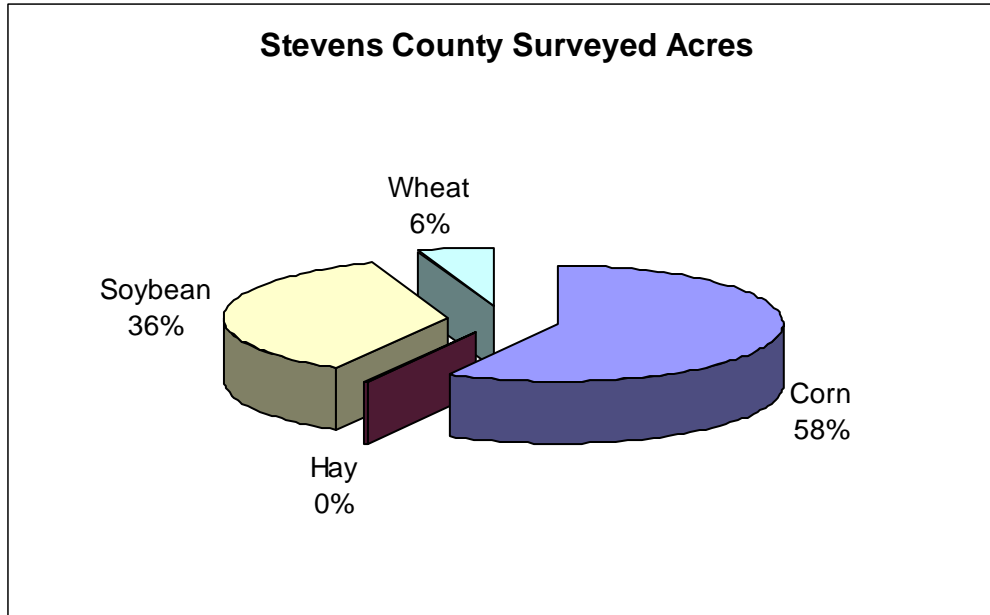
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Dicamba, Dimet. salt, Diflufenzopyr-sodium, Fluazifop-P-butyl, Flumetsulam, Glufosinate-ammonium, Mesotrione, Nicosulfuron, Rimsulfuron, S-Metolachlor, Trifluralin

**Insecticides applied but not published included the following:** Esfenvalerate, Fipronil, Tefluthrin

**Fungicides applied but not published included the following:** Tebuconazole

### Stevens County



**Table 82. 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 Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
2,4-D	2	1.0	0.45	0.45	400
Acetochlor	6	1.0	1.71	1.71	3,786
Atrazine	8	1.0	0.58	0.58	1,731
Bromoxynil	2	1.0	0.25	0.25	176
Glyphosate	81	1.4	0.74	1.06	33,300
MCPA	3	1.0	0.45	0.45	529
Mesotrione	8	1.0	0.12	0.12	374
Nicosulfuron	2	1.0	0.02	0.02	19
Rimsulfuron	2	1.0	0.01	0.01	10
<b>Insecticides</b>					
Lambda-cyhalothrin	4	1.0	0.02	0.02	34
<b>Fungicides</b>					
Pyraclostrobin	3	1.0	0.07	0.07	86
Tebuconazole	1	1.0	0.13	0.13	68

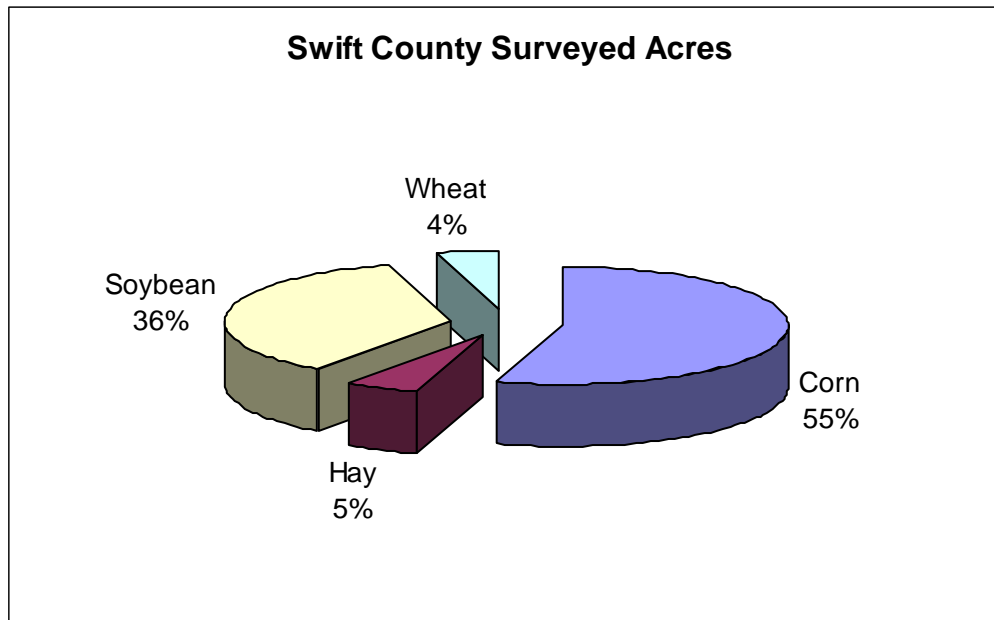
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Dicamba, Fenoxaprop, Flumetsulam, Glufosinate-ammonium, Metribuzin, S-Metolachlor, Sethoxydim, Trifluralin

**Insecticides applied but not published included the following:** Carbofuran Chlorethoxyfos Chlorpyrifos, Cyfluthrin, Tebupirimphos

**Fungicides applied but not published included the following:** Propiconazole, Trifloxystrobin

### Swift County



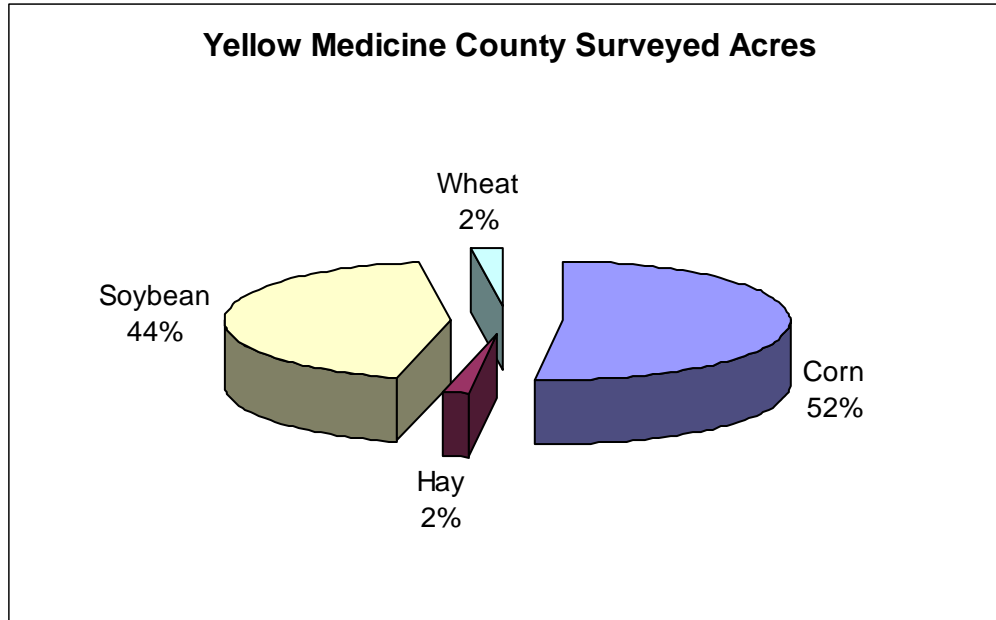
**Table 83. Swift County pesticide applications and rates**

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
2,4-D	1	1.0	0.45	0.45	157
Atrazine	6	1.0	0.33	0.33	518
Glyphosate	83	1.3	0.71	0.95	19,773
MCPA	3	1.0	0.37	0.37	266
Mesotrione	8	1.0	0.12	0.12	243
<b>Insecticides</b>					
Chlorpyrifos	7	1.0	0.72	0.72	1,216
Lambda-cyhalothrin	11	1.0	0.02	0.02	55

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Bromoxynil, Dicamba, Dicamba, Dimet salt, Diflufenzopyr-sodium, Dimethenamid, Fenoxaprop, Flumioxazin, Glufosinate-ammonium, Nicosulfuron, Quizalofop-P-ethyl, Rimsulfuron, S-Metolachlor,  
**Insecticides applied but not published included the following:** Bifenthrin, Cyfluthrin, Esfenvalerate, Fipronil, Methyl parathion, Tebupirimphos  
**Fungicides applied but not published included the following:** Propiconazole, Pyraclostrobin, Tebuconazole

## Yellow Medicine County



**Table 84. 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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
Acetochlor	13	1.0	1.14	1.14	5,092
Atrazine	6	1.1	0.47	0.50	1,142
Glyphosate	91	1.5	0.77	1.12	35,440
Mesotrione	5	1.0	0.11	0.11	174
S-Metolachlor	3	1.0	1.23	1.23	1,093
<b>Insecticides</b>					
Chlorpyrifos	15	1.0	0.60	0.60	3,057
Pyraclostrobin	3	1.0	0.08	0.08	85
<b>Fungicides</b>					
Pyraclostrobin	3	1.0	0.08	0.08	85

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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.

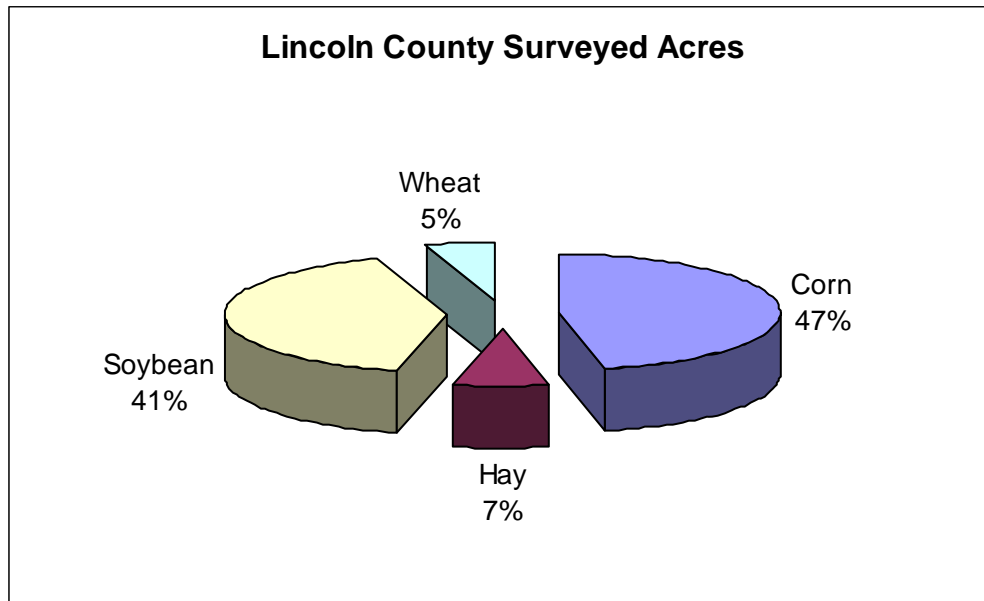
**Herbicides applied but not published included the following:** 2,4-D, Bromoxynil, Cloransulam-methyl, Dicamba, Dimet. salt, Diflufenzopyr-sodium, Dimethenamid-P, EPTC, Fenoxaprop, Flumetsulam, Flumioxazin, Glufosinate-ammonium, MPCA, Trifluralin

**Insecticides applied but not published included the following:** Bifenthrin, Cyfluthrin, Fipronil, Lambda-cyhalothrin, Tebupirimphos, Tefluthrin



## PMA 7 County Data

### Lincoln County



**Table 85. 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 Crop Year <sup>1</sup>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
<b>Herbicides</b>			(a.i.)	(a.i.)	(a.i.)
2,4-D	1	1.0	0.50	0.50	129
Acetochlor	8	1.0	1.20	1.20	1,784
Glyphosate	78	1.3	0.77	1.02	14,822
MCPA	3	1.0	0.33	0.33	161
<b>Insecticides</b>					
Chlorpyrifos	18	1.0	0.56	0.56	1,897
<b>Fungicides</b>					
Pyraclostrobin	3	1.0	0.06	0.06	33

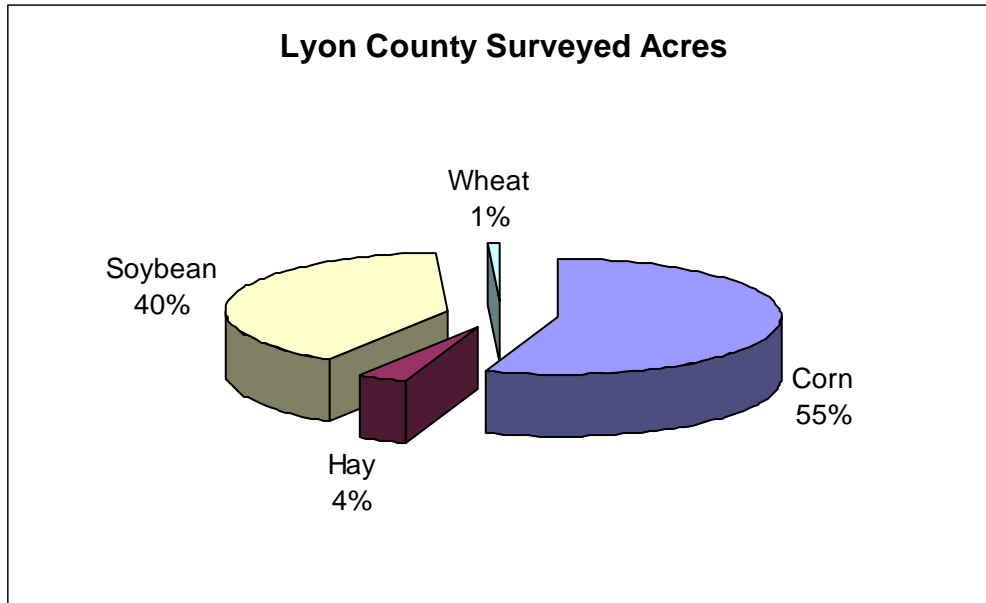
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Dicamba, Dimet. Salt, Diflufenzopyr-sodium, Fenoxaprop, Mesotrione, Nicosulfuron, Rimsulfuron, S-Metolachlor, Thifensulfuron

**Insecticides applied but not published included the following:** Cyfluthrin, Dimethoate, Lambda-cyhalothrin, Tebupirimphos, Tefluthrin,

**Fungicides applied but not published included the following:** Tebuconazole

## Lyon County



**Table 86. 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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
Acetochlor	9	1.0	1.38	1.38	2,597
Atrazine	4	1.0	0.50	0.50	414
Glyphosate	93	1.3	0.73	0.97	19,433
<b>Insecticides</b>					
Chlorpyrifos	11	1.0	0.60	0.60	1,453
Lambda-cyhalothrin	6	1.1	0.03	0.03	35
<b>Fungicides</b>					
Pyraclostrobin	4	1.0	0.05	0.05	44

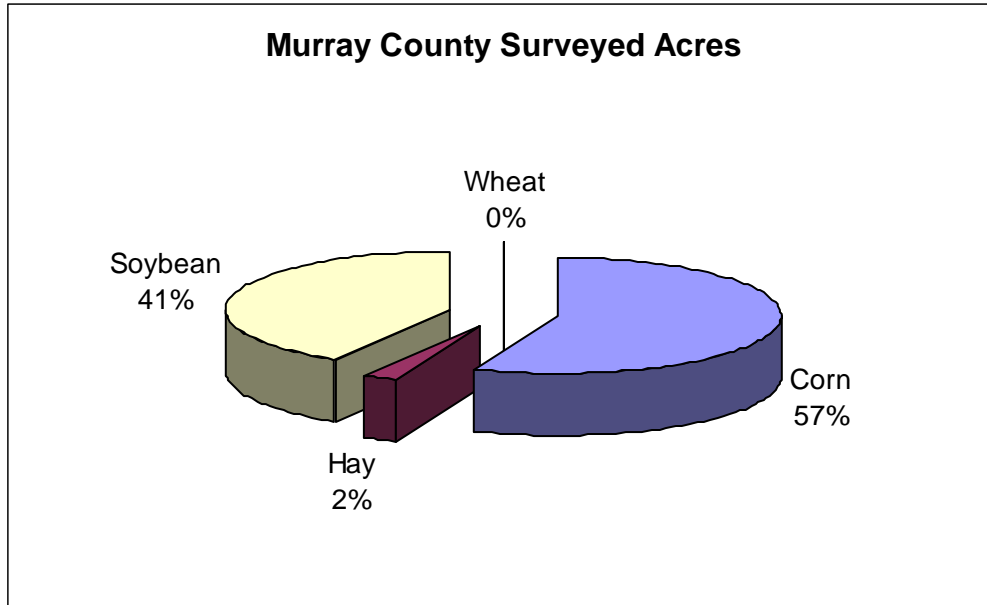
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Dicamba, Dimethenamid-P, EPTC, Fomesafen, MCPA, Mesotrione, Nicosulfuron, Rimsulfuron, Trifluralin

**Insecticides applied but not published included the following:** Bifenthrin, Cyfluthrin, Fipronil, Tebupirimphos, Tefluthrin, Terbufos, Zeta-cypermethrin

**Fungicides applied but not published included the following:** Pyraclostrobin

## Murray County



**Table 87. 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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
Acetochlor	13	1.0	1.24	1.24	5,086
Atrazine	11	1.0	0.48	0.48	1,677
Glyphosate	83	1.4	0.70	0.99	25,404
Mesotrione	3	1.0	0.14	0.14	144
<b>Insecticides</b>					
Chlorpyrifos	17	1.0	0.75	0.75	3,874
Cyfluthrin	6	1.0	0.01	0.01	12
Lambda-cyhalothrin	3	1.0	0.02	0.02	24
Tebupirimphos	6	1.0	0.14	0.14	245

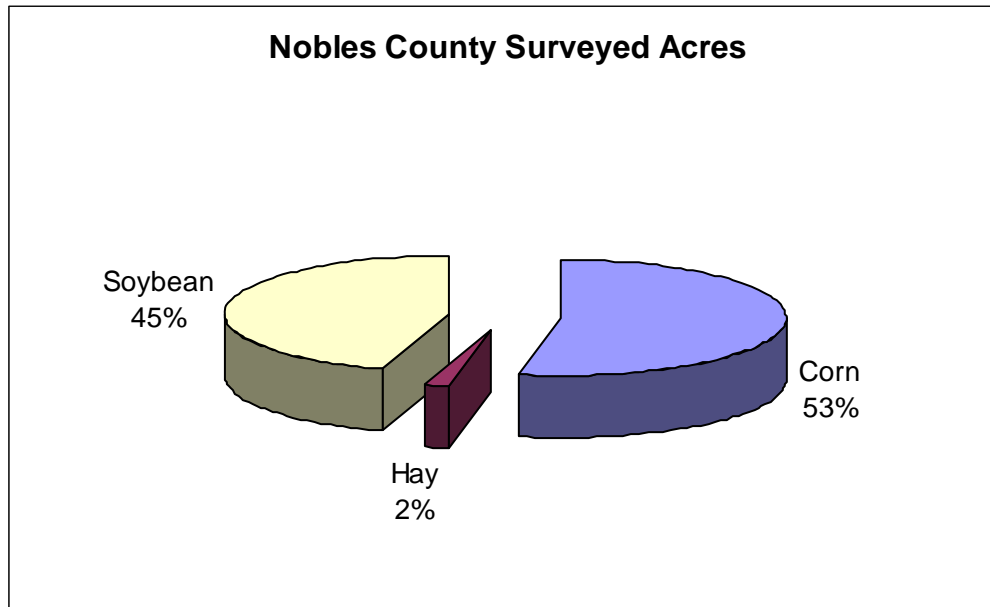
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Carfentrazone-ethyl, Clopyralid, Dicamba, Sodium salt, Diflufenzopyr-sodium, Fenoxaprop, Fluazifop-P-butyl, Flumetsulam, Foramsulfuron, Glufosinate-ammonium, Nicosulfuron, Pendimethalin, Rimsulfuron, S-Metolachlor, Thifensulfuron, Tribenuron-methyl, Trifluralin

**Insecticides applied but not published included the following:** Tefluthrin, Terbufos

**Fungicides applied but not published included the following:** Pyraclostrobin

## Nobles County



**Table 88. 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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
Acetochlor	22	1.0	1.29	1.29	6,587
Atrazine	21	1.0	0.80	0.82	3,937
Glyphosate	71	1.4	0.74	1.05	17,234
Mesotrione	5	1.0	0.11	0.11	137
Trifluralin	5	1.0	0.75	0.75	889
<b>Insecticides</b>					
Chlorpyrifos	9	1.0	0.55	0.55	1,211
Lambda-cyhalothrin	9	1.0	0.02	0.02	50

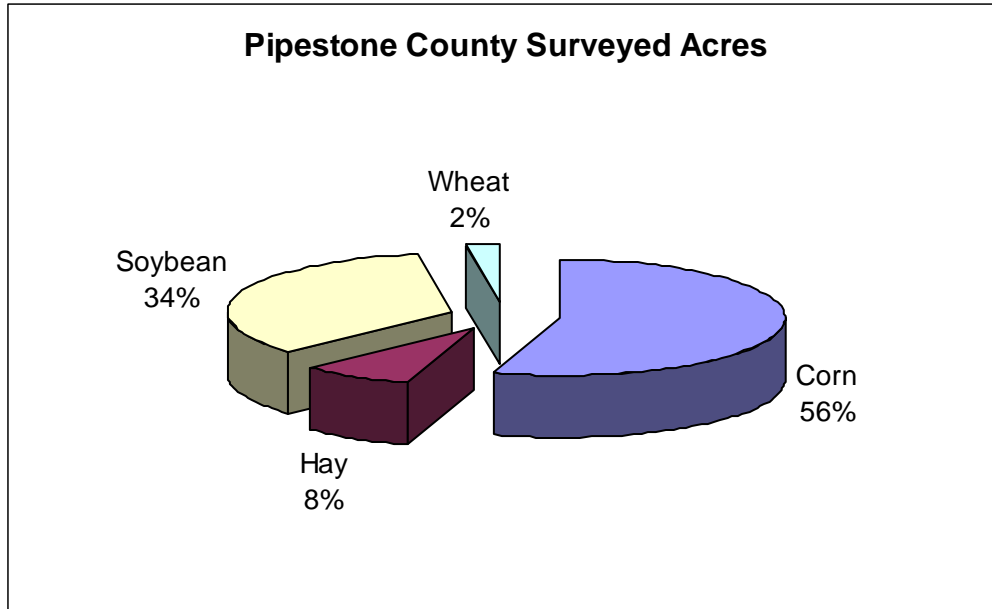
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Clopyralid, Dicamba, Glufosinate-ammonium, Nicosulfuron, Pendimethalin, Primisulfuron, Rimsulfuron, S-Metolachlor, Topramezone

**Insecticides applied but not published included the following:** Bifenthrin, Cyfluthrin, Tebupirimphos, Tefluthrin

**Fungicides applied but not published included the following:** Pyraclostrobin

## Pipestone County



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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
Acetochlor	7	1.0	0.85	0.85	1,405
Atrazine	14	1.0	0.62	0.62	2,021
Dimethenamid-P	3	1.0	0.72	0.72	533
Glyphosate	69	1.2	0.81	1.01	16,149
Mesotrione	11	1.0	0.14	0.14	367
S-Metolachlor	11	1.0	1.62	1.62	4,103
<b>Insecticides</b>					
Chlorpyrifos	10	1.0	0.57	0.57	1,353
Lambda-cyhalothrin	2	1.0	0.02	0.02	11

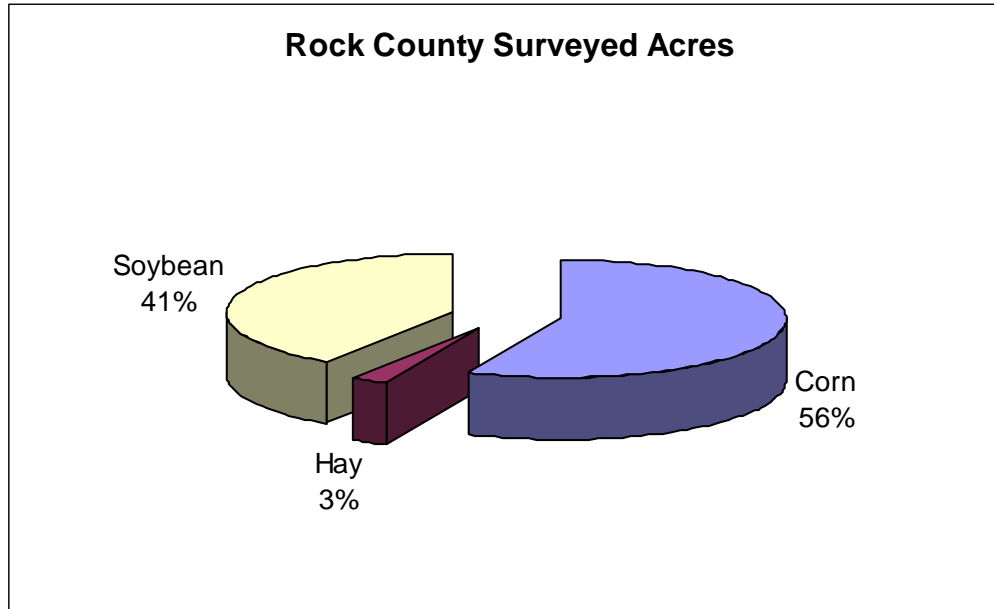
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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 Clopyralid, Dicamba, Dimet. salt, Dicamba, Pot. salt, Dicamba, Sodium salt, Diflufenzopyr-sodium, Dimethenamid-P, Flumetsulam, Foramsulfuron, Glufosinate-ammonium, Imazethapyr, MCPA, , Nicosulfuron, Pendimethalin, Picloram, Quizalofop-P-ethyl, Rimsulfuron, Thifensulfuron, Tribenuron-methyl, Trifluralin

**Insecticides applied but not published included the following:** Bifenthrin, Carbofuran, Cyfluthrin, Fipronil, Phorate, Tebupirimphos, Terbufos

**Fungicides applied but not published included the following:** Pyraclostrobin

## Rock County



**Table 90. 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 Crop Year <sup>1</sup>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
<b>Herbicides</b>			(a.i.)	(a.i.)	(a.i.)
Acetochlor	14	1.0	1.59	1.59	6,273
Atrazine	15	1.0	0.59	0.59	2,544
Glyphosate	82	1.3	0.69	0.90	21,487
Mesotrione	10	1.0	0.08	0.08	224
<b>Insecticides</b>					
Chlorpyrifos	12	1.0	0.51	0.52	1,872
Lambda-cyhalothrin	15	1.0	0.02	0.02	102
Tefluthrin	2	1.0	0.09	0.09	50

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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.

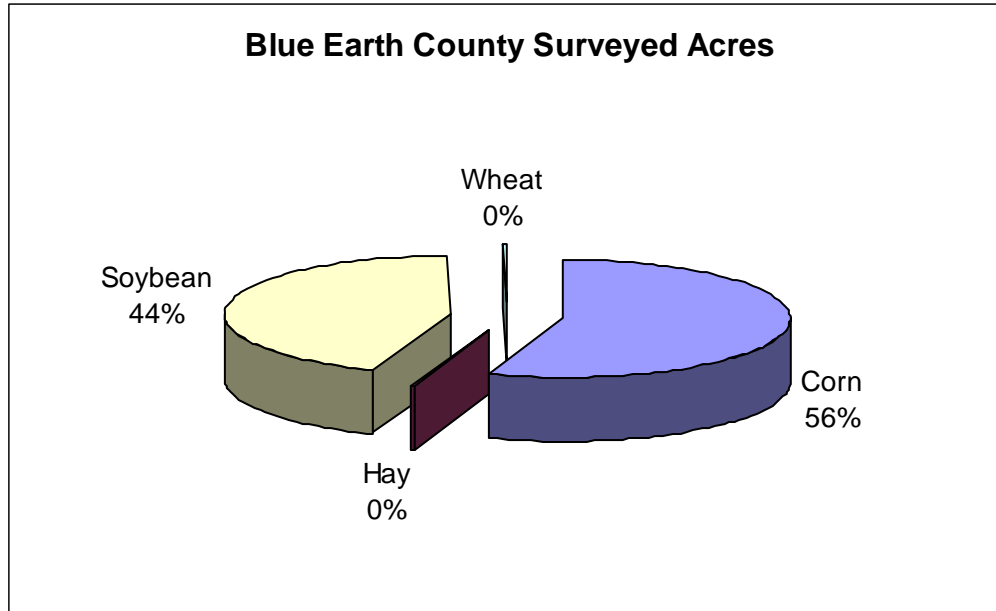
**Herbicides applied but not published included the following:** 2,4-D, Azoxystrobin, Bentazon, Clethodim, Glufosinate-ammonium, Imazamox, Imazethapyr, Nicosulfuron, Pendimethalin, Rimsulfuron, S-Metolachlor, Trifluralin

**Insecticides applied but not published included the following:** Bifenthrin, Chlorethoxyfos, Cyfluthrin, Tebupirimphos, Terbufos

**Fungicides applied but not published included the following:** Pyraclostrobin

## PMA 8 County Data

### Blue Earth County



**Table 91. 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 Crop Year <sup>1</sup>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
<b>Herbicides</b>			(a.i.)	(a.i.)	(a.i.)
Acetochlor	12	1.0	1.51	1.51	5,975
Glufosinate-ammonium	9	1.0	0.30	0.30	850
Glyphosate	81	1.7	0.74	1.24	32,223
<b>Insecticides</b>					
Chlorpyrifos	26	1.0	0.61	0.62	5,200
Lambda-cyhalothrin	4	1.0	0.03	0.03	29

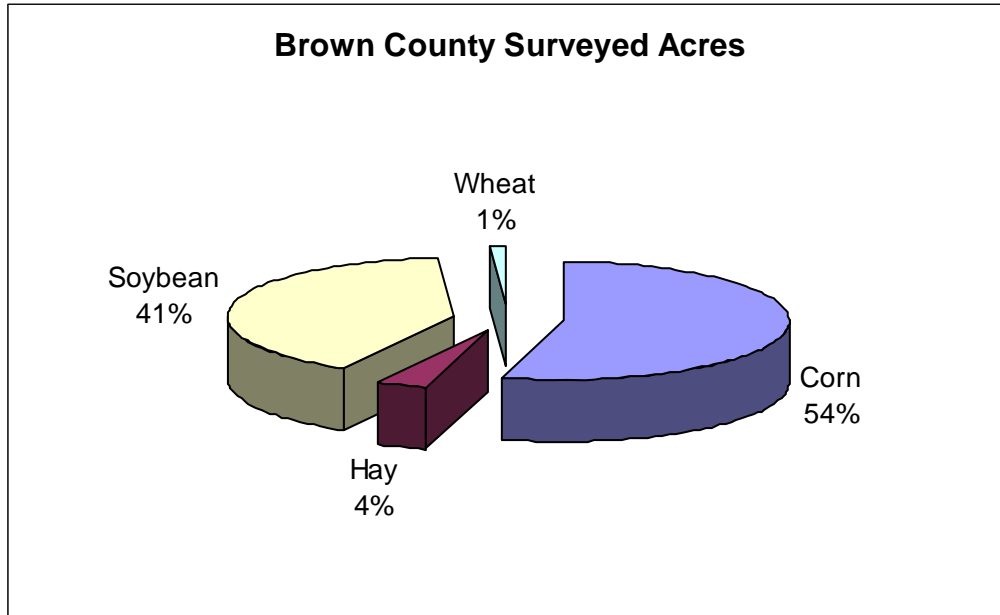
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or underestimate 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, Carfentrazone-ethyl, Clethodim, Dicamba, Dimethenamid-P, Fenoxaprop, Fluazifop-P-butyl, Fomesafen, Imazethapyr, Mesotrione, Pendimethalin, S-Metolachlor, Thifensulfuron, Trifluralin

**Insecticides applied but not published included the following:** Cyfluthrin, Esfenvalerate, Fipronil, Tebupirimphos, Tefluthrin

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

**Brown County**



**Table 92. 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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
Acetochlor	10	1.0	1.53	1.53	2,397
Atrazine	9	1.0	0.42	0.42	603
Glufosinate-ammonium	9	1.0	0.41	0.41	596
Glyphosate	62	1.4	0.76	1.05	10,557
Mesotrione	14	1.0	0.08	0.08	182
Nicosulfuron	4	1.0	0.02	0.02	13
S-Metolachlor	9	1.0	0.79	0.79	1,197
<b>Insecticides</b>					
Chlorpyrifos	7	1.0	0.56	0.56	664
Lambda-cyhalothrin	15	1.1	0.02	0.03	62

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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.

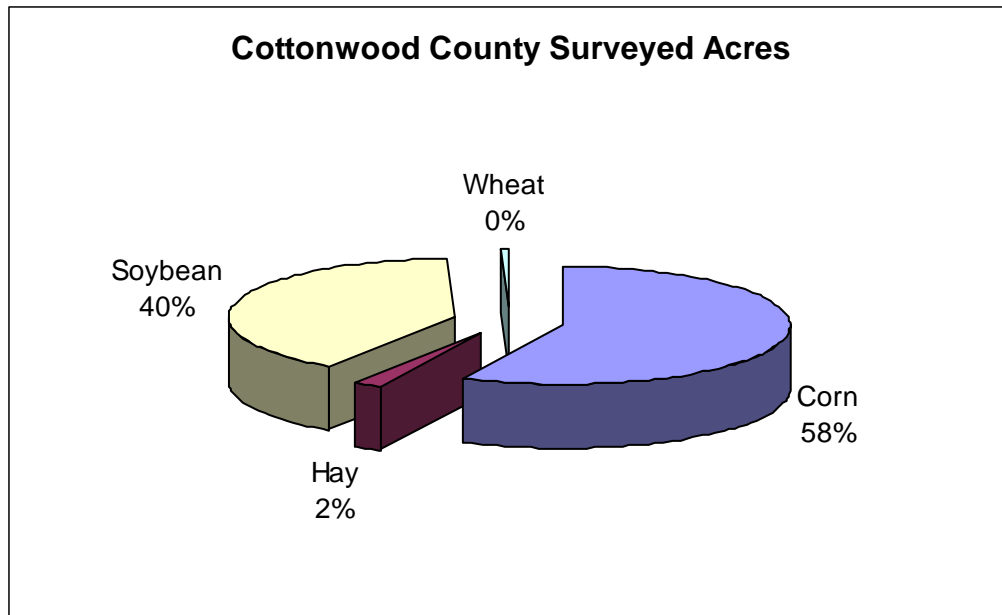
**Herbicides applied but not published included the following:** 2,4-D, Carfentrazone-ethyl, Clethodim, Cloransulam-methyl, Dicamba, Dimet. Salt, Diflufenzopyr-sodium, Dimethenamid-P, Fenoxaprop, Fluazifop-P-butyl, Metribuzin, Rimsulfuron, Thifensulfuron Trifluralin

**Insecticides applied but not published included the following:** Bifenthrin, Cyfluthrin, Tefluthrin

**Fungicides applied but not published included the following:** Pyraclostrobin,



### Cottonwood County



**Table 93. 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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
Acetochlor	17	1.0	1.48	1.48	10,185
Atrazine	11	1.0	0.55	0.55	2,408
Fluazifop-P-butyl	3	1.0	0.04	0.04	40
Glyphosate	79	1.4	0.74	1.05	32,708
Mesotrione	12	1.0	0.11	0.11	516
S-Metolachlor	8	1.0	1.58	1.58	4,765
<b>Insecticides</b>					
Chlorpyrifos	18	1.0	0.57	0.57	4,062
Cyfluthrin	7	1.0	0.01	0.01	16
Lambda-cyhalothrin	4	1.0	0.02	0.02	41
Tebupirimphos	7	1.0	0.12	0.12	314

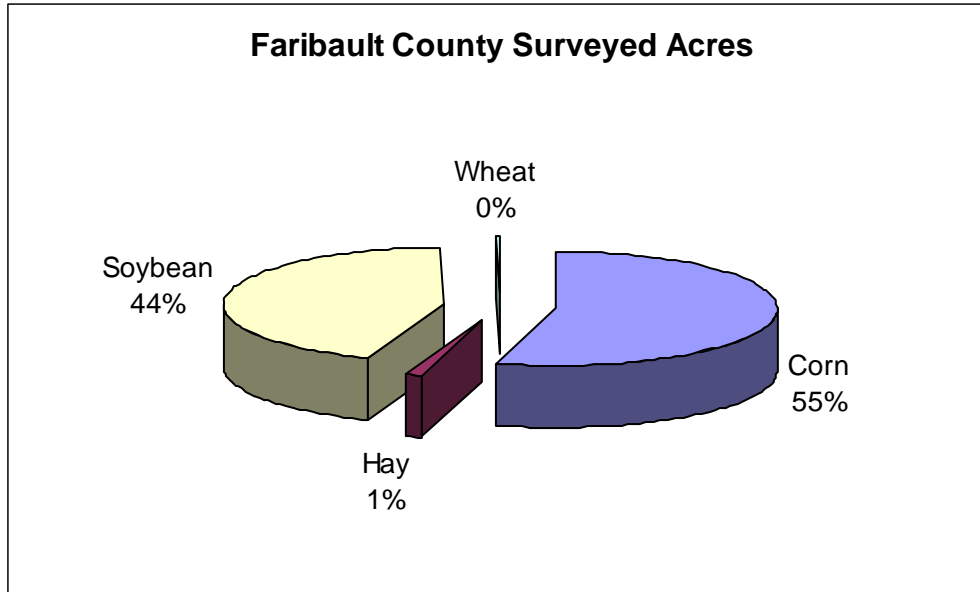
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Bentazon, Bromoxynil, Clethodim, Dicamba, Dimethenamid-P, Fenoxaprop, Flumioxazin, Fomesafen, Glufosinate-ammonium, Imazamox, Imazethapyr, Pendimethalin, Sethoxydim, Trifluralin

**Insecticide applied but not published included the following:** Bifenthrin, Chlorethoxyfos, Permethrin, Tefluthrin,

**Fungicides applied but not published included the following:** Pyraclostrobin

### Faribault County



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

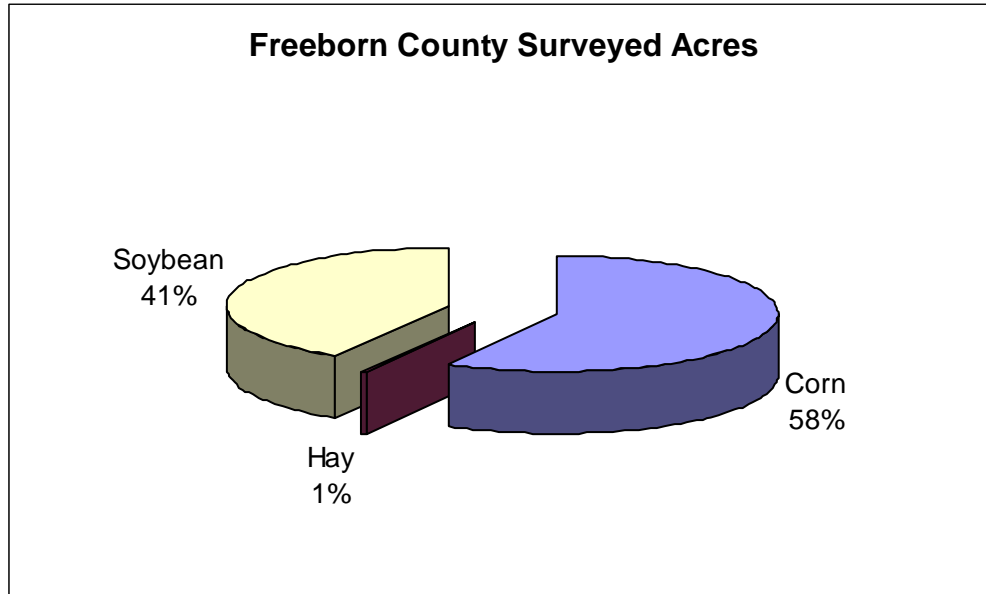
Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
<b>Herbicides</b>			(a.i.)	(a.i.)	(a.i.)
Pyraclostrobin	10	1.0	0.09	0.09	381
Acetochlor	14	1.0	1.16	1.16	6,279
Atrazine	8	1.0	0.47	0.47	1,451
Glufosinate-ammonium	7	1.0	0.41	0.41	1,064
Glyphosate	83	1.5	0.64	0.98	31,581
Mesotrione	4	1.0	0.15	0.15	214
S-Metolachlor	2	1.0	1.52	1.52	1,443
<b>Insecticides</b>					
Chlorpyrifos	8	1.0	0.55	0.55	1,749
Cyfluthrin	2	1.0	0.00	0.00	3
Lambda-cyhalothrin	5	1.0	0.03	0.03	53
Tebupirimphos	2	1.0	0.09	0.09	69

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Clopyralid, Dimethenamid-P, Ethalfluralin, Flumetsulam, Foramsulfuron, Nicosulfuron, Rimsulfuron, Trifluralin

**Insecticides applied but not published included the following:** Bifenthrin, Zeta-cypermethrin

**Freeborn County**



**Table 95. 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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
Acetochlor	21	1.0	1.58	1.58	7,416
Atrazine	8	1.0	0.68	0.68	1,169
Glufosinate-ammonium	4	1.0	0.38	0.38	364
Glyphosate	71	1.5	0.77	1.19	18,762
Mesotrione	5	1.0	0.11	0.11	129
<b>Insecticides</b>					
Chlorpyrifos	10	1.0	0.45	0.45	1,033
<b>Fungicides</b>					
Pyraclostrobin	7	1.0	0.12	0.12	179

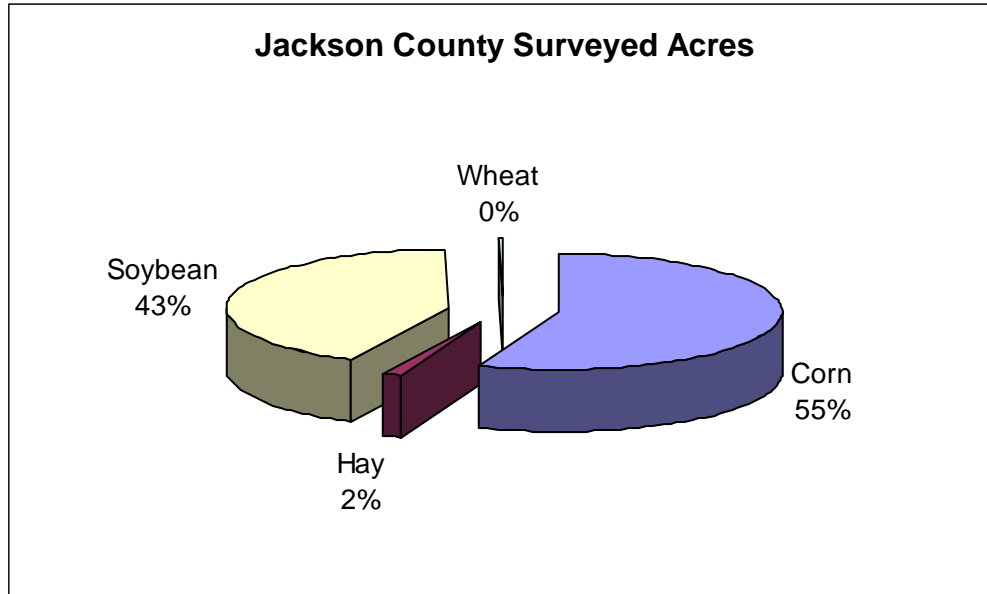
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Flumioxazin, Nicosulfuron, Rimsulfuron, S-Metolachlor

**Insecticides applied but not published included the following:** Bifenthrin, Cyfluthrin, Esfenvalerate, Fiproni, Lambda-cyhalothrin, Tefluthrin

**Fungicides applied but not published included the following:** Pyraclostrobin

## Jackson County



**Table 96. 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 Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
Acetochlor	21	1.0	1.29	1.29	6,907
Atrazine	11	1.0	0.43	0.43	1,207
Glyphosate	77	1.5	0.70	1.04	20,756
Mesotrione	5	1.0	0.11	0.11	145
<b>Insecticides</b>					
Chlorpyrifos	8	1.0	0.55	0.55	1,134
Lambda-cyhalothrin	8	1.0	0.03	0.03	56

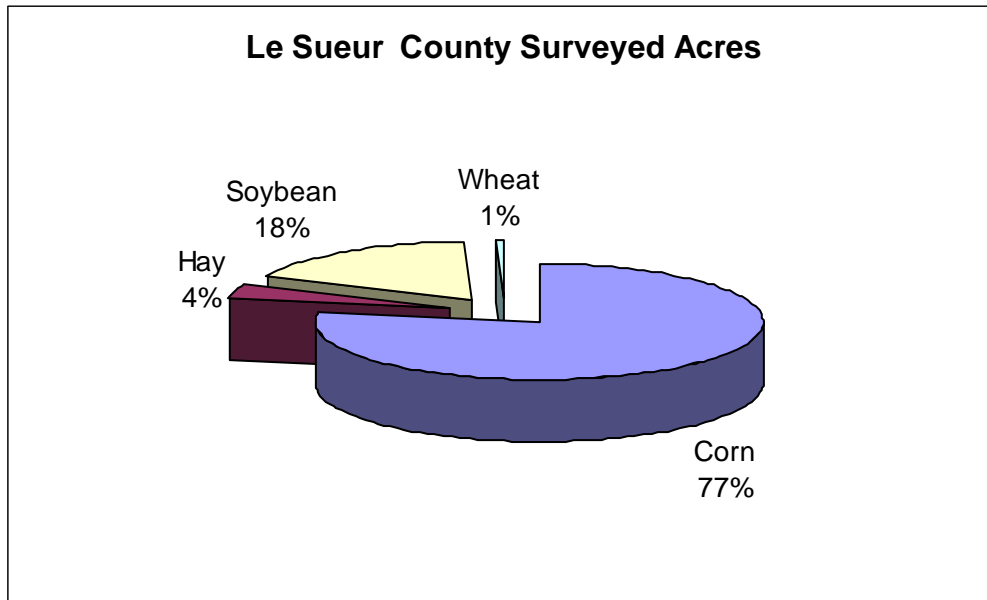
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Dimethenamid-P, Fenoxaprop, Fluazifop-P-butyl, Fomesafen, Imazethapyr, Metolachlor Nicosulfuron, Pendimethalin, Rimsulfuron, S-Metolachlor, Trifluralin

**Insecticides applied but not published included the following:** Bifenthrin, Cyfluthrin, Fipronil, Gamma-cyhalothrin, Tebupirimphos, Tefluthrin

**Fungicides applied but not published included the following:** Pyraclostrobin

## Le Sueur County



**Table 97. 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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
Acetochlor	21	1.0	1.36	1.36	9,421
Atrazine	32	1.0	0.51	0.51	5,357
Glufosinate-ammonium	6	1.0	0.32	0.32	565
Glyphosate	39	1.5	0.57	0.83	10,373
Mesotrione	9	1.0	0.15	0.15	440
Nicosulfuron	1	1.0	0.02	0.02	6
S-Metolachlor	11	1.0	1.69	1.69	6,267
<b>Insecticides</b>					
Lambda-cyhalothrin	4	1.0	0.02	0.02	27

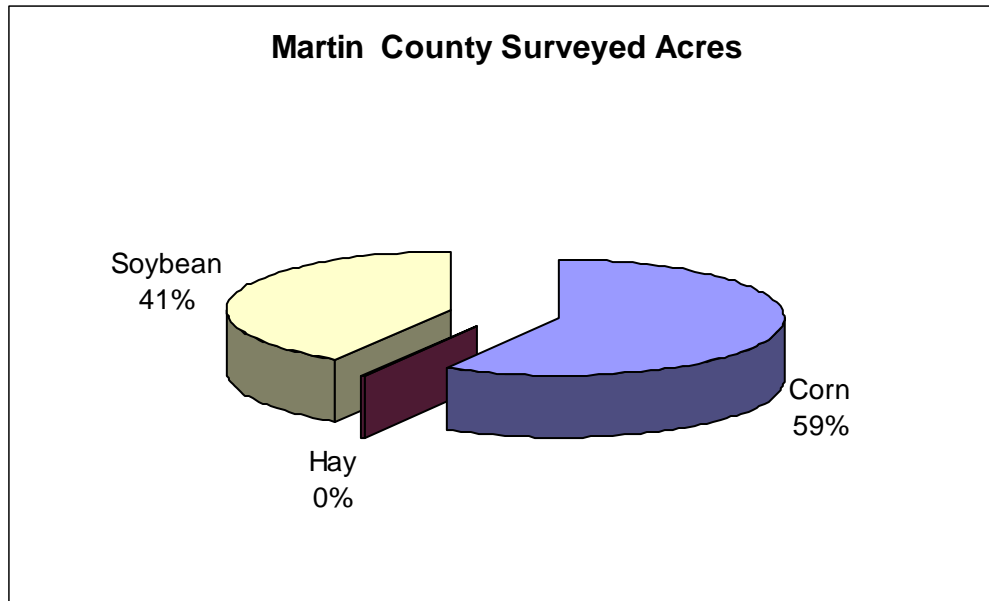
<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically “weighted” in any fashion. 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, Dicamba, Dimet. salt Dicamba, Sodium salt, Diflufenzopyr-sodium, Fenoxaprop, Fluazifop-P-butyl, Fomesafen, Imazethapyr, Nulfuron, Pendimethalin, Primisulfuron, Quizalofop-P-ethyl, Rimsulfuron, Thifensulfuron, Tribenuron-methyl, Trifluralin

**Insecticides applied but not published included the following:** Carbofuran, Chlorpyrifos, Cyfluthrin, Dimethoate, Fipronil, Permethrin, Tebupirimphos, Tefluthrin

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

## Martin County



**Table 98. 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 Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
Acetochlor	41	1.0	1.20	1.20	14,030
Atrazine	11	1.0	0.58	0.58	1,785
Fomesafen	7	1.0	0.18	0.18	378
Glyphosate	64	1.3	0.70	0.93	17,134
Trifluralin	6	1.0	0.90	0.90	1,528
<b>Insecticides</b>					
Chlorpyrifos	9	1.1	0.54	0.58	1,474

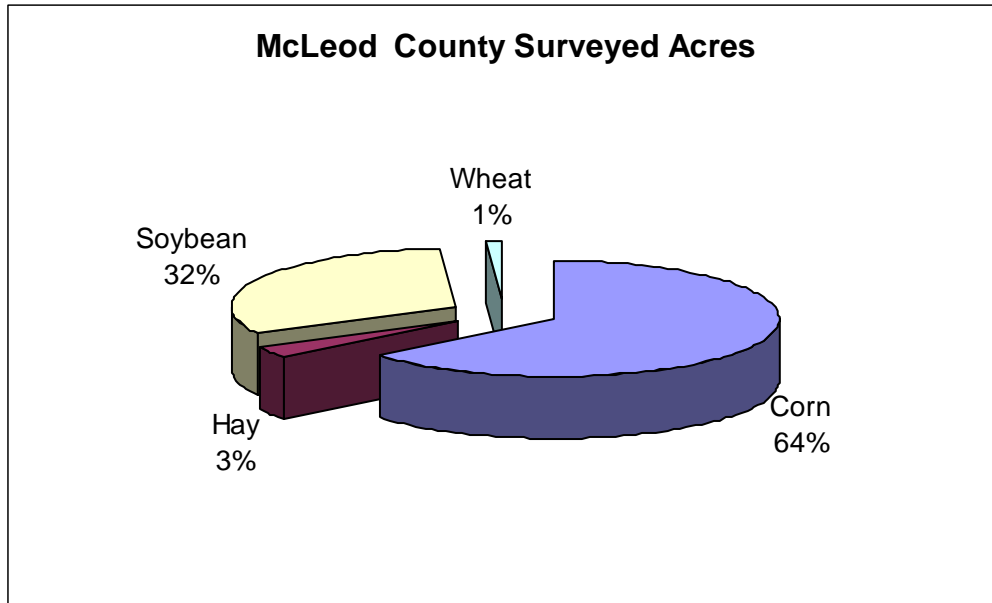
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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-methyl, Dicamba, Dicamba, Dimet. Salt, Dicamba, Pot. Salt, Dicamba, Sodium salt, Diflufenzopyr-sodium, Fenoxaprop, Fluazifop-P-butyl, Flumetsulam, Flumioxazin, Glufosinate-ammonium, Imazethapyr, Mesotrione, Nicosulfuron, Pendimethalin, S-Metolachlor, Sethoxydim

**Insecticides applied but not published included the following:** Cyfluthrin, Lambda-cyhalothrin, Tebupirimphos, Tefluthrin, Terbufos

**Fungicides applied but not published included the following:** Pyraclostrobin

**McLeod County**



**Table 99. 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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
2,4-D	1	1.0	0.48	0.48	112
Acetochlor	10	1.0	1.27	1.27	3,300
Atrazine	25	1.0	0.64	0.64	4,051
Glufosinate-ammonium	7	1.0	0.37	0.37	631
Glyphosate	63	1.5	0.69	1.02	16,279
Mesotrione	20	1.0	0.17	0.17	848
S-Metolachlor	21	1.0	2.01	2.03	10,838
<b>Insecticides</b>					
Chlorpyrifos	11	1.0	0.56	0.56	1,527
Lambda-cyhalothrin	3	1.0	0.02	0.02	17
<b>Fungicides</b>					
Pyraclostrobin	2	1.0	0.09	0.09	48

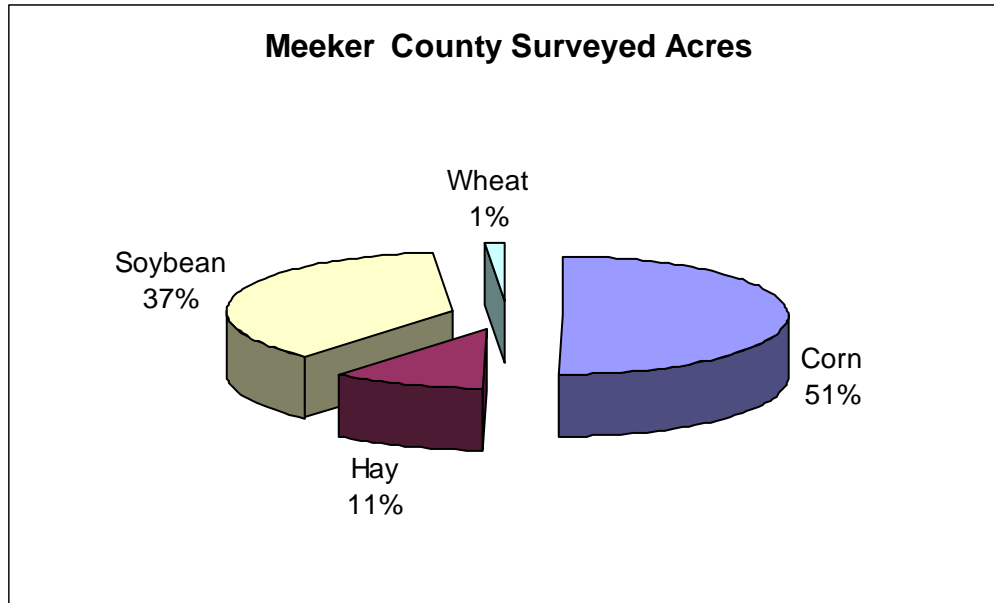
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Dicamba, Dimethenamid, Dimethenamid-P, Fenoxaprop Flumetsulam, MCPA, Nicosulfuron, Primisulfuron, Rimsulfuron, Sethoxydim

**Insecticides applied but not published included the following:** Cyfluthrin, Esfenvalerate, Gamma-cyhalothrin, Tebupirimphos, Tefluthrin

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

### Meeker County



**Table 100. 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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
2,4-D	1	1.0	0.44	0.44	97
Acetochlor	24	1.0	1.19	1.19	7,411
Atrazine	18	1.0	0.52	0.52	2,458
Glyphosate	80	1.3	0.68	0.90	18,636
S-Metolachlor	3	1.0	1.25	1.25	939
<b>Insecticides</b>					
Chlorpyrifos	7	1.0	0.38	0.38	701
Lambda-cyhalothrin	4	1.0	0.02	0.02	20

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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.

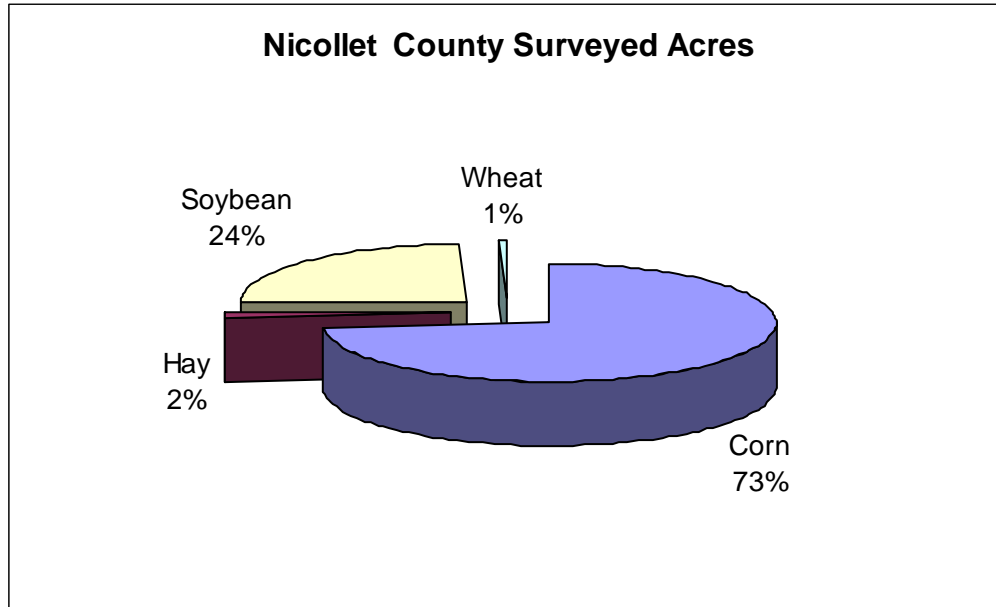
**Herbicides applied but not published included the following:** Clopyralid Dicamba, Dicamba, Pot. salt, Dicamba, Dimet. salt, Dicamba, Sodium salt, Diflufenzopyr-sodium, Dimethenamid-P, Fenoxaprop, Flumetsulam, Glufosinate-ammonium, Halosulfuron, Imazapyr, Imazethapyr, MCPA, Mesotrione, Metribuzin, Nicosulfuron, Pendimethalin, Rimsulfuron, Thifensulfuron

**Insecticides applied but not published included the following:** Esfenvalerate, Fipronil,

**Fungicides applied but not published included the following:** Pyraclostrobin



## Nicollet County



**Table 101. 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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
Acetochlor	14	1.0	1.54	1.54	5,255
Atrazine	22	1.0	0.34	0.36	1,930
Glufosinate-ammonium	11	1.0	0.33	0.33	937
Glyphosate	65	1.4	0.73	1.02	16,410
Mesotrione	22	1.0	0.07	0.07	379
S-Metolachlor	13	1.0	1.01	1.01	3,310
<b>Insecticides</b>					
Chlorpyrifos	8	1.0	0.64	0.64	1,348
Lambda-cyhalothrin	7	1.1	0.02	0.02	41
<b>Fungicides</b>					
Pyraclostrobin	2	1.0	0.10	0.10	51

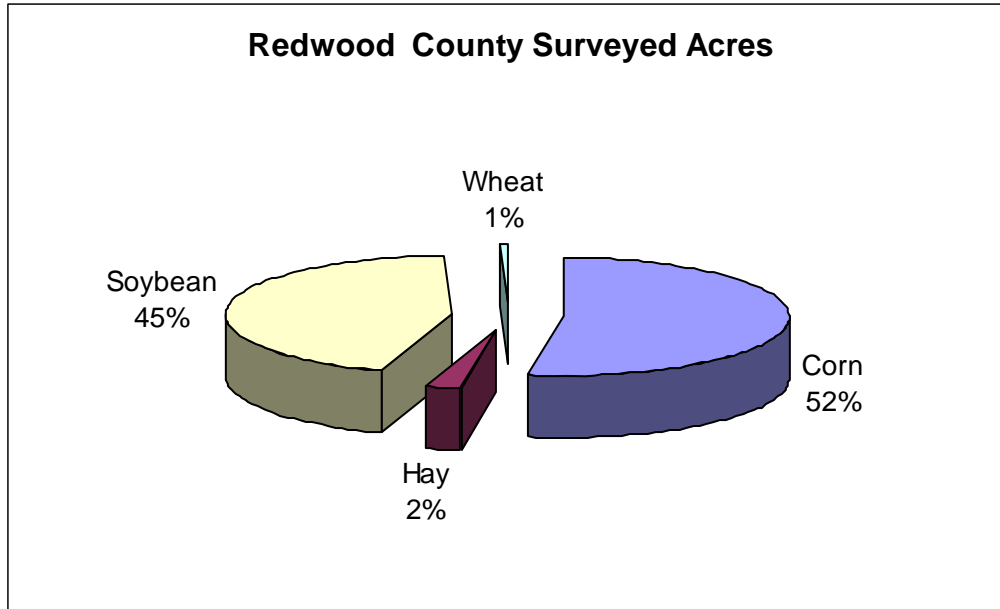
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Alachlor, Dicamba, Dimethenamid-P, Flumioxazin, Fomesafen, Foramsulfuron, Imazamox, MCPA, Nicosulfuron, Pendimethalin, Rimsulfuron, Sethoxydim

**Insecticides applied but not published included the following:** Bifenthrin, Cyfluthrin, Fipronil, Tebupirimphos, Tefluthrin

**Fungicides applied but not published included the following:** Pyraclostrobin

## Redwood County



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

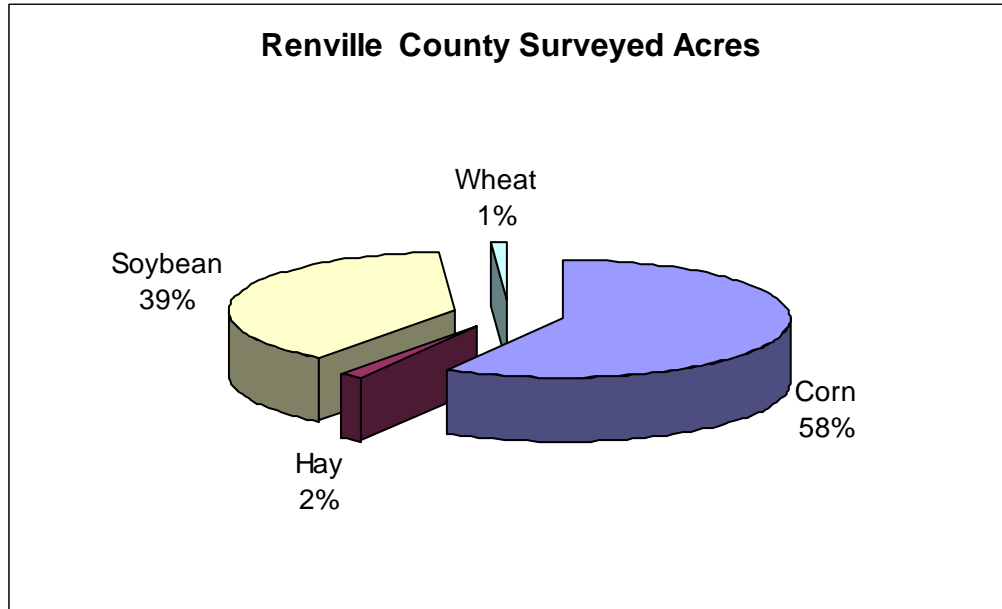
Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	Percent	Number	<i>Pounds per Acre</i> (a.i.)	<i>Pounds per Acre</i> (a.i.)	<i>Total Pounds</i> (a.i.)
<b>Herbicides</b>					
Acetochlor	18	1.0	1.17	1.17	6,270
Atrazine	2	1.0	0.58	0.58	329
Glyphosate	83	1.6	0.82	1.27	31,295
Mesotrione	4	1.0	0.07	0.07	74
Nicosulfuron	3	1.0	0.02	0.02	20
Rimsulfuron	3	1.0	0.01	0.01	10
<b>Insecticides</b>					
Chlorpyrifos	8	1.0	0.58	0.58	1,431
Lambda-cyhalothrin	2	1.2	0.02	0.03	18
<b>Fungicides</b>					
Pyraclostrobin	4	1.0	0.08	0.08	85

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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 Dicamba, Dimet. salt, Diflufenzopyr-sodium, Dimethenamid-P, Fenoxaprop, Fluazifop-P-butyl, Glufosinate-ammonium, S-Metolachlor, Trifluralin

**Insecticides applied but not published included the following:** Cyfluthrin, Esfenvalerate, Tebupirimphos, Tefluthrin

## Renville County



**Table 103. 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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
2,4-D	1	1.0	0.33	0.33	144
Acetochlor	10	1.0	1.45	1.45	5,291
Atrazine	5	1.0	0.24	0.24	417
Glyphosate	89	1.5	0.69	1.06	33,717
Mesotrione	4	1.0	0.07	0.07	92
<b>Insecticides</b>					
Chlorpyrifos	20	1.1	0.46	0.49	3,455
Lambda-cyhalothrin	11	1.0	0.02	0.02	87
<b>Fungicides</b>					
Pyraclostrobin	5	1.0	0.13	0.13	246

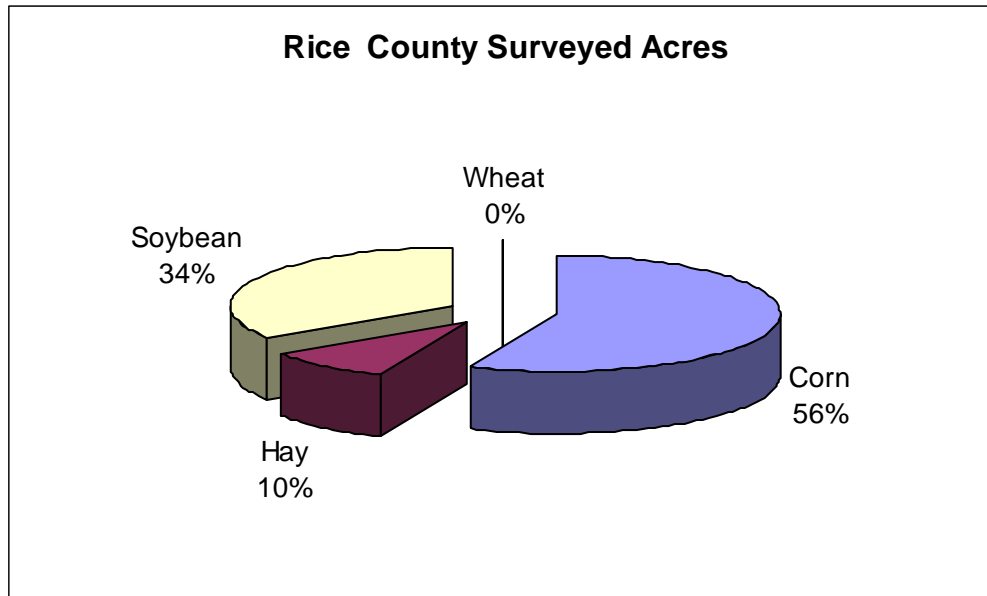
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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:** Bentazon, Bromoxynil, Clethodim, Clopyralid, Cloransulam-methyl, Dicamba, Dicamba, Dimet. salt, Dicamba, Sodium salt, Diflufenzopyr-sodium, Dimethenamid P, Flumetsulam, Foramsulfuron, Halosulfuron, Imazamox, MCPA, Nicosulfuron, Primisulfuron, Rimsulfuron, S-Metolachlor, Thifensulfuron, Trifluralin

**Insecticides applied but not published included the following:** Cyfluthrin, Esfenvalerate, Fipronil, Tebupirimphos, Tefluthrin

**Fungicides applied but not published included the following:** Azoxystrobin, Propiconazole, Tebuconazole

## Rice County



**Table 104. 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 Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
Acetochlor	7	1.0	1.10	1.10	1,241
Atrazine	20	1.0	0.62	0.62	1,846
Glufosinate-ammonium	12	1.0	0.26	0.26	468
Glyphosate	80	1.3	0.69	0.87	10,554
Mesotrione	4	1.0	0.12	0.12	74
S-Metolachlor	15	1.0	1.03	1.03	2,368
<b>Insecticides</b>					
Chlorpyrifos	5	1.2	0.57	0.71	495
Lambda-cyhalothrin	8	1.0	0.02	0.02	27

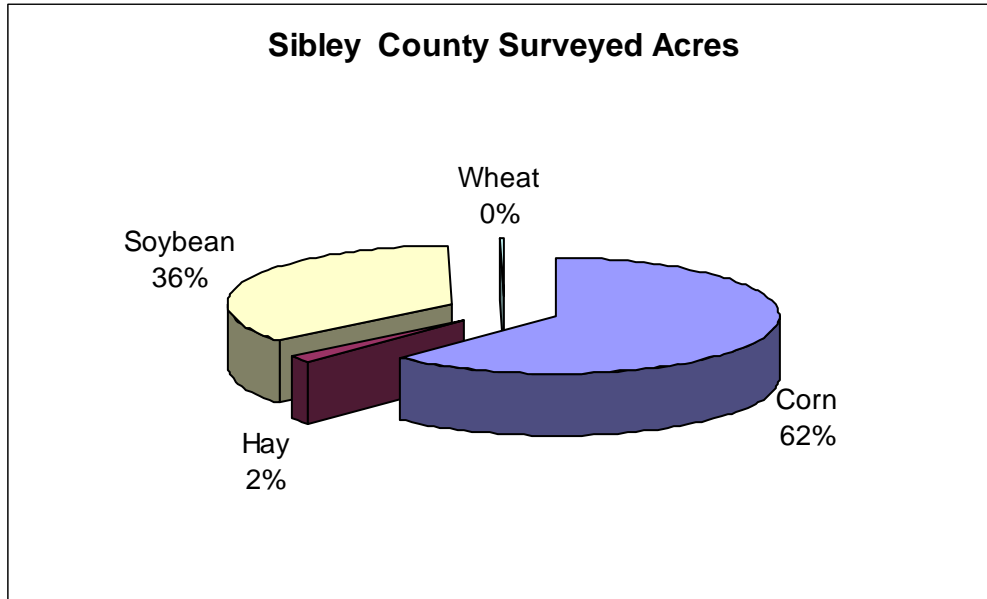
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Dicamba, Dicamba, Pot. salt, Dimethenamid-P, Flumetsulam, Imazethapyr, Metribuzin, Nicosulfuron, Primisulfuron, Rimsulfuron, Trifluralin

**Insecticides applied but not published included the following:** Carbofuran, Cyfluthrin, Esfenvalerate, Fipronil, Gamma-cyhalothrin, Permethrin, Tebupirimphos, Tefluthrin, Zeta-cypermethrin

**Fungicides applied but not published included the following:** Pyraclostrobin

## Sibley County



**Table 105. 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 Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
Acetochlor	31	1.0	1.37	1.37	13,369
Atrazine	20	1.0	0.76	0.76	4,950
Glyphosate	71	1.4	0.76	1.06	24,049
Mesotrione	13	1.0	0.11	0.11	445
Pendimethalin	8	1.0	0.69	0.69	1,654
S-Metolachlor	12	1.0	1.93	1.93	7,097
<b>Insecticides</b>					
Chlorpyrifos	9	1.0	0.53	0.53	1,465
Gamma-cyhalothrin	1	1.0	0.01	0.01	4
Lambda-cyhalothrin	20	1.0	0.03	0.03	158

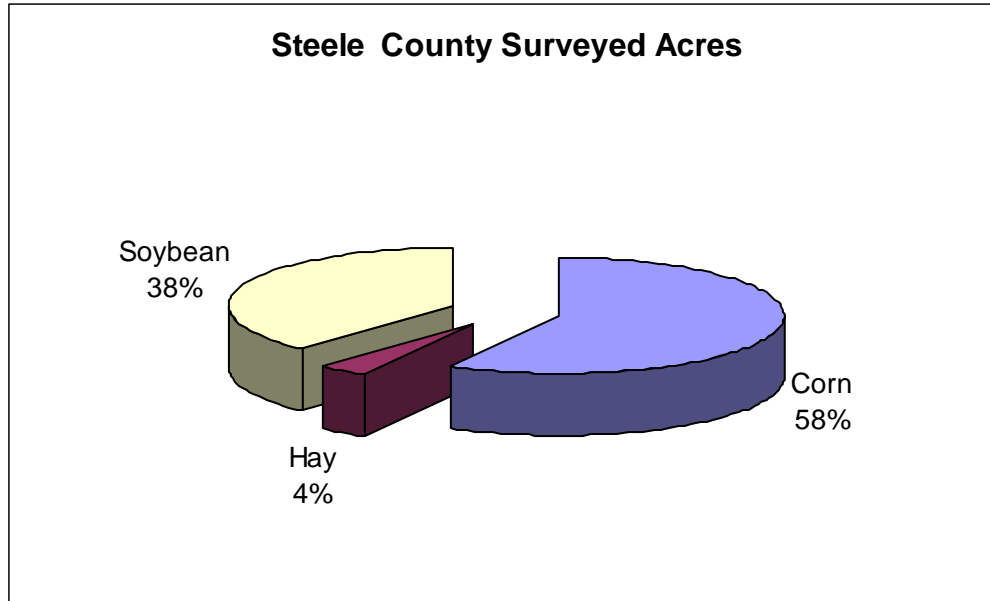
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Clopyralid, Dicamba, Dicamba, Dimet. Salt, Dicamba, Pot. salt, Diflufenzopyr-sodium, Dimethenamid-P, Fluazifop-P-butyl, Flumetsulam, Glufosinate-ammonium, Imazethapyr, Nicosulfuron, Rimsulfuron, Trifluralin

**Insecticides applied but not published included the following:** Bifenthrin  
Fipronil

**Fungicides applied but not published included the following:** Pyraclostrobin

**Steele County**



**Table 106. 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 Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
Acetochlor	9	1.0	1.51	1.51	2,431
Atrazine	24	1.0	0.67	0.67	2,759
Glyphosate	89	1.4	0.77	1.04	16,023
Mesotrione	6	1.0	0.10	0.10	97
S-Metolachlor	8	1.0	1.10	1.10	1,448
<b>Insecticides</b>					
Lambda-cyhalothrin	14	1.0	0.02	0.02	60

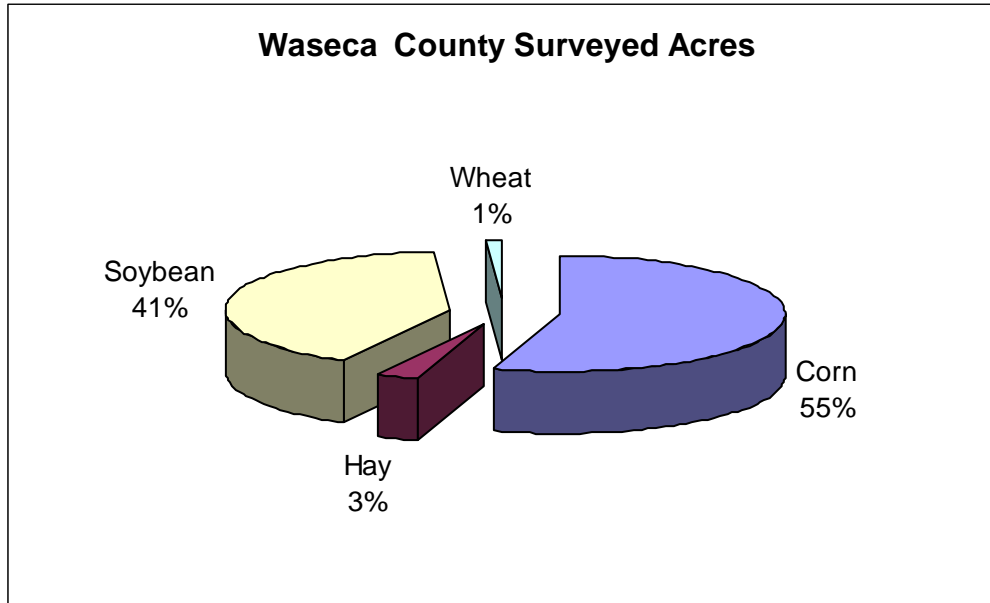
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Dicamba, Dimet. salt, Diflufenzopyr-sodium, Dimethenamid-P, Flumetsulam, Fomesafen, Glufosinate-ammonium, Imazethapyr, Nicosulfuron, Primisulfuron, Rimsulfuron

**Insecticides applied but not published included the following:** Esfenvalerate, Fipronil, Permethrin, Tefluthrin

**Fungicides applied but not published included the following:** Azoxystrobin, Pyraclostrobin

## Waseca County



**Table 107. 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 Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
Acetochlor	31	1.0	1.57	1.57	10,977
Atrazine	7	1.0	0.45	0.45	747
Dimethenamid-P	5	1.0	0.54	0.54	631
Glyphosate	65	1.4	0.68	0.94	13,861
Mesotrione	10	1.0	0.09	0.09	189
S-Metolachlor	4	1.0	1.50	1.50	1,346
<b>Insecticides</b>					
Chlorpyrifos	3	1.0	0.96	0.96	692
Lambda-cyhalothrin	14	1.0	0.02	0.02	78

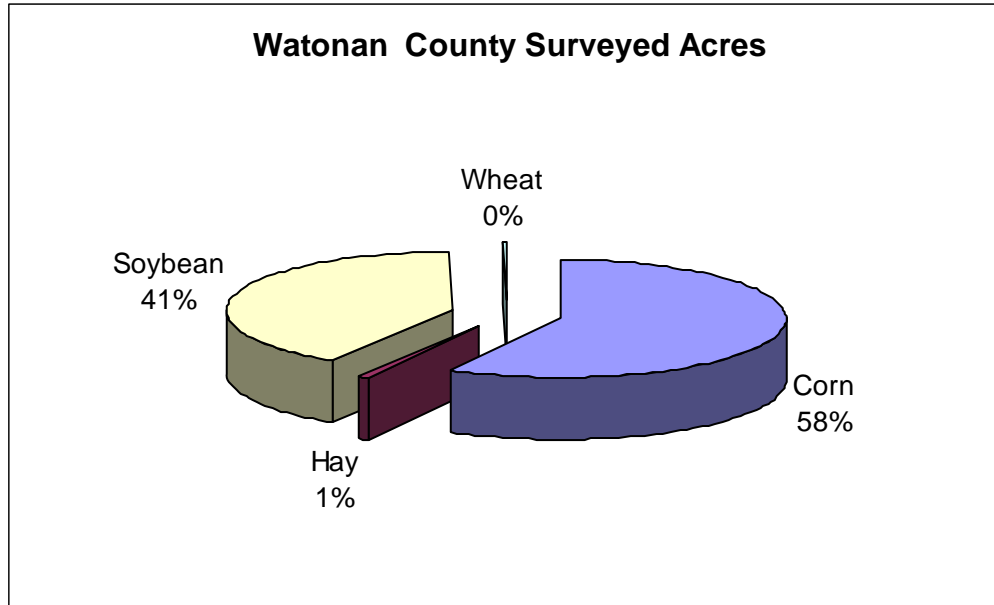
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Alachlor Bromoxynil Clethodim, Clopyralid, Dicamba, Dicamba, Sodium salt, Diflufenzopyr-sodium, Fenoxaprop, Fluazifop-P-butyl, Flumetsulam, Fomesafen, Glufosinate-ammonium, Imazamox, Lactofen, Metribuzin, Nicosulfuron, Rimsulfuron, Thifensulfuron, Topramezone, Trifluralin

**Insecticides applied but not published included the following:** Cyfluthrin, Esfenvalerate, Fipronil, Permethrin, Tebupirimphos, Tefluthrin

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

## Watowan County



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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
Acetochlor	30	1.0	1.27	1.27	12,143
Atrazine	9	1.0	0.64	0.64	1,928
Glufosinate-ammonium	8	1.0	0.32	0.32	784
Glyphosate	81	1.3	0.63	0.83	21,700
Mesotrione	2	1.0	0.12	0.12	83
S-Metolachlor	4	1.0	1.06	1.06	1,257
<b>Insecticides</b>					
Chlorpyrifos	13	1.0	0.53	0.53	2,142
Lambda-cyhalothrin	5	1.0	0.03	0.03	43

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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.

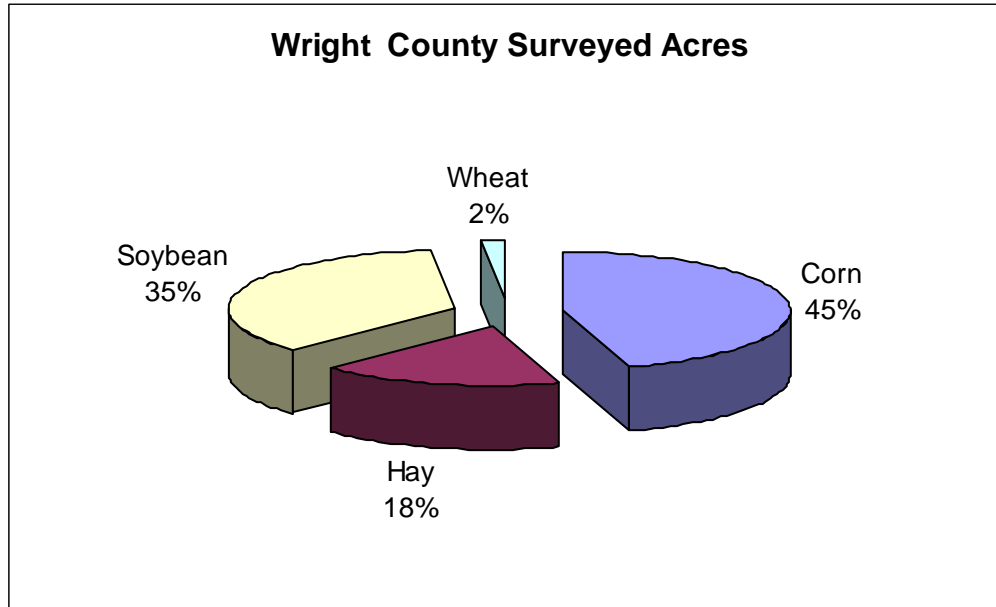
**Herbicides applied but not published included the following:** 2,4-D, Alachlor, Bromoxynil, Clopyralid, Dicamba, Dicamba, Sodium salt, Diflufenzopyr-sodium, Dimethenamid-P, Fenoxaprop, Metribuzin, Nicosulfuron, Rimsulfuron, Trifluralin,

**Insecticides applied but not published included the following:** Bifenthrin, Tefluthrin

**Fungicides applied but not published included the following:** Pyraclostrobin .



## Wright County



**Table 109. 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 Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
Atrazine	18	1.0	0.56	0.56	858
Glyphosate	52	1.5	0.67	1.03	4,688

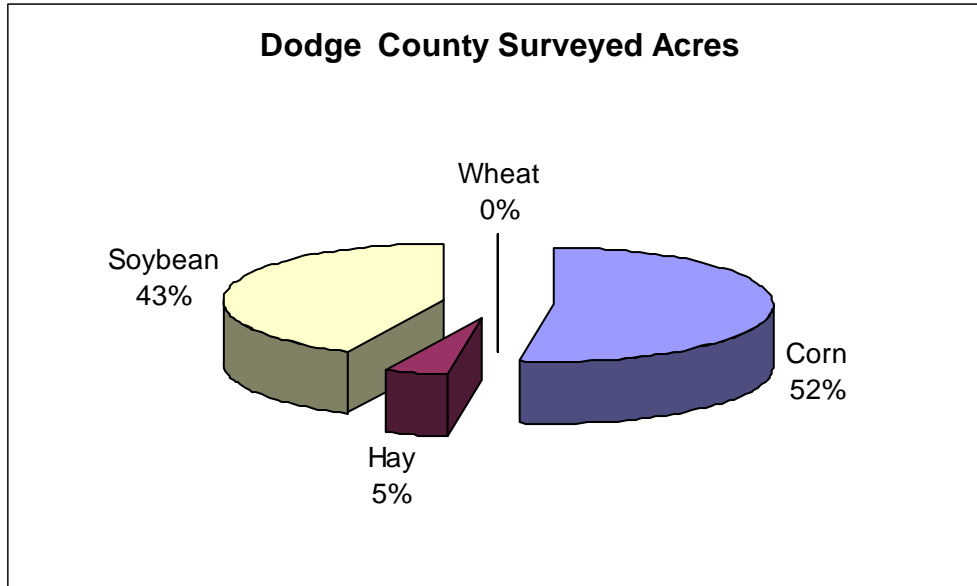
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Dicamba, Pot. salt, Dicamba, Dimet. salt, Diflufenzopyr-sodium, Dimethenamid-P, Glufosinate-ammonium, Mesotrione Nicosulfuron Rimsulfuron S-Metolachlor

**Insecticides applied but not published included the following:** Chlorpyrifos, Lambda-cyhalothrin, Permethrin, Tefluthrin

## PMA 9 County Data

## Dodge County



**Table 110. 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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
Acetochlor	9	1.0	1.23	1.23	2,694
Atrazine	11	1.0	0.66	0.66	1,763
Glyphosate	87	1.5	0.71	1.04	22,805
Mesotrione	14	1.0	0.14	0.14	474
S-Metolachlor	18	1.0	1.60	1.60	7,095
<b>Insecticides</b>					
Fipronil	14	1.0	0.11	0.11	374
Lambda-cyhalothrin	16	1.0	0.03	0.03	102

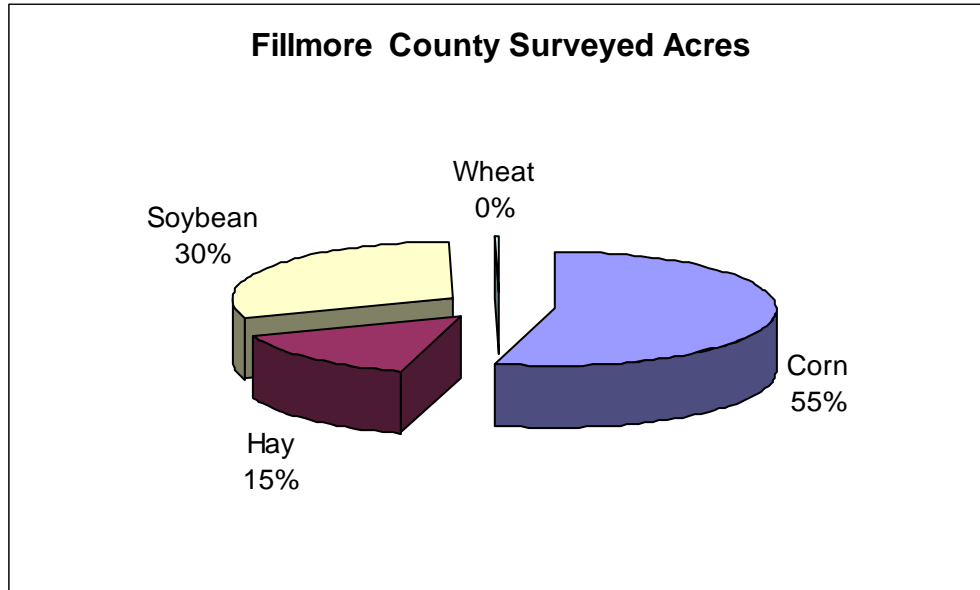
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Dicamba, Dimethenamid-P, Flumetsulam, Fomesafen, Glufosinate-ammonium, Imazethapyr, Nicosulfuron, Primisulfuron, Rimsulfuron, Topramezone

**Insecticides applied but not published included the following:** Carbofuran, Chlorpyrifos, Cyfluthrin, Permethrin, Tefluthrin,

**Fungicides applied but not published included the following:** Pyraclostrobin

### Fillmore County



**Table 111. 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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
Acetochlor	20	1.0	1.34	1.34	3,796
Atrazine	9	1.0	0.66	0.66	791
Clopyralid	2	1.0	0.11	0.11	37
Dicamba, Dimet. salt	4	1.0	0.06	0.06	30
Diflufenzopyr-sodium	4	1.0	0.02	0.02	12
Flumetsulam	2	1.0	0.04	0.04	14
Glyphosate	72	1.1	0.76	0.86	8,626
Mesotrione	5	1.0	0.17	0.17	111
Nicosulfuron	9	1.0	0.02	0.02	26
Rimsulfuron	9	1.0	0.01	0.01	15
<b>Insecticides</b>					
Lambda-cyhalothrin	11	1.0	0.02	0.02	36

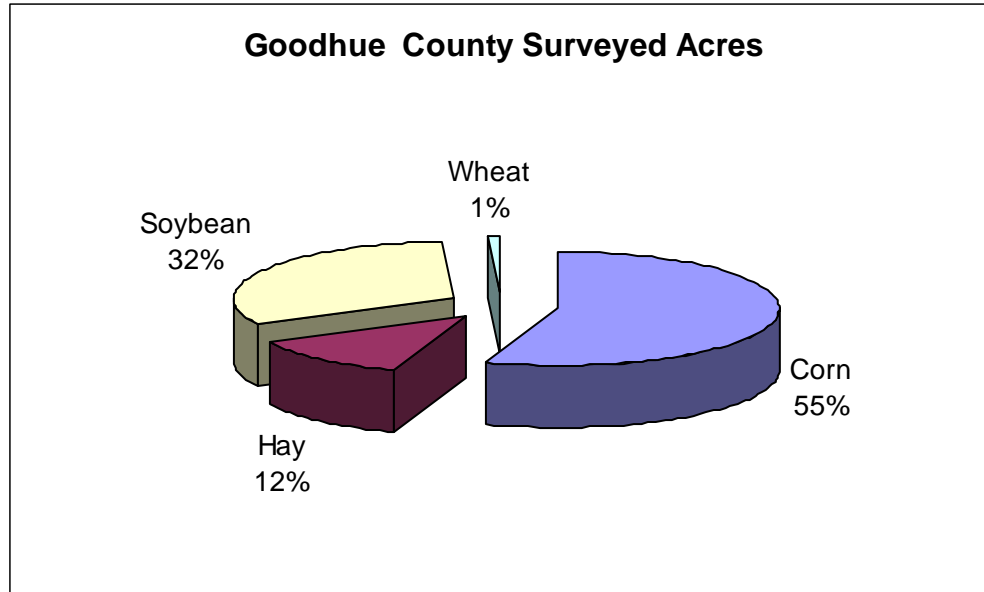
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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:** Acifluorfen, Bentazon, Dicamba, Dicamba, Dicamba, Pot. Salt, Fluazifop-P-butyl, Glufosinate-ammonium, Imazethapyr, MCPA, Metolachlor, Primisulfuron, S-Metolachlor

**Insecticides applied but not published included the following:** Chlorpyrifos, Chlorpyrifos, Cyfluthrin, Gamma-cyhalothrin, Tebupirimphos, Tefluthrin, Zeta-cypermethrin

**Fungicides applied but not published included the following:** Pyraclostrobin

## Goodhue County



**Table 112. 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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
Acetochlor	20	1.0	1.59	1.59	4,380
Atrazine	19	1.2	0.64	0.79	1,984
Clopyralid	13	1.0	0.14	0.14	236
Flumetsulam	13	1.0	0.05	0.05	84
Glyphosate	71	1.4	0.73	0.99	9,651
<b>Insecticides</b>					
Chlorpyrifos	11	1.0	0.54	0.54	839
Cyfluthrin	3	1.3	0.02	0.03	11
Lambda-cyhalothrin	12	1.0	0.03	0.03	43
Tefluthrin	7	1.0	0.13	0.13	119

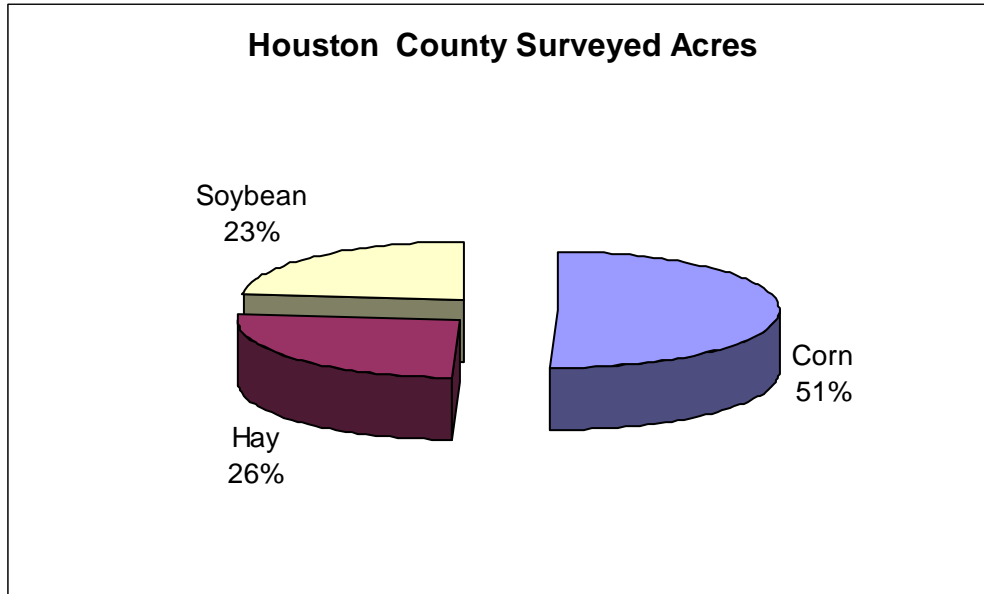
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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 Clomazone, Dicamba, Dimet. salt, Diflufenzopyr-sodium, Dimethenamid-P Fluazifop-P-butyl Flumioxazin Glufosinate-ammonium, Mesotrione, Nicosulfuron, Rimsulfuron, S-Metolachlor

**Insecticides applied but not published included the following:** Bifenthrin, Esfenvalerate, Permethrin, Phorate, Tebupirimphos, Terbufos, Zeta-cypermethrin

**Fungicides applied but not published included the following:** Pyraclostrobin

Houston County



**Table 113.** 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 Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
Atrazine	24	1.0	0.61	0.61	1,811
Clopyralid	9	1.0	0.12	0.12	129
Dicamba, Dimet. salt	10	1.0	0.10	0.10	126
Dicamba, Pot. salt	3	1.0	0.48	0.48	168
Diflufenzopyr-sodium	11	1.0	0.03	0.03	47
Dimethenamid-P	8	1.0	0.51	0.51	538
Flumetsulam	9	1.0	0.04	0.04	48
Glufosinate-ammonium	6	1.0	0.33	0.33	257
Glyphosate	37	1.3	0.77	1.01	4,803
Mesotrione	7	1.0	0.12	0.12	110
Nicosulfuron	19	1.0	0.02	0.02	54
Rimsulfuron	15	1.0	0.01	0.01	22
<b>Insecticides</b>					
Chlorpyrifos	3	1.0	0.54	0.54	221
Cyfluthrin	11	1.3	0.02	0.02	31

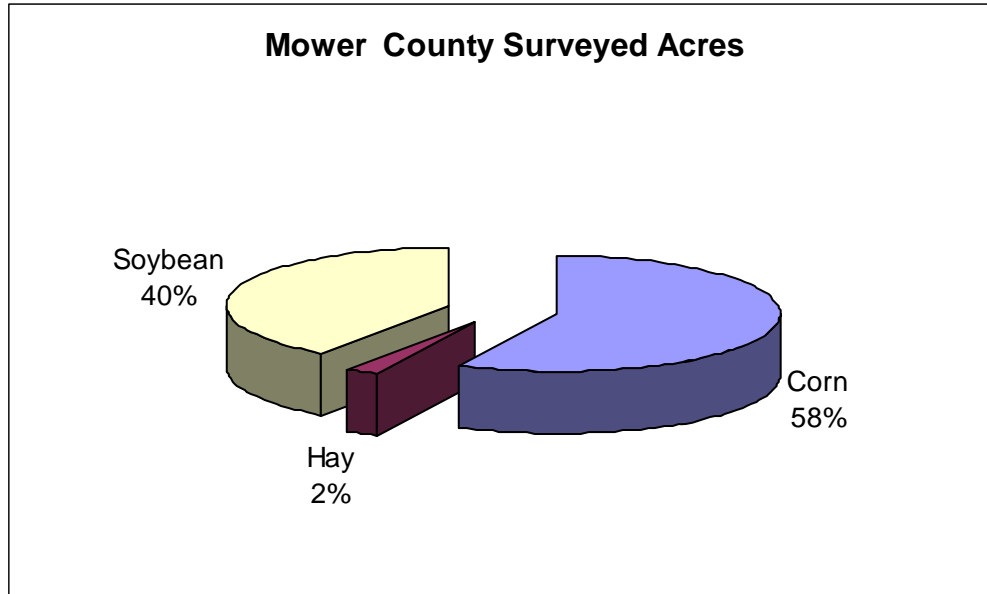
<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically “weighted” in any fashion. 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:** Carfentrazone-ethyl Chlorimuron-ethyl Clethodim, Cloransulam-methyl Dicamba, Dicamba, Sodium salt, Imazamox, Imazethapyr, Pendimethalin, S-Metolachlor

**Insecticides applied but not published included the following:** Lambda-cyhalothrin, Tebupirimphos, Tefluthrin

**Fungicides applied but not published included the following:** Pyraclostrobin

## Mower County



**Table 114. 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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
Acetochlor	11	1.0	1.22	1.22	3,014
Atrazine	13	1.0	0.59	0.59	1,642
Dicamba, Dimet. salt	2	1.0	0.07	0.07	26
Diflufenzopyr-sodium	2	1.0	0.03	0.03	10
Glyphosate	84	1.3	0.75	0.98	17,853
Mesotrione	14	1.0	0.10	0.10	321
Nicosulfuron	4	1.0	0.02	0.02	21
Rimsulfuron	4	1.0	0.01	0.01	10
<b>Insecticides</b>					
Fipronil	8	1.0	0.13	0.13	233
Lambda-cyhalothrin	18	1.0	0.02	0.02	91
<b>Fungicides</b>					
Pyraclostrobin	3	1.0	0.11	0.11	62

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Clopyralid, Dicamba,

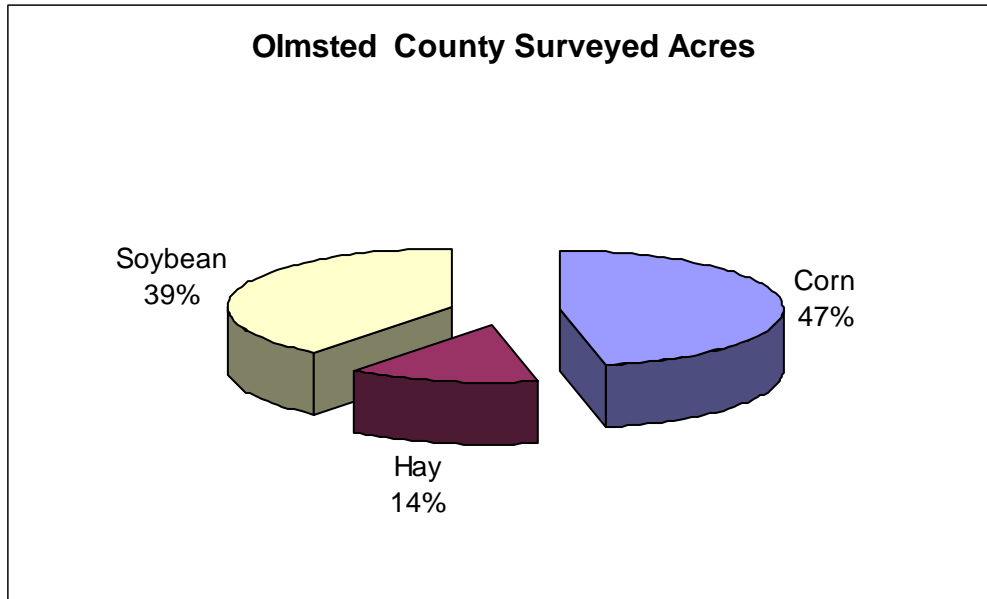
Dimethenamid-P, Fluazifop-P-butyl, Flumetsulam, Glufosinate-ammonium, S-Metolachlor, Trifluralin

**Insecticides applied but not published included the following:** Chlorpyrifos, Cyfluthrin, Esfenvalerate,

Gamma-cyhalothrin, Permethrin, Tebupirimphos

**Fungicides applied but not published included the following:** Azoxystrobin

### Olmsted County



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

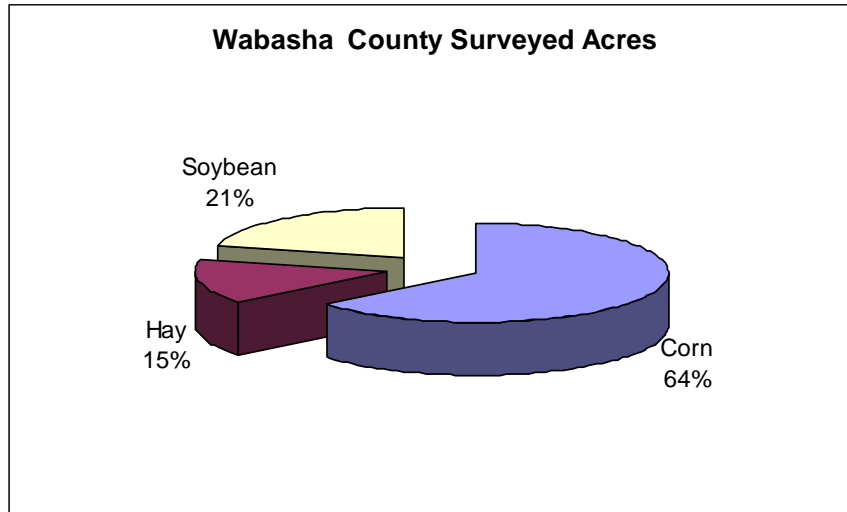
Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
Acetochlor	7	1.0	1.31	1.31	853
Atrazine	14	1.0	0.49	0.49	699
Glyphosate	64	1.3	0.77	1.01	6,435
Mesotrione	8	1.0	0.12	0.12	98
S-Metolachlor	4	1.0	1.37	1.37	596
<b>Insecticides</b>					
Lambda-cyhalothrin	22	1.0	0.02	0.02	44
<b>Fungicides</b>					
Pyraclostrobin	7	1.0	0.10	0.10	73

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Dicamba, Dicamba, Dimet. salt, Dicamba, Pot. Salt, Diflufenzopyr-sodium, Flumetsulam, Imazamox, Imazethapyr, Metribuzin, Nicosulfuron, Primisulfuron, Rimsulfuron, Thifensulfuron, Trifluralin

**Insecticides applied but not published included the following:** Chlorpyrifos, Cyfluthrin, Gamma-cyhalothrin, Tebupirimphos, Tefluthrin

## Wabasha County



**Table 116. Wabasha County pesticide applications and rates**  
**Pesticide Applications And Rates By Active Ingredient**  
**Wabasha County**

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
Acetochlor	35	1.0	1.75	1.75	11,149
Atrazine	28	1.0	0.55	0.55	2,692
Clopyralid	9	1.0	0.12	0.12	185
Dicamba	5	1.0	0.16	0.16	146
Dicamba, Dimet. salt	3	1.0	0.07	0.07	33
Diflufenzopyr-sodium	3	1.0	0.03	0.03	13
Flumetsulam	9	1.0	0.04	0.04	62
Glyphosate	55	1.0	0.77	0.80	7,864
Imazethapyr	3	1.0	0.03	0.03	16
Mesotrione	8	1.0	0.13	0.13	194
Nicosulfuron	1	1.0	0.03	0.03	8
Rimsulfuron	1	1.0	0.02	0.02	4
S-Metolachlor	9	1.0	1.38	1.38	2,170
<b>Insecticides</b>					
Cyfluthrin	2	1.0	0.02	0.02	7
Lambda-cyhalothrin	12	1.0	0.02	0.02	48

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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.

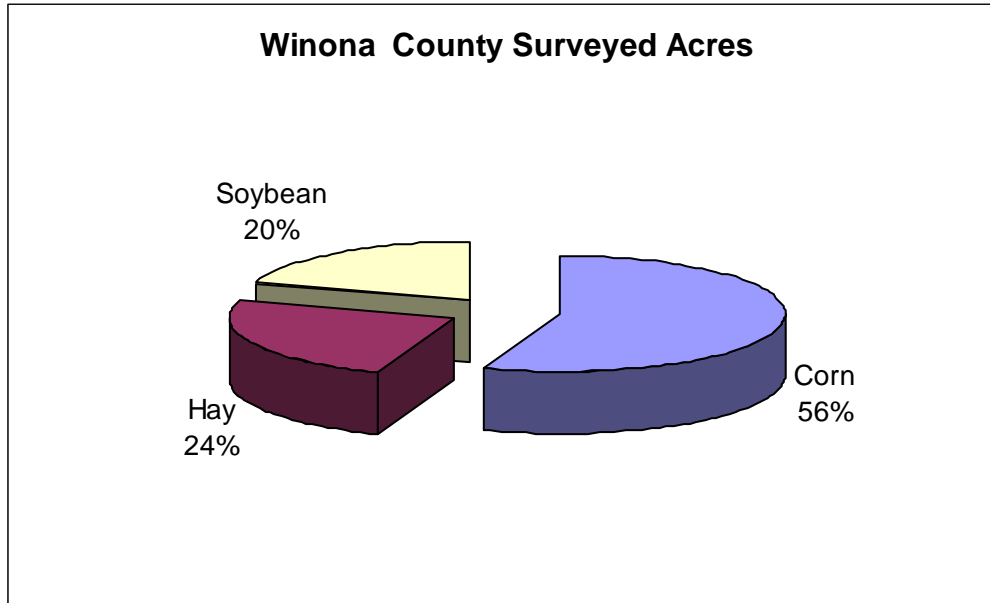
**Herbicides applied but not published included the following:** 2,4-D, Clethodim, Dicamba, Pot. Salt, Glufosinate-ammonium, Topramezone

**Insecticides applied but not published included the following:** Bifenthrin, Carbofuran, Chlorpyrifos, Esfenvalerate, Fipronil, Gamma-cyhalothrin, Tebupirimphos, Tefluthrin, Zeta-cypermethrin

**Fungicides applied but not published included the following:** Pyraclostrobin



## Winona County



**Table 117. 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 Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
Acetochlor	21	1.0	0.91	0.91	2,833
Atrazine	25	1.0	0.44	0.44	1,613
Clopyralid	6	1.0	0.14	0.14	116
Flumetsulam	6	1.0	0.05	0.05	43
Glyphosate	49	1.2	0.78	0.97	7,176
Mesotrione	6	1.0	0.10	0.10	85
Nicosulfuron	2	1.0	0.01	0.01	5
Rimsulfuron	2	1.0	0.01	0.01	2
S-Metolachlor	7	1.0	1.24	1.24	1,202
<b>Insecticides</b>					
Lambda-cyhalothrin	4	1.0	0.02	0.02	12
Tefluthrin	7	1.0	0.16	0.16	160
<b>Fungicides</b>					
Pyraclostrobin	2	1.0	0.10	0.10	33

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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.

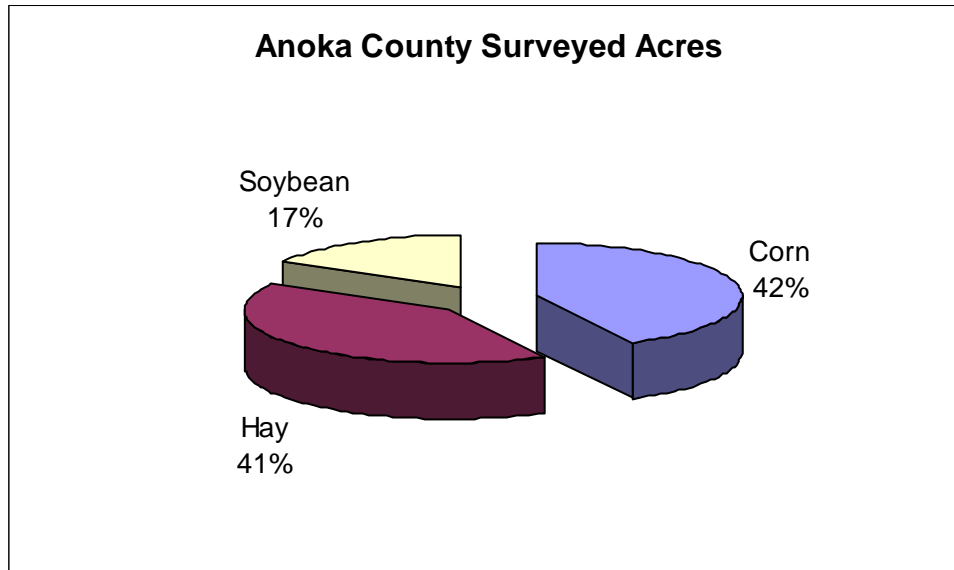
**Herbicides applied but not published included the following:** 2,4-D, Clethodim, Dicamba, Dicamba, Dimet. salt, Dicamba, Pot. salt, Diflufenzopyr-sodium, Dimethenamid-P, Fomesafen, Glufosinate-ammonium, Imazethapyr, Pendimethalin, Primisulfuron, Topramezone, Trifluralin,

**Insecticides applied but not published included the following:** Chlorpyrifos, Cyfluthrin, Permethrin, Tebupirimphos

**Fungicides applied but not published included the following:** Azoxystrobin, Propiconazole

## PMA 10 County Data

### Anoka County



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

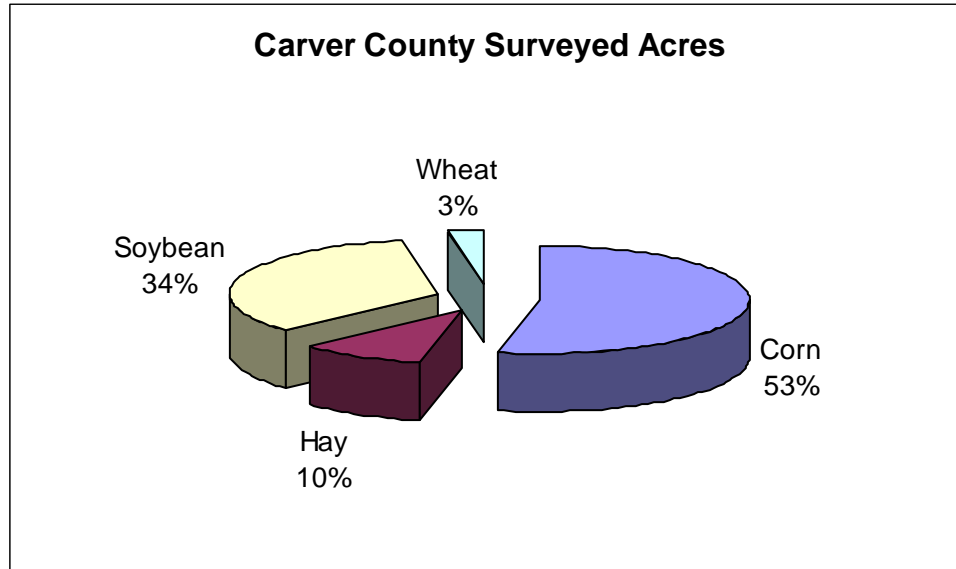
Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
<b>Herbicides</b>					
Atrazine	16	1.0	0.84	0.84	709
Glyphosate	40	1.0	0.69	0.72	1,487

<sup>1</sup> Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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:** Dicamba, Dimet. salt Diflufenzopyr-sodium, Glufosinate-ammonium, Imazethapyr, Mesotrione, Pendimethalin, S-Metolachlor

**Insecticides applied but not published included the following:** Chlorpyrifos

**Carver County**



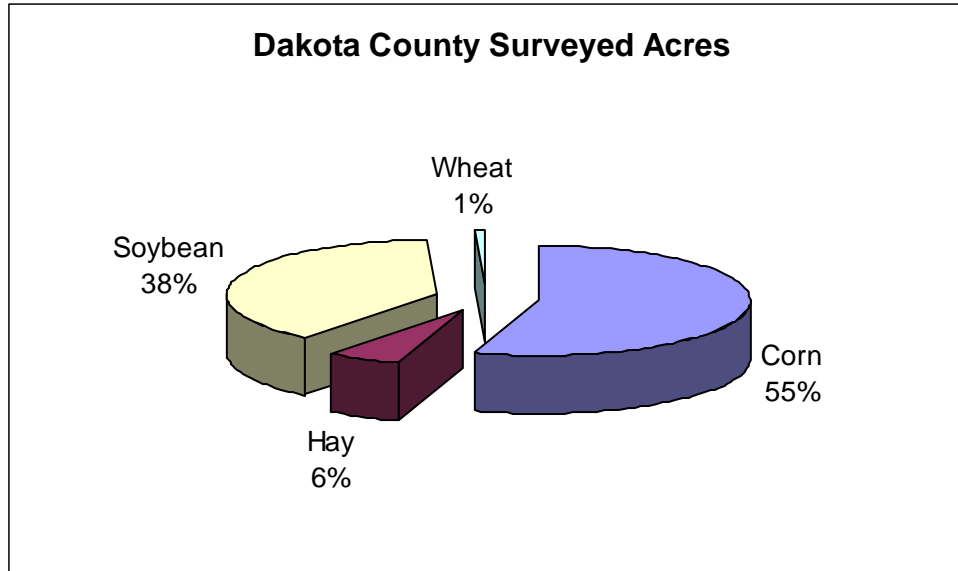
**Table 119. Carver County pesticide applications and rates**

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year <sup>1</sup>
	Percent	Number	Pounds per Acre (a.i.)	Pounds per Acre (a.i.)	Total Pounds (a.i.)
<b>Herbicides</b>					
Acetochlor	5	1.0	1.41	1.41	1,315
Atrazine	20	1.0	0.64	0.64	2,198
Dimethenamid-P	2	1.0	0.75	0.75	288
Glyphosate	55	1.1	0.88	0.94	8,869
Mesotrione	13	1.0	0.12	0.12	268
Nicosulfuron	7	1.0	0.02	0.02	27
Rimsulfuron	7	1.0	0.01	0.01	13
<b>Insecticides</b>					
Chlorpyrifos	12	1.1	0.49	0.53	1,070
Lambda-cyhalothrin	12	1.2	0.02	0.03	52

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Carfentrazone-ethyl Dicamba, Dicamba, Pot. salt, Dicamba, Sodium salt, Fenoxaprop, Flumetsulam, Flumioxazin, Glufosinate-ammonium, Halosulfuron, Imazethapyr, MPCA, Pendimethalin, S-Metolachlor, Trifluralin  
**Insecticides applied but not published included the following:** Carbofuran, Gamma-cyhalothrin, Lambda-cyhalothrin, Tefluthrin,  
**Fungicides applied but not published included the following:** Azoxystrobin, Propiconazole, Pyraclostrobin

## Dakota County



**Table 120. 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 Crop Year <sup>1</sup>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
<b>Herbicides</b>			(a.i.)	(a.i.)	(a.i.)
Atrazine	17	1.0	0.51	0.51	1,186
Glufosinate-ammonium	13	1.0	0.41	0.41	712
Glyphosate	65	1.1	0.68	0.76	6,867
Mesotrione	14	1.0	0.12	0.12	239
S-Metolachlor	12	1.0	1.48	1.48	2,394
<b>Insecticides</b>					
Chlorpyrifos	13	1.0	0.55	0.55	961
Lambda-cyhalothrin	24	1.0	0.02	0.02	70

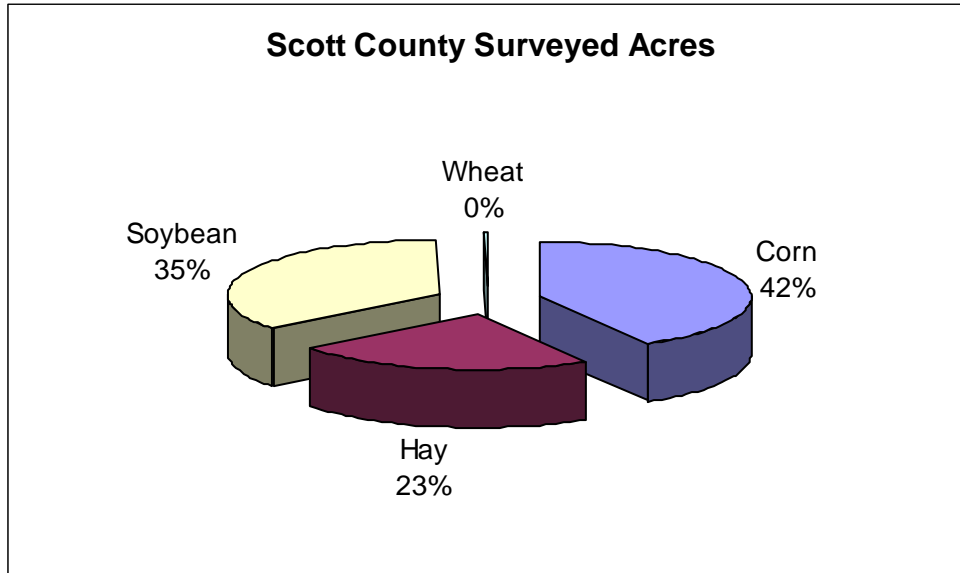
<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. 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, Pot. salt, Dimethenamid-P, Fluazifop-P-butyl, Imazethapyr, Metribuzin, Nicosulfuron, Primisulfuron, Rimsulfuron, Thifensulfuron, Topramezone

**Insecticides applied but not published included the following:** Cyfluthrin, Fipronil, Tefluthrin, Zeta-cypermethrin

**Fungicides applied but not published included the following:** Pyraclostrobin

**Scott County**



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

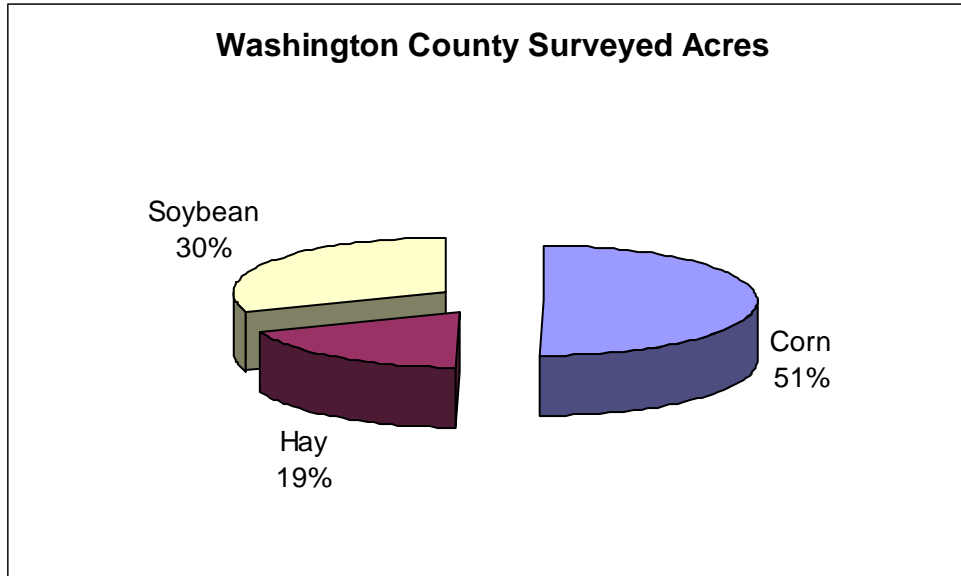
<b>Agricultural Chemical (a.i.)</b>	<b>Surveyed Area Applied</b>	<b>Average Applications</b>	<b>Average Rate Per Application</b>	<b>Average Rate Per Crop Year</b>	<b>Total Applied Crop Year<sup>1</sup></b>
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
<b>Herbicides</b>					
Acetochlor	22	1.0	1.12	1.12	2,052
Atrazine	13	1.0	0.65	0.65	736
Glyphosate	56	1.4	0.67	0.94	4,469
Mesotrione	12	1.0	0.17	0.17	175
Nicosulfuron	4	1.0	0.02	0.02	6
Rimsulfuron	2	1.0	0.01	0.01	2
S-Metolachlor	13	1.0	1.67	1.67	1,855
<b>Insecticides</b>					
Chlorpyrifos	16	1.0	0.34	0.34	481
Lambda-cyhalothrin	8	1.1	0.02	0.02	16

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Dicamba, Dicamba, Dimet. Salt, Diflufenzopyr-sodium, Dimethenamid, Fluazifop-P-butyl, Flumetsulam, Flumioxazin, Fomesafen, Glufosinate-ammonium, Imazamox, Imazethapyr, Pendimethalin, Thifensulfuron

**Insecticides applied but not published included the following:** Cyfluthrin, Tebupirimphos

## Washington County



**Table 122. 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 Crop Year <sup>1</sup>
	<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>
<b>Herbicides</b>					
Acetochlor	2	1.0	1.54	1.54	365
Atrazine	12	1.0	0.55	0.55	674
Glyphosate	63	1.2	0.69	0.85	5,598

<sup>1</sup> Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2007 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, Clopyralid, Dimethenamid-P, Flumetsulam, Glufosinate-ammonium, Mesotrione, Nicosulfuron, Rimsulfuron, S-Metolachlor

**Insecticides applied but not published included the following:** Chlorethoxyfos, Cyfluthrin, Tebupirimphos

**Fungicides applied but not published included the following:** Chlorethoxyfos, Chlorpyrifos, Cyfluthrin, Lambda-cyhalothrin, Tebupirimphos

# 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 2007 Cropping Year

**1. ACREAGE**

REPORT FOR THE FARM YOU OPERATE <i>(Include Land Rented From Others, Exclude Land Rented Out)</i>				
2007 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 2007 CROPS** - Include applications after September 1, 2004 on crops for 2007 harvest. *(Please report below the acres treated with each individual chemical during 2007 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:	
					13 Quarts	30 Grams
<b>CORN</b>						
	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



<b>NAME OF PESTICIDE USED</b> <i>(Please list chemicals used. If necessary, refer to the enclosed list)</i>	<b>Office Use</b>	<b>Acres Treated</b>	<b>No. of Applications</b>	<b>Rate</b>	<b>Unit Code:</b> 1 Pounds 12 Gallons 13 Quarts 14 Pints 15 Ounces 30 Grams
<b>CORN (cont.)</b>					
	346	347	348	349	350
	351	352	353	354	355
	356	357	358	359	360
	361	362	363	364	365
	366	367	368	369	370
	371	372	373	374	375
	376	377	378	379	380
	381	382	383	384	385
	386	387	388	389	390

<b>NAME OF PESTICIDE USED</b> <i>(Please list chemicals used. If necessary, refer to the enclosed list)</i>	<b>Office Use</b>	<b>Acres Treated</b>	<b>No. of Applications</b>	<b>Rate</b>	<b>Unit Code:</b> 1 Pounds 12 Gallons 13 Quarts 14 Pints 15 Ounces 30 Grams
<b>WHEAT (Durum, other Spring, Winter)</b>					
	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
<b>SOYBEANS</b>					
	501	502	503	504	505
	506	507	508	509	510
	511	512	513	514	515
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
<b>SOYBEANS (cont.)</b>					
	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 13 Quarts 15 Ounces	12 Gallons 14 Pints 30 Grams
<b>ALL HAY</b>						
	601	602	603	604		605
	606	607	608	609		610
	611	612	613	614		615
	616	617	618	619		620
	621	622	623	624		625
	626	627	628	629		630

If rates are not known, may we call your pesticide applicator? Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, Company \_\_\_\_\_ Contact \_\_\_\_\_ City \_\_\_\_\_ Phone # \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_

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

## 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 pilot<sup>12</sup> 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 pilot<sup>13</sup> 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.

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<sup>12</sup> “*Expanded Minnesota Agricultural Statistics Pesticide Use Data*”, 2003, by MASS and MDA.

<sup>13</sup> Unpublished data. From the September 20, 2003 EPA Report.

