2013 Pesticide Usage on Four Major Crops in Minnesota

Minnesota Department of Agriculture

USDA: NASS
Minnesota Field Office

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Introduction

Acknowledgements

This survey was a cooperative effort between the Minnesota Department of Agriculture (MDA) and the the United States Department of Agriculture: National Agricultural Statistics Service (NASS), Minnesota field office. The detailed pesticide use information could not have been collected without the cooperation of thousands of farmers who voluntarily responded to the survey in the midst of their normally busy lives, and for this we are extremely grateful. Similarly, the assistance of agricultural chemical dealers and co-operatives is much appreciated. Special thanks goes to Dan Lofthus, Director of NASS within the USDA at the Minnesota field office and his 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.

2013 Pesticide Use Summary and Highlights

This report summarizes herbicide, insecticide and fungicide use information reported by approximately 2,300 farmers for the 2013 crop year. Excellent participation and good record keeping by Minnesota farmers and agricultural chemical dealerships played a vital part in providing complete and detailed pesticide information. The survey targeted four major crops in Minnesota: corn, soybean, wheat, and hay. Collectively these crops account for more than 90% of Minnesota's cropland. This survey collected pesticide information from nine hundred thousand acres of cropland in 76 of the state's most intensive agricultural counties. The survey covered nearly 5% of the state's corn acres, 5% of the soybean acres, 4% of the hay acres, and 7% of the wheat acres.

The report represents the sixth survey conducted on pesticide use in Minnesota by the MDA. The first surveys collected information for the 2003, 2005, 2007, 2009, and 2011 crop years and also included corn, soybean, hay and wheat. Those surveys can be found at:

http://www.mda.state.mn.us/chemicals/pesticides/pesticideuse.aspx

Corn Highlights: Herbicides, insecticides, and fungicides were applied to 99%, 14%, and 11%, respectively, of the surveyed corn acres. For the 1,500 farms that reported corn information on approximately 417,000 acres, the top four herbicide products (based on percent acres covered) were glyphosate[1] (85%), acetochlor (33%), flumetsulam (21%) and clopyralid (21%). Bifenthrin (7%), cyfluthrin (3%), phostebupirim (3%), and tefluthrin (3%) were the major corn insecticides used in

[1] Including all forms of glyphosate

the survey. The major fungicide products were pyraclostrobin and propiconazole applied on 6% and 3% of all corn acres respectively.

Soybean Highlights: Herbicides, insecticides, and fungicides were applied to 99%, 36%, and 14%, respectively, on the 358,000 surveyed acres of soybeans. Over 1,300 farms provided pesticide information on this crop.

Glyphosate was applied to 92% of the acres. Sulfentrazone was applied on 11% of all soybean acres and cloransulam was applied on 10% of all soybean acres. Lambda-cyhalothrin and chlorpyrifos were the major soybean insecticides used in the survey and were applied on 16% and 13%, respectively, of all soybean acres. Pyraclostrobin and propiconazole were the major soybean fungicides used in the survey and were applied on 8% and 3% of all soybean acres.

Wheat Highlights: Herbicides, insecticides, and fungicides were applied to 98%, 33%, and 65%, respectively, on 79,500 wheat acres. Approximately 275 farms provided information for wheat. The top three herbicide products (based on percent of total acres covered) were bromoxynil (61%), pyrasulfotole (41%) and fluroxypyr (29%). Lambda-cyhalothrin and chlorpyrifos were the major wheat insecticides used in the survey and were applied to approximately 23% and 9% of all wheat acres. The three major fungicide products were tebuconazole, propiconazole, and prothioconazole, applied on 29%, 26%, and 22% of all wheat acres respectively.

Hay Highlights: Herbicides, Insecticides, and fungicides were applied to 3%, 11%, and <1%, respectively, on 74,000 acres of hay. Approximately 1,100 farms provided information on this crop. The three major pesticide products applied were the insecticides lambda-cyhalothrin, chlorpyrifos, and gamma-cyhalothrin which were applied on 7%, 3%, and 1%, of all hay acres respectively.

Survey Design and Implementation

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

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

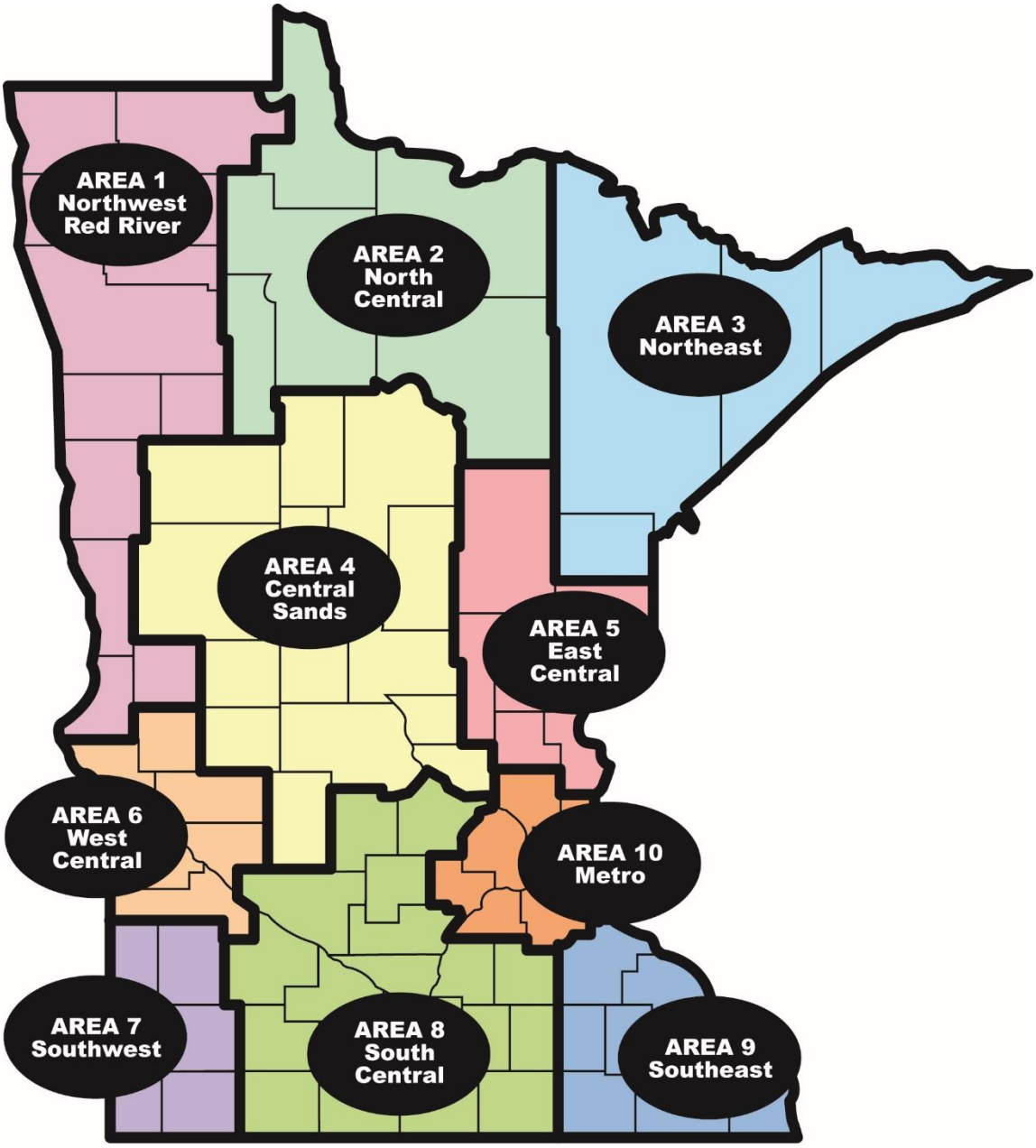

Figure 1. MDA Pesticide Management Areas (PMA)

Some of the challenges of collecting pesticide use data are:

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

NASS developed the sample population of 7,600 farms. This was done by selecting 100 farms from each of 76 agricultural counties. All farmers from each county who grew one or more of the target crops (corn, soybean, wheat and hay) were eligible to be selected. The selection of 100 farms per county was based upon NASS's extensive expertise with telephone surveys. This number provided a large enough pool to reach the desired goal of obtaining approximately 40 farms per county with complete records. Table 1 summarizes the crop acres surveyed for each crop and corresponding acreage receiving herbicide, insecticide or fungicide. Table 2 summarizes the number of participating farms in each county along with the total acres of each crop. The average number of participating farms per county was 30.

Approximately 2,300 interviews were completed. Respondents were required to have all pesticide applications and rates for a specific crop to be considered for inclusion in the survey. For example, an individual grower may have had good records for corn and soybean acres but could not find the records for the insecticides applied to the hay crop. In this scenario, the corn and soybean fields would be used and the hay field would eventually be eliminated from the data set.

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

Farmers were interviewed over the phone in April 2014. These were "cold calls," meaning the farmers did not get any type of notification about the survey prior to the contact. The interviews typically would last 5 to 10 minutes.

Data Collection Process

1) Farmers were first asked to identify the number of acres of corn, soybean, wheat and hay grown in the 2013 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 2013 crop year.

Crop Acres Surveyed

Crop	Number of Respondents	Total Surveyed Acres	Herbicide Applied		Insecticide Applied		Fungicide Applied	
			Acres	(%)	Acres	(%)	Acres	(%)
Corn	1,550	417,003	413,181	(99%)	59,357	(14%)	45,231	(11%)
Soybeans	1,318	358,477	355,703	(99%)	130,721	(36%)	49,762	(14%)
Wheat	275	79,502	77,910	(98%)	26,465	(33%)	51,556	(65%)
Hay	1,161	74,788	1,895	(3%)	8,132	(11%)	691	(<1%)
Totals	2,269[2]	929,770	848,689	(91%)	224,675	(24%)	294,434	(32%)

[2] The total sum of respondents across all crops was 4,304. However, since most farmers grew more than one type of major crop, the actual number of participating farms was 2,269.

Table 2. Farms and crop acreage by county and PMA

County	PMA	# of Surveyd Farms	Corn Acres	Soybean Acres	Wheat Acres	Hay Acres	Total Acres
Clay	1	26	6,384	8,139	2,214	2,308	19,045
Grant	1	33	12,575	9,437	1,220	445	23,677
Kittson	1	32	3,635	19,880	17,894	2,123	43,532
Mahnomen	1	30	2,795	4,609	2,062	1,490	10,956
Marshall	1	16	1,297	9,382	9,710	330	20,719
Norman	1	39	10,862	16,053	7,407	628	34,950
Pennington	1	19	*	5,120	4,325	*	11,788
Polk	1	28	1,741	8,747	8,391	2,364	21,243
Red Lake	1	28	3,116	7,803	5,893	1,163	17,975
Roseau	1	27	*	3,419	5,410	*	11,532
Traverse	1	24	11,960	13,675	*	*	27,819
Wilkin	1	29	6,046	8,132	4,349	819	19,346
Totals	1	331	62,009	114,396	70,899	15,278	262,582
Becker	4	42	8,323	6,680	924	2,835	18,762
Benton	4	32	2,364	*	*	1,204	4,698
Cass	4	36	457	*	*	4,471	5,138
Crow Wing	4	32	871	*	*	1,920	2,924
Douglas	4	30	1,988	2,631	333	712	5,664
Hubbard	4	30	2,454	*	*	1,900	4,354
Kandiyohi	4	29	4,291	3,622	*	*	8,778
Morrison	4	37	3,483	*	*	2,205	6,011
Otter Tail	4	32	5,540	3,763	975	1,656	11,934
Pope	4	44	9,242	6,647	744	1,680	18,313
Sherburne	4	30	2,723	933	*	*	4,729
Stearns	4	32	5,875	2,960	*	*	10,095
Todd	4	33	1,825	*	*	1,223	3,878
Wadena	4	34	2,904	2,182	*	2,047	7,133
Totals	4	473	52,340	31,478	3,891	24,702	112,411
Aitkin	5	38	586	*	*	2,892	3,833
Chisago	5	34	3,732	2,850	*	*	7,370
Isanti	5	34	3,829	2,543	*	*	7,265
Kanabec	5	27	829	*	*	1,562	2,891
Mille Lacs	5	33	1,358	*	*	1,007	2,991
Pine	5	35	1,282	*	*	3,801	5,890
Totals	5	201	11,616	*	*	10,883	30,240
Big Stone	6	21	6,121	5,731	*	*	12,734
Chippewa	6	32	9,992	6,210	*	*	16,658
Lac qui Parle	6	26	5,761	5,125	*	*	11,189
Stevens	6	40	11,973	10,225	1,011	535	23,744
Swift	6	30	12,887	7,774	*	*	21,593
Yellow Medicine	6	27	8,707	7,567	*	*	16,717
Totals	6	176	55,441	42,632	2,516	2,046	102,635
Lincoln	7	26	7,056	5,750	275	902	13,983
Lyon	7	21	5,685	4,222	*	*	10,183
Murray	7	23	6,551	5,860	*	*	12,460
Nobles	7	34	7,252	6,424	*	*	13,799
Pipestone	7	30	6,457	4,561	*	*	11,873
Rock	7	18	5,007	3,313	*	*	8,495
Totals	7	152	38,008	30,130	439	2,216	70,793
Blue Earth	8	27	6,030	4,340	*	*	10,618
Brown	8	31	9,057	7,165	*	*	16,801

County	PMA	# of Surveyd Farms	Corn Acres	Soybean Acres	Wheat Acres	Hay Acres	Total Acres
Cottonwood	8	30	7,262	6,878	*	*	14,364
Faribault	8	34	14,431	11,503	*	*	25,995
Freeborn	8	29	8,745	5,918	*	*	14,809
Jackson	8	26	8,615	7,265	*	*	15,981
Le Sueur	8	26	3,796	3,999	*	*	8,011
Martin	8	29	13,062	6,741	*	*	19,878
McLeod	8	33	7,016	3,533	*	*	10,784
Meeker	8	32	5,846	5,576	*	*	12,282
Nicollet	8	32	7,688	3,785	*	*	11,924
Redwood	8	34	10,202	7,708	*	*	18,158
Renville	8	28	9,525	6,186	*	*	15,846
Rice	8	36	5,788	4,872	*	*	11,658
Sibley	8	30	5,713	2,122	*	*	8,039
Steele	8	34	5,236	4,790	*	*	10,491
Waseca	8	25	4,460	3,058	*	*	7,714
Watonwan	8	25	6,957	3,851	*	*	10,917
Wright	8	24	1,711	1,111	*	*	3,488
Totals	8	565	141,140	100,401	612	5,605	247,758
Dodge	9	28	8,917	3,632	*	*	13,914
Fillmore	9	24	5,377	2,683	*	*	9,403
Goodhue	9	38	7,325	4,045	*	*	12,287
Houston	9	21	2,332	*	*	1,254	3,823
Mower	9	24	5,325	9,204	*	*	14,807
Olmsted	9	30	3,351	2,225	*	*	6,370
Wabasha	9	32	4,848	*	*	1,661	7,797
Winona	9	27	2,762	*	*	1,737	5,227
Totals	9	224	40,237	24,026	*	*	73,628
Anoka	10	31	1,487	*	*	1,140	3,390
Carver	10	25	5,016	*	*	1,027	6,877
Dakota	10	25	3,753	2,456	*	*	6,764
Scott	10	31	2,429	2,257	*	*	5,332
Washington	10	35	3,527	1,539	*	*	7,364
Totals	10	147	16,212	7,803	846	4,866	29,727
Totals	State	2,269	417,003	358,477	79,506	74,788	929,774

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

Data Reporting and Limitations

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

Data sets are not "Weighted"
Traditional surveys conducted by NASS employ advanced sampling strategies and are designed to statistically represent a non-homogenous population, thus data is "weighted" to account for sample size, county size and crop acreage, etc.

Such strategies can be very expensive and are not without their own limitations.[3] As previously mentioned, approximately 30 farms per county participated in the survey. Farmers that grew the four major crops were randomly selected from county lists of producers accessed by NASS.

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

Therefore, attempts to extrapolate data for purposes of estimating total pounds of a product or active ingredient used in a county, area, or statewide must consider an appropriate statistical analysis of the dataset for the estimations to be valid. Failure to do so may provide over- or under-representation of the data. The MDA can be contacted to further discuss interpretation of the survey data.

Due to the method that was used for pesticide data collection, it is not possible to report on the number of crop acres receiving two or more products, though the individual applications and rates are captured. For example, some producers in south central Minnesota (Area 8) use a pre-emergence, soil-applied herbicide for grass control and follow up post-emergence for broadleaves. Following this general pesticide strategy, Surpass or Harness may be selected for pre-emergence weed control and Callisto as the post-emergence product. Acetochlor (Surpass/Harness) was reported in this area on 37% of the corn acres and mesotrione (Callisto) was reported on 19% of acres. Because the acres are not identical, it is not possible to capture acres with both products applied on a total number of acres.

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

[3] For an explanation of NASS survey methods and data quality, visit the NASS website at http://www.nass.usda.gov/Education_and_Outreach/Understanding_Statistics/index.asp "Statistical Aspects of Surveys" for more specific facts about agricultural chemical use surveys. Click on "Survey and Estimation Procedures" section of NASS "Agricultural Chemical Usage - Field Crops" reports available at http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1560

On individual fields, this survey indicates that the use of different brand name products containing the same active ingredients is infrequent. The average number of applications for most products was 1.0 application per year. Glyphosate is one of the exceptions for both corn and soybean. In this survey, there were 1.2 applications of glyphosate per year on corn (85)% of all surveyed corn acres at a rate of 0.96 pounds/acre.

Statewide Pesticide Applications – Corn

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

To obtain a list of products (brand names) registered in Minnesota and containing the active ingredients listed below, visit http://npirspublic.ceris.purdue.edu/state/state_menu.aspx?state=MN, enter the database, submit “active ingredient” as the search option, enter the name of the active ingredient, click “submit,” check the appropriate boxes, and “submit” to obtain a list of all registered products containing the active ingredient.

Table 3. Publication status for corn pesticide active ingredients

Active Ingredient	Published	Active Ingredient	Published
Herbicide		**Insecticide**	
2,4-D	P	Bifenthrin	P
Acetochlor	P	Chlorethoxyfos	P
Atrazine	P	Chlorpyrifos	P
Bromoxynil	P	Cyfluthrin	P
Clopyralid	P	Esfenvalerate	*
Dicamba	P	Gamma-cyhalothrin	P
Diflufenzopyr	P	Lambda-cyhalothrin	P
Dimethenamid-p	P	Permethrin	*
Flumetsulam	P	Phostebupirim	P
Flumioxazin	*	Tefluthrin	P
Fluroxypyr	*	Terbufos	*
Fluthiacet-methyl	P		
Fomesafen	*	**Fungicide**	
Glufosinate-ammonium	P	Azoxystrobin	P
Glyphosate	P	Fluxapyroxad	P
Halosulfuron	*	Metconazole	P
Mesotrione	P	Propiconazole	P
Nicosulfuron	P	Prothioconazole	P
Pendimethalin	P	Pyraclostrobin	P
Primisulfuron	*	Tebuconazole	P
Rimsulfuron	P		
S-metolachlor	P		
Saflufenacil	P		
Sethoxydim	*		
Simazine	*		
Tembotrione	P		
Thifensulfuron	*		
Topramezone	P		
Triencarbazone-methyl	P		

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

A statewide summary of corn pesticide applications is provided in Table 4. Five percent (5%) of all Minnesota corn acres were surveyed for the 2013 season. Herbicides were applied to 99% of all surveyed corn acres. Insecticides were applied to 14% of all acres and 11% of surveyed acres received fungicides.

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

Agricultural Chemical	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicide					
2,4-D	1	1.0	0.48	0.48	1,052
Acetochlor	33	1.0	1.17	1.18	163,491
Atrazine	10	1.0	0.54	0.54	21,290
Bromoxynil	<1	1.0	0.20	0.20	265
Clopyralid	21	1.0	0.07	0.07	6,655
Dicamba	7	1.0	0.16	0.16	4,466
Diflufenzopyr	5	1.0	0.05	0.05	1,169
Dimethenamid-p	8	1.0	0.54	0.54	19,023
Flumetsulam	21	1.0	0.03	0.03	2,709
Fluthiacet-methyl	<1	1.0	0.00	0.00	1
Glufosinate-ammonium	1	1.0	0.42	0.42	951
Glyphosate	85	1.2	0.96	1.14	403,034
Mesotrione	17	1.0	0.09	0.09	6,180
Nicosulfuron	<1	1.0	0.20	0.20	380
Pendimethalin	<1	1.0	1.29	1.29	971
Rimsulfuron	<1	1.0	0.12	0.12	185
S-metolachlor	14	1.0	0.94	0.95	56,362
Saflufenacil	4	1.0	0.06	0.06	1,123
Tembotrione	4	1.0	0.08	0.08	1,108
Topramezone	2	1.0	0.02	0.02	117
Triencarbazone-methyl	1	1.0	0.01	0.01	49
Insecticide					
Bifenthrin	7	1.0	0.06	0.06	1,809
Chlorethoxyfos	<1	1.0	0.02	0.02	23
Chlorpyrifos	1	1.0	0.36	0.36	1,491
Cyfluthrin	3	1.0	0.01	0.01	75
Gamma-cyhalothrin	1	1.0	0.00	0.00	11
Lambda-cyhalothrin	1	1.0	0.01	0.01	54
Phostebupirim	3	1.0	0.13	0.13	1,505
Tefluthrin	3	1.4	0.12	0.16	2,193
Zeta-cypermethrin	<1	1.0	0.02	0.02	30
Fungicide					
Azoxystrobin	1	1.0	0.08	0.08	217
Fluxapyroxad	1	1.0	0.67	0.67	2,805

[4] Excludes any products with less than five responses.

Agricultural Chemical	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Metconazole	1	1.2	0.03	0.03	204
Propiconazole	3	1.1	0.04	0.04	476
Prothioconazole	2	1.0	0.09	0.09	675
Pyraclostrobin	6	1.1	0.29	0.31	7,585
Tebuconazole	2	1.0	0.09	0.09	675
Trifloxystrobin	2	1.1	0.04	0.04	399

Herbicides applied but not published included the following: Flumioxazin, Fluroxypyr, Fomesafen, Halosulfuron, Primisulfuron, Sethoxydim, Simazine, and Thifensulfuron
Insecticides applied but not published included the following: Esfenvalerate, Permethrin, and Terbufos.

Acetochlor, atrazine and s-metolachlor are three commonly used herbicides for which the Minnesota Department of Agriculture has developed specific voluntary Best Management Practices to protect groundwater and surface water resources. Because of the additional concerns regarding the use of these products, their use frequencies are compared below. Figure 2 illustrates the range of rates reported for atrazine use on corn for 2003, 2005, 2007, 2009, 2011, and 2013.

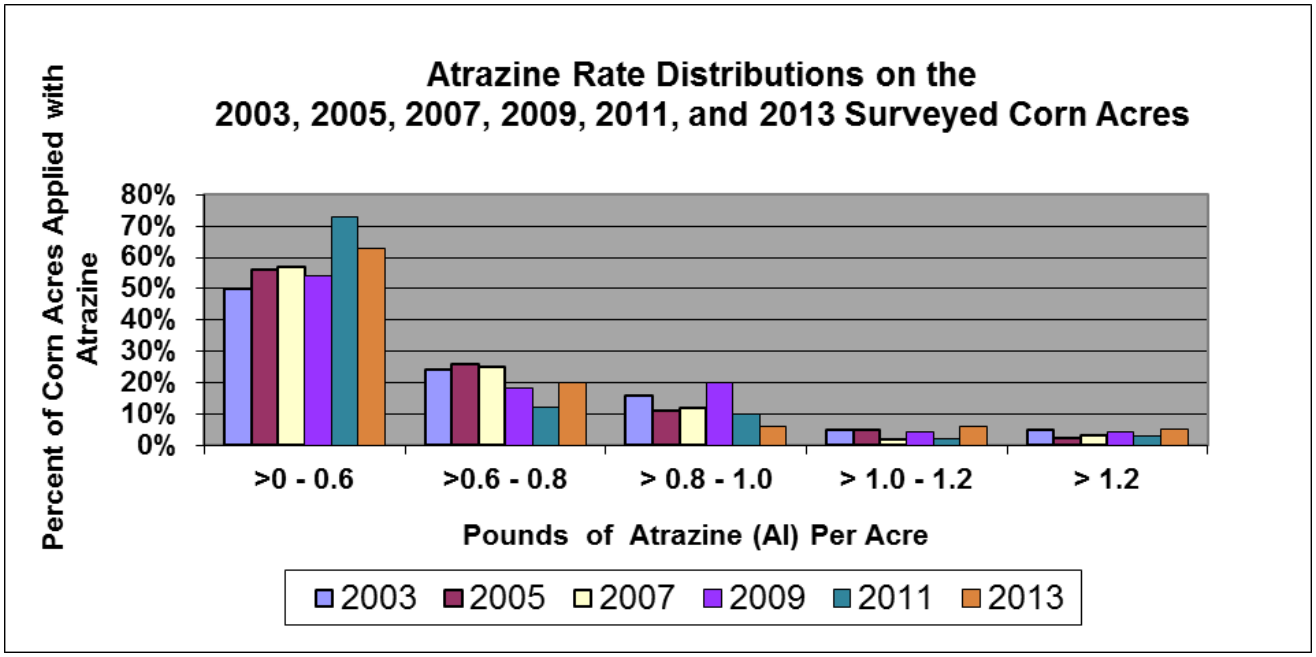

Figure 2. Atrazine (active ingredient) rate per acre distribution across surveyed corn acres for the 2003, 2005, 2007, 2009, 2011, and 2013 crop years.

Atrazine use in Minnesota has fallen from 30% in 2003 to 10% in 2013.The application rate has fallen from 0.67 pounds a.i. per acre in 2003 to 0.54 pounds a.i. per acre in 2013.

Acetochlor use in Minnesota is detailed in Figure 3, which illustrates the range of acetochlor rates reported for use in the 2003, 2005, 2007, 2009, 2011, and 2013 crop years.

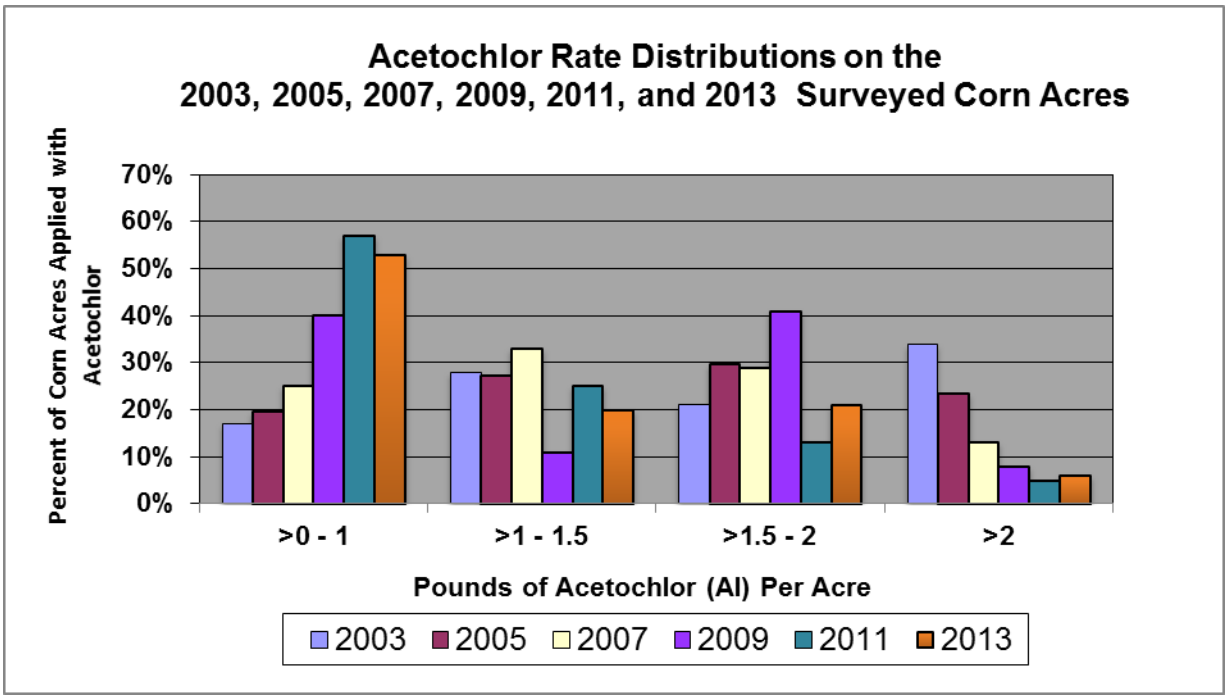

Figure 3. Acetochlor (active ingredient) rate per acre distribution across surveyed corn acres for the 2003, 2005, 2007, 2009, 2011, and 2013 crop years.

Acetochlor use in Minnesota has risen from 25% in 2003 to 33% in 2013. The application rate of acetochlor dropped from 1.63 pounds a.i. per acre in 2003 to 1.18 pounds a.i. per acre in 2013.

S-metolachlor use in Minnesota is detailed in Figure 4, which illustrates the range of rates reported for use of s-metolachlor in the 2003, 2005, 2007, 2009, 2011, and 2013 crop years.

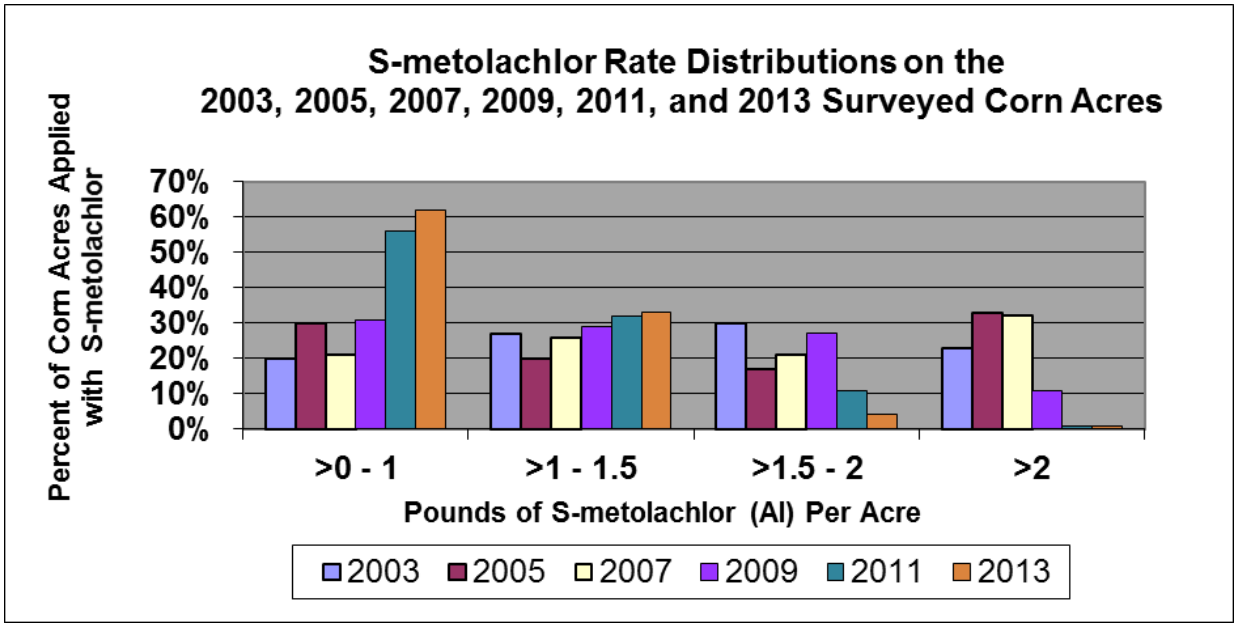

Figure 4. S-metolachlor (active ingredient) rate distribution across surveyed corn acres for the 2003, 2005, 2007, 2009, 2011, and 2013 crop years.

S-metolachlor use in Minnesota has risen slightly from 12% in 2003 to 14% in 2013. The application rate fell significantly from 1.67 pounds a.i. per acre in 2003 to 0.95 pounds a.i. per acre in 2013.

Corn herbicide county-level estimated use maps

Atrazine, acetochlor and s-metolachlor use in Minnesota varies among counties. Some reasons for the variation in use include different weed species, soils, crop rotations and the pesticide packages that individual pesticide dealers promote in geographic areas of the state. As the vast majority of these herbicides are used in corn production, corn acres within each county will also have a direct influence on any county-based comparisons. Maps of the estimated land area in each county receiving atrazine, acetochlor or s-metolachlor can be constructed using data from the 2013 MDA survey.

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

Tables of statewide and regional MDA survey results are reported strictly as percentages of survey respondents. By multiplying the percentage of surveyed county crop acres receiving a

specific pesticide by the number of NASS acres for those crops assumes that all crop acres in a county receive herbicide applications at the same rate as those acres included in the survey. Although this assumption results in an extrapolation whose accuracy cannot be verified statistically, the exercise provides a helpful means of utilizing available data to compare the ways in which counties use certain herbicides relative to the amount of land in the county farmed for corn, soybean, wheat and hay. If a county is highlighted in blue, then no acres were reported by NASS for a particular crop, but MDA survey results did report crops grown in that county. Therefore, these counties are excluded from the mapping results.

Additionally, the maps help to correct a potential misinterpretation of statewide use data. Because the survey draws nearly equally from each county (approximately 40 farms per county), when an active ingredient's use data is presented as a statewide average of all counties, it is not adjusted for differing farm sizes or the amount of county land in corn, soybeans, wheat or hay production. Instead, statewide averages are simply a reporting of data collected from all survey respondents. This averaging process can lead to inappropriate conclusions and may under-represent an active ingredient's use in smaller geographical areas. Similarly, the county-level data tables are only a report of data from survey respondents, and provide no means of identifying a county's relative use of an active ingredient. The extrapolation conducted to create the county-level estimated use maps in an attempt to adjust the survey's raw data using the assumption that the approximately 30 producers surveyed in a county are representative of county-level farm sizes and practices associated with corn, soybeans, wheat and hay production. This produces a potentially more realistic, regional estimate of active ingredient use based on factors that statewide averaging or simple county-level survey results can't approximate.

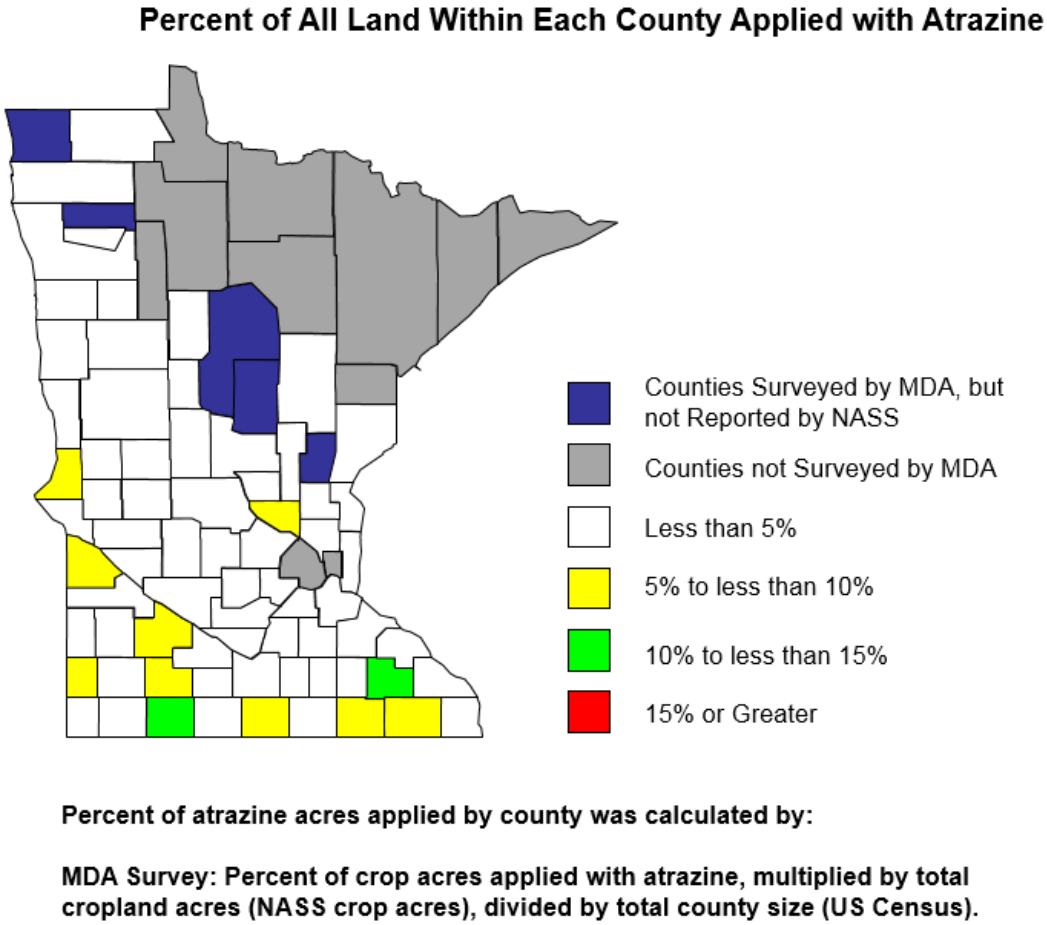

Figure 5. Estimated percent of land acres applied with atrazine on a county basis for the 2013 crop year.

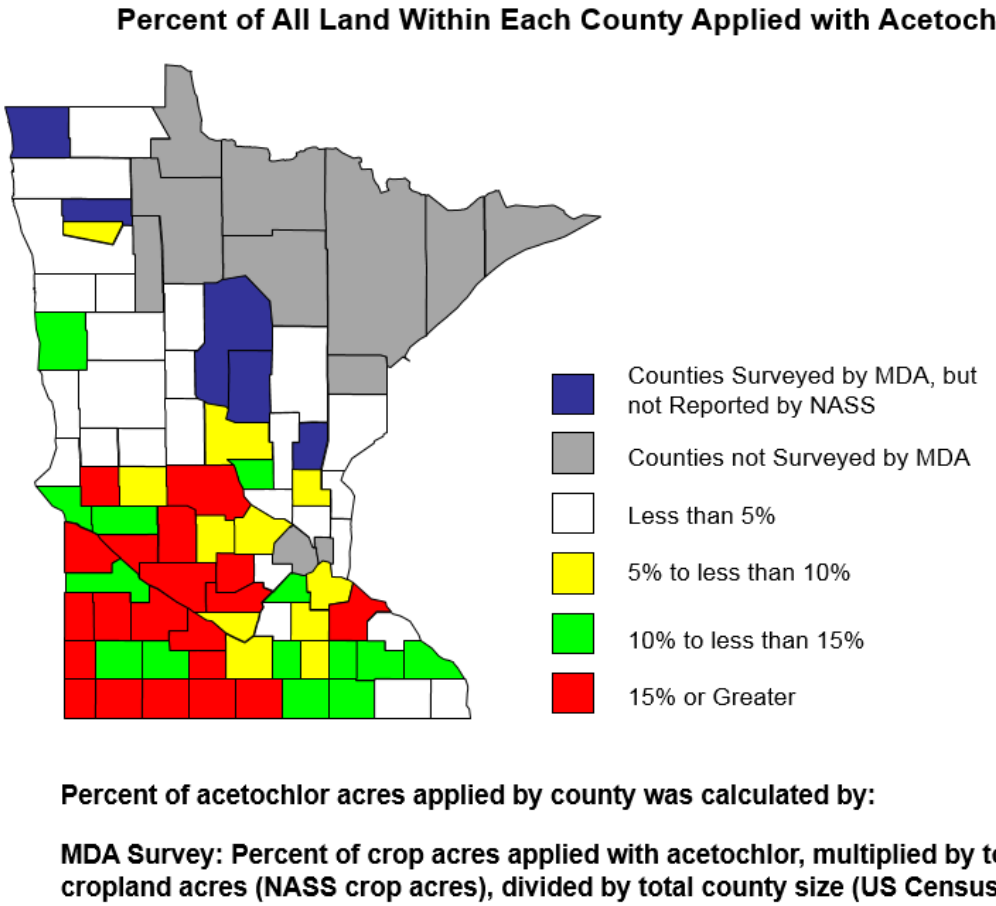

Figure 6. Estimated percent of land acres applied with acetochlor on a county basis for the 2013 crop year.

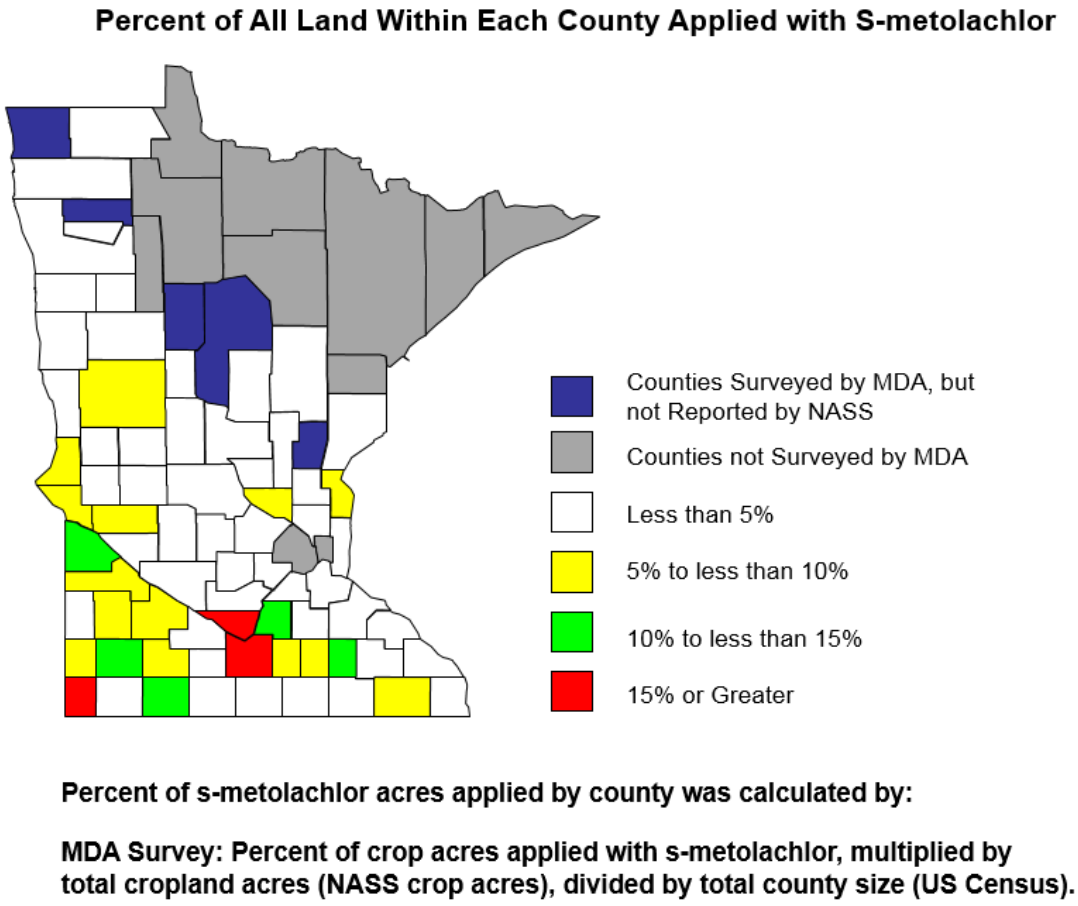

Figure 7. Estimated percent of land acres applied with s-metolachor on a county basis for the 2013 crop year.

Pesticide Applications on Corn by Pesticide Management Areas

Table 5 details the number of 2013 respondents with usable reports in each Pesticide Management Area (PMA), the number of corn acres in each area and the number of corn acres receiving herbicides, insecticides and fungicides. Tables 6 – 13 provide corn pesticide applications and rates by individual PMAs.

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

PMA	Number of Respondents	Corn Acres	Herbicide Acres	Insecticide Acres	Fungicide Acres
1	175	62,009	61,418	927	6,878
4	273	52,340	51,334	3,770	5,125
5	83	11,616	11,462	*	*
6	153	55,441	55,271	4,618	4,911
7	137	38,008	37,745	7,147	3,628
8	475	141,140	140,115	31,686	19,179
9	175	40,237	39,714	9,532	5,333
10	79	16,212	16,122	*	*
Totals	**1,550**	**417,003**	**413,181**	**59,357**	**45,231**

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

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	17	1.0	1.07	1.07	11,238
Atrazine	8	1.0	0.31	0.31	1,556
Clopyralid	15	1.0	0.08	0.08	738
Dicamba	11	1.0	0.11	0.11	709
Diflufenzopyr	10	1.0	0.04	0.04	248
Dimethenamid-p	10	1.0	0.50	0.50	3,144
Flumetsulam	14	1.0	0.03	0.03	294
Glyphosate	89	1.3	0.92	1.20	66,582
Mesotrione	12	1.0	0.08	0.08	615
S-metolachlor	9	1.0	0.92	0.92	5,024
Saflufenacil	5	1.0	0.05	0.05	176
Tembotrione	6	1.0	0.07	0.07	280
Triencarbazone-methyl	3	1.0	0.01	0.01	21
Fungicide					
Metconazole	2	1.2	0.02	0.03	46
Propiconazole	4	1.0	0.03	0.03	77
Pyraclostrobin	6	1.2	0.34	0.39	1,533
Trifloxystrobin	4	1.0	0.04	0.04	96

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Fluroxypyr, Fomesafen, Glufosinate-ammonium, Nicosulfuron, Pendimethalin, and Topramezone
Insecticides applied but not published included the following: Bifenthrin, Chlorethoxyfos, Chlorpyrifos, Lambda-cyhalothrin, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Fluxapyroxad.

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	25	1.0	1.07	1.09	14,497
Atrazine	13	1.0	0.60	0.60	4,060
Clopyralid	21	1.0	0.07	0.07	833
Dicamba	7	1.0	0.27	0.27	1,010
Diflufenzopyr	4	1.0	0.05	0.05	95
Dimethenamid-p	6	1.0	0.44	0.44	1,275
Flumetsulam	21	1.0	0.03	0.03	342
Glyphosate	86	1.2	0.98	1.16	52,307
Mesotrione	18	1.0	0.10	0.10	923
S-metolachlor	21	1.0	0.96	0.97	10,747
Tembotrione	2	1.0	0.08	0.08	79
Fungicides					
Prothioconazole	7	1.0	0.09	0.09	336
Pyraclostrobin	3	1.0	0.33	0.33	444
Tebuconazole	7	1.0	0.09	0.09	336

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this area. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or sub-area levels.

Herbicides applied but not published included the following: 2,4-D, Bromoxynil, Fluthiacet-methyl, Glufosinate-ammonium, Nicosulfuron, Pendimethalin, Primisulfuron, Saflufenacil, Topramezone, Triencarbazone-methyl
Insecticides applied but not published included the following: Bifenthrin, Chlorethoxyfos, Chlorpyrifos, Cyfluthrin, Gamma-cyhalothrin, Phostebupirim, Tefluthrin, and Terbufos.
Fungicides applied but not published included the following: Fluxapyroxad and Metconazole.

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	35	1.0	1.37	1.37	5,615
Atrazine	22	1.0	0.57	0.57	1,440
Clopyralid	14	1.0	0.08	0.08	124
Flumetsulam	14	1.0	0.03	0.03	51
Glyphosate	80	1.2	0.96	1.14	10,594
Mesotrione	16	1.0	0.08	0.08	161
S-metolachlor	26	1.0	0.91	0.91	2,694

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Diflufenzopyr, Dimethenamid-p, Glufosinate-ammonium, Halosulfuron, Nicosulfuron, Tembotrione, Topramezone, and Triencarbazone-methyl.
Insecticides applied but not published included the following: Permethrin and Tefluthrin.
Fungicides applied but not published included the following: Pyraclostrobin.

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Herbicides			(a.i.)	(a.i.)	(a.i.)
Acetochlor	35	1.0	1.03	1.04	20,381
Atrazine	4	1.0	0.47	0.47	1,124
Clopyralid	32	1.0	0.07	0.07	1,301
Dicamba	4	1.0	0.23	0.23	501
Diflufenzopyr	3	1.0	0.08	0.08	113
Dimethenamid-p	11	1.0	0.57	0.57	3,554
Flumetsulam	32	1.0	0.03	0.03	538
Glyphosate	88	1.2	0.99	1.20	58,277
Mesotrione	19	1.0	0.09	0.09	981
S-metolachlor	13	1.0	0.96	1.00	7,185
Saflufenacil	9	1.0	0.07	0.07	332
Insecticides					
Bifenthrin	5	1.0	0.06	0.06	142
Fungicides					
Propiconazole	3	1.0	0.05	0.05	95
Pyraclostrobin	4	1.0	0.24	0.24	539

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Halosulfuron, Simazine, Tembotrione, and Triencarbazone-methyl.
Insecticides applied but not published included the following: Chlorethoxyfos, Chlorpyrifos, Cyfluthrin, Phostebupirim, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Azoxystrobin, Fluxapyroxad, Prothioconazole, Tebuconazole, and Trifloxystrobin.

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	46	1.0	1.16	1.16	20,221
Atrazine	9	1.0	0.57	0.57	1,916
Clopyralid	27	1.0	0.08	0.08	770
Dimethenamid-p	3	1.0	0.45	0.45	582
Flumetsulam	26	1.0	0.03	0.03	309
Glyphosate	85	1.2	1.00	1.15	37,850
Mesotrione	23	1.0	0.10	0.10	854
S-metolachlor	15	1.0	1.03	1.03	5,940
Saflufenacil	3	1.0	0.05	0.05	54
Insecticides					
Bifenthrin	5	1.0	0.07	0.07	134
Cyfluthrin	8	1.0	0.01	0.01	21
Phostebupirim	8	1.0	0.13	0.13	415
Tefluthrin	5	1.0	0.10	0.10	191
Fungicides					
Pyraclostrobin	7	1.0	0.29	0.29	826

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Diflufenzopyr, Rimsulfuron, Tembotrione, Thifensulfuron, and Topramezone.
Insecticides applied but not published included the following: Chlorpyrifos, Esfenvalerate, Lambda-cyhalothrin, Permethrin, Terbufos, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Azoxystrobin, Fluxapyroxad, Metconazole, Propiconazole, Prothioconazole, Tebuconazole, and Trifloxystrobin.

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 Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	37	1.0	1.25	1.26	65,349
Atrazine	9	1.0	0.52	0.52	6,536
Clopyralid	20	1.0	0.07	0.07	2,055
Dicamba	5	1.0	0.15	0.15	1,081
Diflufenzopyr	5	1.0	0.06	0.06	419
Dimethenamid-p	9	1.0	0.61	0.61	8,193
Flumetsulam	20	1.0	0.03	0.03	835
Glufosinate-ammonium	1	1.0	0.37	0.37	302
Glyphosate	80	1.2	0.93	1.10	123,781
Mesotrione	19	1.0	0.08	0.08	2,053
Nicosulfuron	1	1.0	0.30	0.30	360
Rimsulfuron	1	1.0	0.13	0.13	184
S-metolachlor	14	1.0	0.86	0.87	17,242
Saflufenacil	4	1.0	0.07	0.07	427
Tembotrione	4	1.0	0.08	0.08	379
Topramezone	3	1.0	0.02	0.02	63
Insecticides					
Bifenthrin	11	1.1	0.06	0.07	1,032
Chlorpyrifos	1	1.0	0.40	0.40	696
Cyfluthrin	4	1.0	0.01	0.01	37
Lambda-cyhalothrin	1	1.0	0.02	0.02	18
Phostebupirim	4	1.0	0.13	0.13	742
Tefluthrin	3	1.7	0.11	0.19	931
Fungicides					
Azoxystrobin	1	1.0	0.08	0.08	89
Fluxapyroxad	2	1.0	0.67	0.67	1,488
Metconazole	2	1.1	0.03	0.04	103
Propiconazole	3	1.2	0.04	0.04	198
Prothioconazole	2	1.0	0.09	0.09	212
Pyraclostrobin	8	1.0	0.33	0.33	3,850
Tebuconazole	2	1.0	0.09	0.09	212

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this area. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or sub-area levels.

Herbicides applied but not published included the following: 2,4-D, Bromoxynil, Cloransulam, Flumioxazin, Fluroxypyr, Fluthiacet-methyl, Pendimethalin, Primisulfuron, Sethoxydim , and Triencarbazone-methyl.
Insecticides applied but not published included the following: Gamma-cyhalothrin and Terbufos.
Fungicides applied but not published included the following: Trifloxystrobin.

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	34	1.0	1.20	1.21	16,679
Atrazine	16	1.0	0.65	0.65	4,094
Clopyralid	19	1.0	0.08	0.08	594
Dicamba	19	1.0	0.13	0.13	978
Diflufenzopyr	14	1.0	0.05	0.05	265
Dimethenamid-p	11	1.0	0.44	0.44	1,999
Flumetsulam	19	1.0	0.03	0.03	240
Glyphosate	92	1.1	0.96	1.05	38,872
Mesotrione	13	1.0	0.09	0.09	500
S-metolachlor	15	1.0	1.05	1.05	6,437
Saflufenacil	6	1.0	0.04	0.04	112
Tembotrione	3	1.0	0.07	0.07	96
Triencarbazone-methyl	2	1.0	0.01	0.01	12
Insecticides					
Bifenthrin	13	1.0	0.07	0.07	377
Cyfluthrin	2	1.0	0.01	0.01	5
Phostebupirim	2	1.0	0.12	0.12	99
Tefluthrin	9	1.0	0.11	0.11	373
Fungicides					
Propiconazole	6	1.0	0.04	0.04	96
Pyraclostrobin	6	1.2	0.13	0.16	380

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this area. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or sub-area levels.

Herbicides applied but not published included the following: 2,4-D, Bromoxynil, Fluthiacet-methyl, Glufosinate-ammonium, Halosulfuron, Nicosulfuron, Pendimethalin, Primisulfuron, and Thifensulfuron.
Insecticides applied but not published included the following: Chlorethoxyfos, Lambda-cyhalothrin, and Terbufos.
Fungicides applied but not published included the following: Azoxystrobin, Fluxapyroxad, Metconazole, Prothioconazole, Tebuconazole, and Trifloxystrobin.

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Herbicides			(a.i.)	(a.i.)	(a.i.)
Acetochlor	52	1.0	1.13	1.13	9,511
Atrazine	6	1.0	0.63	0.63	563
Clopyralid	22	1.0	0.07	0.07	241
Dicamba	2	1.0	0.28	0.28	92
Flumetsulam	22	1.0	0.03	0.03	100
Glyphosate	84	1.1	0.99	1.13	15,381
Mesotrione	7	1.0	0.08	0.08	93
S-metolachlor	6	1.0	1.07	1.07	1,092

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Diflufenzopyr, Dimethenamid-p, Fluthiacet-methyl, Glufosinate-ammonium, Nicosulfuron, Pendimethalin, Rimsulfuron, and Tembotrione.
Insecticides applied but not published included the following: Bifenthrin, Cyfluthrin, Esfenvalerate, and Phostebupirim.
Fungicides applied but not published included the following: Prothioconazole, Pyraclostrobin, and Tebuconazole.

Statewide Pesticide Applications – Soybean

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

To obtain a list of products (brand names) registered in Minnesota and containing the active ingredients listed below, visit http://npirspublic.ceris.purdue.edu/state/state_menu.aspx?state=MN, enter the database, submit “active ingredient” as the search option, enter the name of the active ingredient, click “submit,” check the appropriate boxes, and “submit” to obtain a list of all registered products containing the active ingredient.

Table 14. Publication status for soybean pesticide active ingredients

Active Ingredient	Published	Active Ingredient	Published
Herbicides		**Insecticides**	
Acetochlor	P	Beta-cyfluthrin	P
Bentazon	*	Bifenthrin	P
Chlorimuron	P	Chlorpyrifos	P
Clethodim	P	Cyfluthrin	*
Cloransulam	P	Esfenvalerate	P
Dicamba	P	Gamma-cyhalothrin	P
Dimethenamid-p	P	Imidacloprid	P
Ethalfluralin	*	Lambda-cyhalothrin	P
Fenoxaprop	*	Thiamethoxam	P
Fluazifop	P	Zeta-cypermethrin	P
Flufenacet	P	**Fungicide**	
Flumiclorac	P	Azoxystrobin	P
Flumioxazin	P	Chlorothalonil	*
Fluthiacet-methyl	P	Fluoxastrobin	P
Fomesafen	P	Propiconazole	P
Glufosinate-ammonium	P	Pyraclostrobin	P
Glyphosate	P	Tebuconazole	*
Imazamox	P	Tetraconazole	P
Imazethapyr	P	Trifloxystrobin	P
Lactofen	P		
Metribuzin	P		
Pendimethalin	P		
Phenmedipham	*		
Quizalofop	*		
S-metolachlor	P		
Saflufenacil	P		
Sulfentrazone	P		
Thifensulfuron	P		
Trifluralin	P		

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

A statewide summary of soybean pesticide applications is provided in Table 15. Five percent (5%) of all Minnesota soybean acres were surveyed for the 2013 season. Herbicides were applied to 99% of all surveyed soybean acres. Insecticides were applied to 36% of all acres and 14% of surveyed acres received fungicides.

Table 15. Pesticide applications and rates by active ingredient (a.i.) for soybean statewide[5].

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	1	1.0	1.00	1.00	1,997
Chlorimuron	<1	1.0	0.01	0.01	8
Clethodim	5	1.0	0.06	0.06	1,023
Cloransulam	10	1.0	0.02	0.02	901
Dicamba	0	1.0	0.18	0.18	102
Dimethenamid-p	1	1.0	0.34	0.34	1,522
Fluazifop	2	1.0	0.08	0.09	659
Flufenacet	<1	1.0	0.19	0.19	222
Flumiclorac	1	1.0	0.02	0.02	54
Flumioxazin	2	1.1	0.08	0.09	691
Fluthiacet-methyl	2	1.0	0.00	0.00	27
Fomesafen	5	1.0	0.16	0.16	2,879
Glufosinate-ammonium	2	1.6	0.37	0.60	4,506
Glyphosate	92	1.6	0.95	1.50	495,047
Imazamox	1	1.0	0.03	0.03	54
Imazethapyr	6	1.0	0.06	0.06	1,214
Lactofen	1	1.0	0.16	0.16	777
Metribuzin	1	1.0	0.29	0.29	759
Pendimethalin	2	1.0	1.10	1.12	6,379
S-metolachlor	1	1.0	0.94	0.94	3,789
Saflufenacil	3	1.0	0.03	0.03	303
Sulfentrazone	11	1.0	0.19	0.19	7,376
Thifensulfuron	1	1.0	0.02	0.02	79
Trifluralin	1	1.0	0.60	0.60	2,813
Insecticides					
Beta-cyfluthrin	2	1.0	0.02	0.02	133
Bifenthrin	5	1.0	0.06	0.06	1,163
Chlorpyrifos	13	1.0	0.43	0.44	20,995
Esfenvalerate	1	1.0	0.03	0.03	168
Gamma-cyhalothrin	3	1.0	0.01	0.01	65
Imidacloprid	2	1.0	0.04	0.04	265
Lambda-cyhalothrin	16	1.0	0.02	0.02	1,241
Thiamethoxam	1	1.0	0.03	0.03	80
Zeta-cypermethrin	2	1.0	0.02	0.02	130

[5] Excludes any products with less than 5 responses.

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Fungicides			(a.i)	(a.i.)	(a.i.)
Azoxystrobin	2	1.0	0.12	0.12	883
Fluoxastrobin	<1	1.0	0.12	0.12	62
Propiconazole	3	1.0	0.06	0.06	515
Pyraclostrobin	8	1.0	0.11	0.11	3,039
Tetraconazole	1	1.0	0.07	0.07	223
Trifloxystrobin	2	1.0	0.05	0.05	477

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Ethalfluralin, Fenoxaprop, Phenmedipham, and Quizalofop.
Insecticides applied but not published included the following: Cyfluthrin.
Fungicides applied but not published included the following: Chlorothalonil and Tebuconazole.

Area Pesticide Applications – Soybean

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

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

PMA	Number of Respondents	Soybean Acres	Herbicide Acres	Insecticide Acres	Fungicide Acres
1	244	114,396	113,920	19,706	10,105
4	152	31,478	31,239	13,280	2,830
5	58	7,611	7,551	2,048	493
6	139	42,632	42,295	21,575	4,607
7	128	30,130	29,920	15,437	3,970
8	412	100,401	99,338	49,796	18,407
9	123	24,026	23,735	6,028	8,918
10	62	7,803	7,705	2,851	432
Totals	**1,318**	**358,477**	**355,703**	**130,721**	**49,762**

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Clethodim	5	1.0	0.05	0.05	321
Cloransulam	2	1.0	0.02	0.02	47
Flumioxazin	2	1.0	0.07	0.07	188
Fluthiacet-methyl	1	1.0	0.00	0.00	4
Fomesafen	4	1.0	0.11	0.11	433
Glufosinate-ammonium	4	1.7	0.38	0.65	3,244
Glyphosate	93	1.7	0.90	1.54	164,150
Imazethapyr	5	1.0	0.07	0.07	417
Lactofen	2	1.0	0.18	0.18	378
Saflufenacil	3	1.0	0.02	0.02	78
Insecticides					
Bifenthrin	2	1.0	0.05	0.05	131
Chlorpyrifos	6	1.0	0.43	0.43	3,157
Lambda-cyhalothrin	7	1.0	0.02	0.02	187
Fungicides					
Azoxystrobin	1	1.0	0.13	0.13	198
Propiconazole	2	1.0	0.07	0.07	154
Pyraclostrobin	4	1.0	0.09	0.09	451
Trifloxystrobin	2	1.0	0.07	0.07	154

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Dimethenamid-p, Fluazifop, Flumiclorac, Imazamox, Metribuzin, Pendimethalin, Phenmedipham, S-metolachlor, and Thifensulfuron.
Insecticides applied but not published included the following: Beta-cyfluthrin, Cyfluthrin, Esfenvalerate, Gamma-cyhalothrin, Imidacloprid, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Fluoxastrobin, Tebuconazole, and Tetraconazole.

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Clethodim	9	1.0	0.06	0.06	171
Cloransulam	6	1.0	0.02	0.02	41
Fluthiacet-methyl	2	1.0	0.00	0.00	2
Fomesafen	7	1.0	0.16	0.16	323
Glufosinate-ammonium	2	1.7	0.37	0.64	356
Glyphosate	92	1.5	0.95	1.47	42,505
Imazethapyr	9	1.0	0.03	0.03	100
Sulfentrazone	11	1.0	0.14	0.14	520
Insecticides					
Bifenthrin	8	1.0	0.08	0.08	185
Chlorpyrifos	13	1.1	0.37	0.41	1,730
Esfenvalerate	2	1.0	0.03	0.03	19
Lambda-cyhalothrin	21	1.1	0.02	0.02	143
Thiamethoxam	1	1.0	0.03	0.03	14
Fungicide					
Pyraclostrobin	6	1.0	0.09	0.09	174

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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: Chlorimuron, Dimethenamid-p, Fluazifop, Flumiclorac, Lactofen, Metribuzin, S-metolachlor, Saflufenacil, Thifensulfuron, and Trifluralin.
Insecticides applied but not published included the following: Beta-cyfluthrin, Gamma-cyhalothrin, Imidacloprid, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Fluoxastrobin, Propiconazole, Tetraconazole, and Trifloxystrobin.

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Glyphosate	92	1.4	0.93	1.26	8,788
Imazethapyr	12	1.0	0.06	0.06	60
Insecticides					
Lambda-cyhalothrin	10	1.0	0.02	0.02	15

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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: Chlorimuron, Clethodim, Cloransulam, Glufosinate-ammonium, Quizalofop, Saflufenacil, Sulfentrazone, and Thifensulfuron.
Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, and Gamma-cyhalothrin.
Fungicides applied but not published included the following: Fluoxastrobin, Propiconazole, Pyraclostrobin, Tebuconazole, and Trifloxystrobin.

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Clethodim	4	1.0	0.07	0.07	109
Cloransulam	12	1.0	0.02	0.02	119
Fluazifop	4	1.0	0.05	0.05	89
Flumioxazin	7	1.0	0.05	0.05	158
Fomesafen	4	1.0	0.21	0.21	332
Glyphosate	92	1.0	1.00	1.00	39,124
Sulfentrazone	12	1.0	0.18	0.18	922
Insecticides					
Beta-cyfluthrin	2	1.0	0.02	0.02	22
Chlorpyrifos	18	1.0	0.39	0.39	3,035
Gamma-cyhalothrin	5	1.0	0.00	0.00	8
Imidacloprid	2	1.0	0.04	0.04	44
Lambda-cyhalothrin	26	1.0	0.02	0.02	236
Fungicides					
Pyraclostrobin	4	1.0	0.14	0.14	216

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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: Acetochlor, Chlorimuron, Dicamba, Fenoxaprop, Flufenacet, Fluthiacet-methyl, Glufosinate-ammonium, Imazamox, Imazethapyr, Lactofen, Metribuzin, Pendimethalin, Phenmedipham, S-metolachlor, Saflufenacil, Thifensulfuron, and Trifluralin.
Insecticides applied but not published included the following: Bifenthrin, Esfenvalerate, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Tetraconazole, and Trifloxystrobin.

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Clethodim	5	1.0	0.06	0.06	104
Cloransulam	26	1.0	0.02	0.02	163
Fomesafen	7	1.1	0.17	0.17	342
Glyphosate	88	1.4	0.97	1.42	37,651
Imazethapyr	8	1.0	0.06	0.06	143
Pendimethalin	8	1.0	1.30	1.30	3,045
Saflufenacil	8	1.0	0.02	0.02	57
Sulfentrazone	26	1.0	0.16	0.16	1,255
Insecticides					
Bifenthrin	4	1.0	0.06	0.06	79
Chlorpyrifos	26	1.0	0.47	0.47	3,694
Gamma-cyhalothrin	6	1.0	0.00	0.00	9
Lambda-cyhalothrin	21	1.0	0.02	0.02	139
Fungicides					
Pyraclostrobin	10	1.0	0.10	0.10	288

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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: Acetochlor, Bentazon, Dimethenamid-p, Fluazifop, Flumiclorac, Flumioxazin, Fluthiacet-methyl, Glufosinate-ammonium, Lactofen, Metribuzin, Quizalofop, S-metolachlor, and Trifluralin.
Insecticides applied but not published included the following: Beta-cyfluthrin, Esfenvalerate, Imidacloprid, Thiamethoxam, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Azoxystrobin, Chlorothalonil, Propiconazole, Tetraconazole, and Trifloxystrobin.

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 Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Clethodim	3	1.2	0.05	0.07	210
Cloransulam	13	1.0	0.02	0.02	304
Dimethenamid-p	2	1.0	0.36	0.36	765
Fluazifop	2	1.1	0.09	0.10	220
Flumioxazin	2	1.0	0.13	0.13	301
Fluthiacet-methyl	3	1.0	0.00	0.00	15
Fomesafen	8	1.0	0.18	0.18	1,390
Glufosinate-ammonium	1	1.5	0.36	0.54	549
Glyphosate	92	1.6	0.97	1.52	140,498
Imazethapyr	4	1.0	0.05	0.05	228
Lactofen	2	1.0	0.14	0.14	230
Metribuzin	2	1.0	0.29	0.29	439
S-metolachlor	3	1.0	0.91	0.91	2,683
Saflufenacil	3	1.0	0.03	0.03	101
Sulfentrazone	14	1.0	0.18	0.18	2,546
Thifensulfuron	1	1.0	0.01	0.01	4
Trifluralin	1	1.0	0.50	0.50	310
Insecticides					
Beta-cyfluthrin	3	1.0	0.02	0.02	61
Bifenthrin	9	1.0	0.06	0.06	595
Chlorpyrifos	18	1.0	0.46	0.46	8,191
Esfenvalerate	2	1.0	0.04	0.04	85
Gamma-cyhalothrin	4	1.0	0.01	0.01	36
Imidacloprid	3	1.0	0.05	0.05	123
Lambda-cyhalothrin	19	1.0	0.02	0.02	420
Thiamethoxam	1	1.0	0.03	0.03	30
Zeta-cypermethrin	4	1.0	0.02	0.02	63
Fungicides					
Azoxystrobin	4	1.0	0.11	0.11	512
Propiconazole	4	1.0	0.05	0.05	167
Pyraclostrobin	9	1.0	0.12	0.12	1,111
Tetraconazole	1	1.0	0.06	0.06	72
Trifloxystrobin	3	1.0	0.04	0.04	129

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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: Acetochlor, Bentazon, Chlorimuron, Dicamba, Fenoxaprop, Flufenacet, Flumiclorac, Imazamox, Pendimethalin, and Phenmedipham.
Fungicides applied but not published included the following: Chlorothalonil and Fluoxastrobin.

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Clethodim	7	1.0	0.04	0.04	69
Cloransulam	27	1.0	0.03	0.03	224
Fluazifop	3	1.0	0.11	0.11	74
Glyphosate	95	1.3	0.95	1.22	28,026
Imazethapyr	9	1.0	0.07	0.07	147
Saflufenacil	5	1.0	0.03	0.03	35
Sulfentrazone	27	1.0	0.27	0.27	1,756
Insecticides					
Bifenthrin	8	1.0	0.06	0.06	106
Chlorpyrifos	8	1.0	0.31	0.31	561
Esfenvalerate	2	1.0	0.03	0.03	14
Lambda-cyhalothrin	10	1.0	0.02	0.02	47
Thiamethoxam	4	1.0	0.03	0.03	27
Fungicides					
Azoxystrobin	2	1.0	0.15	0.15	63
Propiconazole	4	1.0	0.06	0.06	53
Pyraclostrobin	31	1.0	0.10	0.10	745
Trifloxystrobin	4	1.0	0.06	0.06	53

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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: Acetochlor, Dimethenamid-p, Fenoxaprop, Flufenacet, Flumiclorac, Fluthiacet-methyl, Fomesafen, Lactofen, Metribuzin, S-metolachlor, Thifensulfuron, and Trifluralin.
Insecticides applied but not published included the following: Gamma-cyhalothrin and Zeta-cypermethrin.
Fungicides applied but not published included the following: Chlorothalonil and Tetraconazole.

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Herbicides			(a.i.)	(a.i.)	(a.i.)
Clethodim	7	1.0	0.07	0.07	38
Glyphosate	88	1.3	1.04	1.35	9,252
Imazethapyr	4	1.0	0.07	0.07	20
Insecticides					
Lambda-cyhalothrin	32	1.0	0.02	0.02	52

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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: Chlorimuron, Cloransulam, Dimethenamid-p, Fluazifop, Fomesafen, Glufosinate-ammonium, Lactofen, Phenmedipham, Paflufenacil, Sulfentrazone, Thifensulfuron, and Trifluralin.
Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, Esfenvalerate, Thiamethoxam, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Pyraclostrobin, Tetraconazole, and Trifloxystrobin.

Statewide Pesticide Applications – Wheat

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

To obtain a list of products (brand names) registered in Minnesota and containing the active ingredients listed below, visit http://npirspublic.ceris.purdue.edu/state/state_menu.aspx?state=MN, enter the database, submit “active ingredient” as the search option, enter the name of the active ingredient, click “submit,” check the appropriate boxes, and “submit” to obtain a list of all registered products containing the active ingredient.

Table 25. Publication status for wheat pesticide active ingredients

Active Ingredient	Published	Active Ingredient	Published
Herbicides		**Insecticides**	
2,4-D	P	Chlorpyrifos	P
Bromoxynil	P	Cyfluthrin	*
Carfentrazone	*	Lambda-cyhalothrin	P
Clodinafop-propargyl	*	Zeta-cypermethrin	P
Clopyralid	P	**Fungicides**	
Fenoxaprop	P	Azoxystrobin	*
Florasulam	P	Metconazole	*
Flucarbazone	P	Propiconazole	P
Fluroxypyr	P	Prothioconazole	P
Glyphosate	P	Pyraclostrobin	P
MCPA	P	Tebuconazole	P
Mesosulfuron-methyl	*	Trifloxystrobin	P
Pinoxaden	P		
Propoxycarbazone	*		
Pyrasulfotole	P		
Pyroxsulam	P		
Thifensulfuron	P		
Tribenuron	P		
Triencarbazone-methyl	P		

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

A statewide summary of wheat pesticide applications is provided in Table 26. Seven percent (7%) of all Minnesota wheat acres were surveyed for the 2013 season. Herbicides were applied to 98% of all surveyed wheat acres. Insecticides were applied to 33% of all acres and 65% of surveyed acres received fungicides.

Table 26. Pesticide applications and rates by active ingredient (a.i.) for wheat statewide[6]

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
2,4-D	6	1.0	0.47	0.47	2,248
Bromoxynil	61	1.0	0.19	0.19	9,297
Clopyralid	28	1.0	0.10	0.10	2,184
Fenoxaprop	15	1.0	0.08	0.08	913
Florasulam	2	1.0	0.00	0.00	3
Flucarbazone	3	1.0	0.02	0.02	48
Fluroxypyr	29	1.0	0.10	0.10	2,318
Glyphosate	1	1.0	0.90	0.90	622
MCPA	25	1.0	0.29	0.29	5,770
Pinoxaden	15	1.0	0.04	0.04	494
Pyrasulfotole	41	1.0	0.03	0.03	1,002
Pyroxsulam	2	1.0	0.01	0.01	18
Thifensulfuron	13	1.0	0.12	0.12	1,246
Tribenuron	13	1.0	0.06	0.06	593
Triencarbazone-methyl	12	1.0	0.00	0.00	42
Insecticides					
Chlorpyrifos	9	1.0	0.37	0.37	2,538
Lambda-cyhalothrin	23	1.1	0.02	0.02	410
Zeta-cypermethrin	2	1.0	0.02	0.02	38
Fungicides					
Propiconazole	26	1.1	0.07	0.08	1,534
Prothioconazole	22	1.0	0.08	0.08	1,335
Pyraclostrobin	17	1.0	0.08	0.08	1,053
Tebuconazole	29	1.0	0.08	0.08	1,856
Trifloxystrobin	9	1.0	0.08	0.08	559

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Clodinafop-propargyl, Mesosulfuron-methyl, and Propoxycarbazone.
Insecticides applied but not published included the following: Cyfluthrin.
Fungicides applied but not published included the following: Azoxystrobin and Metconazole.

[6] 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

PMA	Number of Respondents	Wheat Acres	Herbicide Acres	Insecticides Acres	Fungicide Acres
1	163	70,899	70,662	25,288	47,972
4	43	3,891	3,000	883	1,358
5	*	*	*	*	*
6	25	2,516	2,316	*	*
7	11	439	374	*	*
8	22	612	546	*	*
9	*	*	*	*	*
10	5	846	*	*	*
Totals	**275**	**79,506**	**77,910**	**26,465**	**51,556**

* less than five responses

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
2,4-D	5	1.0	0.48	0.48	1,782
Bromoxynil	60	1.0	0.19	0.19	8,338
Clopyralid	31	1.0	0.10	0.10	2,155
Fenoxaprop	15	1.0	0.08	0.08	832
Flucarbazone	4	1.0	0.02	0.02	48
Fluroxypyr	32	1.0	0.10	0.10	2,274
MCPA	26	1.0	0.29	0.29	5,367
Pinoxaden	15	1.0	0.04	0.04	435
Pyrasulfotole	41	1.0	0.03	0.03	916
Thifensulfuron	14	1.0	0.13	0.13	1,241
Tribenuron	14	1.0	0.06	0.06	592
Triencarbazone-methyl	12	1.0	0.00	0.00	37
Insecticides					
Chlorpyrifos	10	1.0	0.37	0.37	2,514
Lambda-cyhalothrin	24	1.1	0.02	0.02	389
Fungicides					
Propiconazole	27	1.1	0.07	0.08	1,494
Prothioconazole	23	1.0	0.08	0.08	1,212
Pyraclostrobin	17	1.1	0.08	0.08	942
Tebuconazole	30	1.0	0.08	0.08	1,733
Trifloxystrobin	9	1.0	0.08	0.08	499

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Clodinafop-propargyl, Flufenacet, Metribuzin, and Pyroxsulam.
Insecticides applied but not published included the following: Beta-cyfluthrin and Zeta-cypermethrin.

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

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

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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: Florasulam, Flucarbazone, Pinoxaden, Pyroxsulam,Thifensulfuron, and Tribenuron.
Insecticides applied but not published included the following: Chlorpyrifos and Gamma-cyhalothrin.
Fungicides applied but not published included the following: Azoxystrobin, Fluoxastrobin, Metconazole, Propiconazole, Prothioconazole, Tebuconazole, and Trifloxystrobin.

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

No data was publishable for wheat in PMA 5.

Herbicides applied but not published included the following: Bromoxynil, Fenoxaprop, and Pyrasulfotole.

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Bromoxynil	61	1.0	0.19	0.19	293
MCPA	11	1.0	0.27	0.27	75
Pyrasulfotole	39	1.0	0.03	0.03	28
Fungicides					
Propiconazole	26	1.0	0.05	0.05	30
Pyraclostrobin	42	1.0	0.07	0.07	69
Trifloxystrobin	22	1.0	0.07	0.07	40

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Clopyralid, Fenoxaprop, Florasulam, Fluroxypyr, Glyphosate, Pinoxaden, Pyroxsulam, and Triencarbazone-methyl.
Insecticides applied but not published included the following: Lambda-cyhalothrin.
Fungicides applied but not published included the following: Metconazole, Prothioconazole, and Tebuconazole.

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

Agricultural Chemical	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
2,4-D	49	1.0	0.48	0.48	103

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Fenoxaprop, Florasulam, Fluroxypyr, MCPA, Pinoxaden, Pyrasulfotole, and Pyroxsulam.
Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Prothioconazole, Pyraclostrobin, Tebuconazole, and Trifloxystrobin.

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
2,4-D	51	1.0	0.48	0.48	367
Bromoxynil	21	1.0	0.20	0.20	125
Fungicides					
Pyraclostrobin	22	1.0	0.10	0.10	14

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, MCPA, Pyrasulfotole, Thifensulfuron, Tribenuron, and Triencarbazone-methyl.
Insecticides applied but not published included the following: Chlorpyrifos and Lambda-cyhalothrin.
Fungicides applied but not published included the following: Propiconazole, Prothioconazole, Tebuconazole, and Trifloxystrobin.

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

No data was publishable for wheat in Area 9.

Herbicides applied but not published included the following: Bromoxynil, Pyrasulfotole, and Triencarbazone-methyl.

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

No data was publishable for wheat in Area 10.

Herbicides applied but not published included the following: Bromoxynil, Glyphosate, Pinoxaden, and Pyrasulfotole.

Statewide Pesticide Applications – Hay

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

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

Table 36. Publication status for hay pesticide active ingredients

Active Ingredient	Published
Herbicides	
2,4-D	P
Aminopyralid	*
Clethodim	*
Clopyralid	*
Fluazifop	*
Glyphosate	P
Imazamox	P
Imazethapyr	*
MCPA	*
Pendimethalin	*
picloram	*
Insecticides	
Beta-cyfluthrin	*
Chlorpyrifos	P
Cyfluthrin	*
Dimethoate	*
Gamma-cyhalothrin	P
Lambda-cyhalothrin	P
Fungicides	
Pyraclostrobin	P

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

A statewide summary of hay pesticide applications is provided in Table 37. Four percent (4%) of all Minnesota hay acres were surveyed for the 2013 season. Herbicides were applied to 3% of all surveyed hay acres. Insecticides were applied to 11% of all acres and <1% surveyed acres were recorded as being applied with fungicides.

Table 37. Pesticide applications and rates by active ingredient (a.i.) for hay statewide[7].

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
2,4-D	<1	1.1	0.54	0.57	170
Glyphosate	1	1.3	0.84	1.06	827
Imazamox	<1	1.0	0.04	0.04	6
Insecticides					
Chlorpyrifos	3	1.0	0.33	0.33	847
Gamma-cyhalothrin	1	1.0	0.00	0.00	2
Lambda-cyhalothrin	7	1.1	0.02	0.02	106
Fungicides					
Pyraclostrobin	<1	1.0	0.07	0.07	54

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this area. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or sub-area levels.

Herbicides applied but not published included the following: Aminopyralid, Clethodim, Clopyralid, Fluazifop, Imazethapyr, MCPA, Pendimethalin, and Picloram.
Insecticides applied but not published included the following: Beta-cyfluthrin, Cyfluthrin, and Dimethoate.

[7] Excludes any products with less than 5 responses.

Area Pesticide Applications – Hay

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

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

PMA	Number of Respondents	Hay Acres	Herbicide Acres	Insecticide Acres	Fungicide Acres
1	122	15,278	*	1,650	*
4	350	24,702	*	1,221	*
5	155	10,883	*	*	*
6	51	2,046	*	*	*
7	54	2,216	*	712	*
8	181	5,605	*	1,142	*
9	146	9,192	*	2,952	*
10	102	4,866	*	*	*
Totals	**1,161**	**74,788**	**1,895**	**8,132**	**691**

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

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Insecticide					
Lambda-cyhalothrin	8	1.1	0.02	0.02	25

Herbicides applied but not published included the following: Glyphosate, MCPA, and Pendimethalin.
Insecticides applied but not published included the following: Chlorpyrifos.
Fungicides applied but not published included the following: Pyraclostrobin.

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicide					
Glyphosate	1	1.0	0.95	0.95	251
Insecticide					
Chlorpyrifos	2	1.0	0.27	0.27	168
Lambda-cyhalothrin	3	1.0	0.02	0.02	11

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Imazamox, Imazethapyr, Pendimethalin, and Picloram.
Insecticides applied but not published included the following: Gamma-cyhalothrin.
Fungicides applied but not published included the following: Pyraclostrobin.

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, Imazamox, and Pendimethalin.

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

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

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Insecticides			(a.i.)	(a.i.)	(a.i.)
Lambda-cyhalothrin	11	1.0	0.02	0.02	9

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, and Clethodim.
Insecticides applied but not published included the following: Chlorpyrifos and Gamma-cyhalothrin.
Fungicides applied but not published included the following: Pyraclostrobin.

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Insecticides					
Chlorpyrifos	2	1.0	0.33	0.33	57
Lambda-cyhalothrin	10	1.0	0.03	0.03	25

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Clopyralid, and Imazamox.
Insecticides applied but not published included the following: Gamma-cyhalothrin.
Fungicides applied but not published included the following: Pyraclostrobin.

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

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Insecticides					
Chlorpyrifos	8	1.0	0.37	0.37	477
Lambda-cyhalothrin	10	1.1	0.02	0.02	29

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Fluazifop, Glyphosate, Imazamox, and Pendimethalin.
Insecticides applied but not published included the following: Beta-cyfluthrin, Chlorpyrifos, Cyfluthrin, Dimethoate, and Gamma-cyhalothrin.
Fungicides applied but not published included the following: Pyraclostrobin.

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

No data is publishable for hay in Area 10.

Herbicides applied but not published included the following: Imazethapyr.
Insecticides applied but not published included the following: Lambda-cyhalothrin.
Fungicides applied but not published included the following: Pyraclostrobin.

County Pesticide Applications

Tables 47 through 122 detail the percent of total surveyed acres receiving herbicides, insecticides and fungicides and the corresponding rates[8].

PMA 1 County Data

Clay County

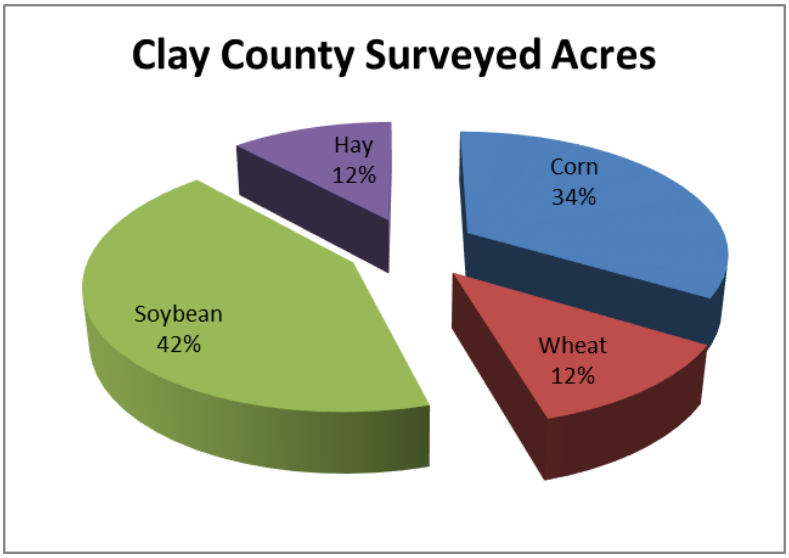

Table 47. Clay County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	16	1.0	1.05	1.05	3,276
Bromoxynil	8	1.0	0.17	0.17	254
Clopyralid	14	1.0	0.09	0.09	230
Glyphosate	67	1.4	0.81	1.12	14,424
Pyrasulfotole	8	1.0	0.03	0.03	41
Triencarbazone-methyl	6	1.0	0.00	0.00	6

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Clethodim, Dimethenamid-p, Fenoxaprop, Florasulam, Fluazifop, Flumetsulam, Flumiclorac, Fluroxypyr, Fomesafen, Glufosinate-ammonium, Imazethapyr, MCPA, Mesotrione, Pyroxsulam, S-metolachlor, Saflufenacil, Tembotrione, and Topramezone.

[8] Excludes any products with less than 5 responses.

Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, Lambda-cyhalothrin, and zeta-cypermethrin.
Fungicides applied but not published included the following: Prothioconazole, Pyraclostrobin, Tebuconazole, and Tetraconazole.

Grant County

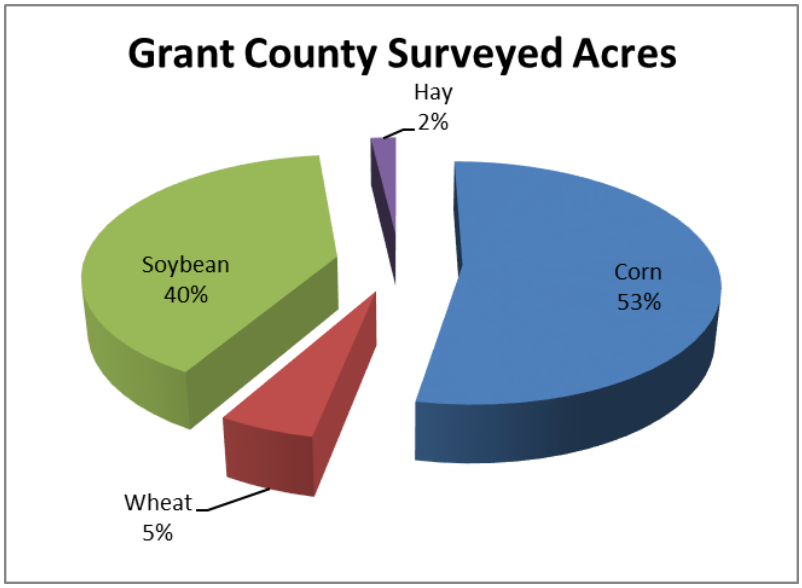

Table 48. Grant County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	7	1.1	0.87	0.97	1,507
Bromoxynil	4	1.0	0.22	0.22	229
Clethodim	5	1.0	0.05	0.05	53
Clopyralid	7	1.1	0.07	0.08	129
Dicamba	15	1.0	0.10	0.10	353
Diflufenzopyr	14	1.0	0.03	0.03	111
Flumetsulam	7	1.1	0.03	0.03	48
Glyphosate	91	1.5	0.95	1.43	30,899
MCPA	3	1.0	0.24	0.24	174
Mesotrione	7	1.0	0.07	0.07	124
Insecticides					
Lambda-cyhalothrin	13	1.1	0.02	0.02	67
Fungicides					
Pyraclostrobin	7	1.0	0.08	0.08	126

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Cloransulam, Dimethenamid-p, Fenoxaprop, Fluazifop, Fluroxypyr, Fluthiacet-methyl, Fomesafen, Imazamox, Imazethapyr, Lactofen, Pendimethalin, Pinoxaden, Pyrasulfotole, S-metolachlor, and Sulfentrazone.

Insecticides applied but not published included the following: Beta-cyfluthrin, Bifenthrin, Chlorpyrifos, and Imidacloprid.
Fungicides applied but not published included the following: Metconazole, Propiconazole, Prothioconazole, Tebuconazole, and Trifloxystrobin.

Kittson County

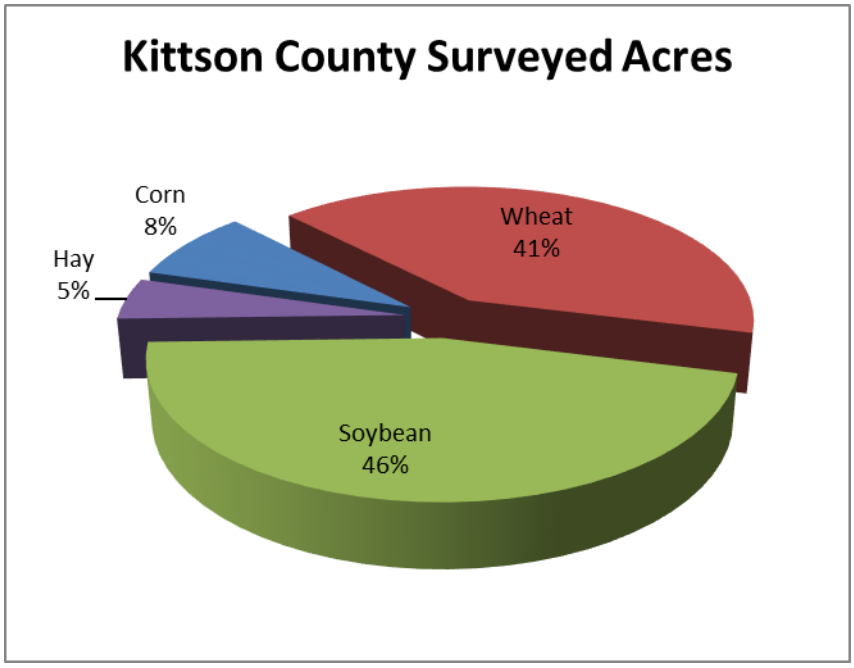

Table 49. Kittson County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Bromoxynil	23	1.0	0.20	0.20	2,044
Clopyralid	18	1.0	0.09	0.09	694
Fluroxypyr	18	1.0	0.09	0.09	720
Glyphosate	88	1.7	0.87	1.50	33,401
MCPA	16	1.0	0.25	0.25	1,706
Pinoxaden	11	1.0	0.05	0.05	232
Pyrasulfotole	9	1.0	0.03	0.03	122
Insecticides					
Chlorpyrifos	12	1.0	0.42	0.42	2,155
Lambda-cyhalothrin	19	1.3	0.02	0.03	181
Fungicides					
Propiconazole	21	1.1	0.06	0.07	585
Pyraclostrobin	8	1.0	0.40	0.40	1,437
Tebuconazole	18	1.0	0.09	0.09	659
Trifloxystrobin	9	1.0	0.08	0.08	289

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Fenoxaprop, Florasulam, Glufosinate-ammonium, Imazethapyr, Lactofen, Propoxycarbazone, Pyroxsulam, Saflufenacil, Tembotrione, Thifensulfuron, Tribenuron, and Triencarbazone-methyl.
Insecticides applied but not published included the following: Bifenthrin and Zeta-cypermethrin.
Fungicides applied but not published included the following: Azoxystrobin, Fluxapyroxad, Metconazole, Prothioconazole, and Tetraconazole.

Mahnomen County

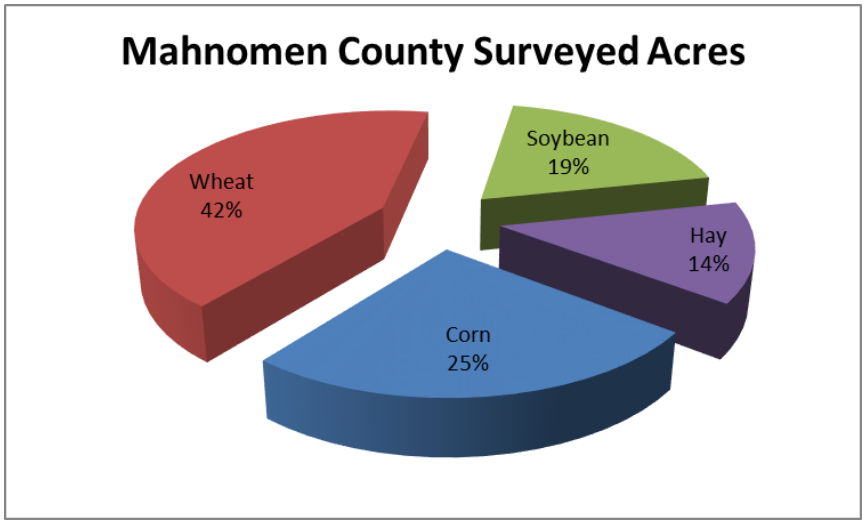

Table 50. Mahnomen County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Bromoxynil	18	1.0	0.14	0.14	369
Glyphosate	62	1.4	0.94	1.29	8,772
Pyrasulfotole	18	1.0	0.03	0.03	70

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Clopyralid, Dimethenamid-p, Fenoxaprop, Flumetsulam, Fluroxypyr, Glufosinate-ammonium, Lactofen, MCPA, Mesotrione, S-metolachlor, Saflufenacil, Tembotrione, and Triencarbazone-methyl.
Insecticides applied but not published included the following: Chlorpyrifos, Cyfluthrin, Gamma-cyhalothrin, and Lambda-cyhalothrin.
Fungicides applied but not published included the following: Metconazole, Propiconazole, Prothioconazole, Pyraclostrobin, Tebuconazole, and Trifloxystrobin.

Marshall County

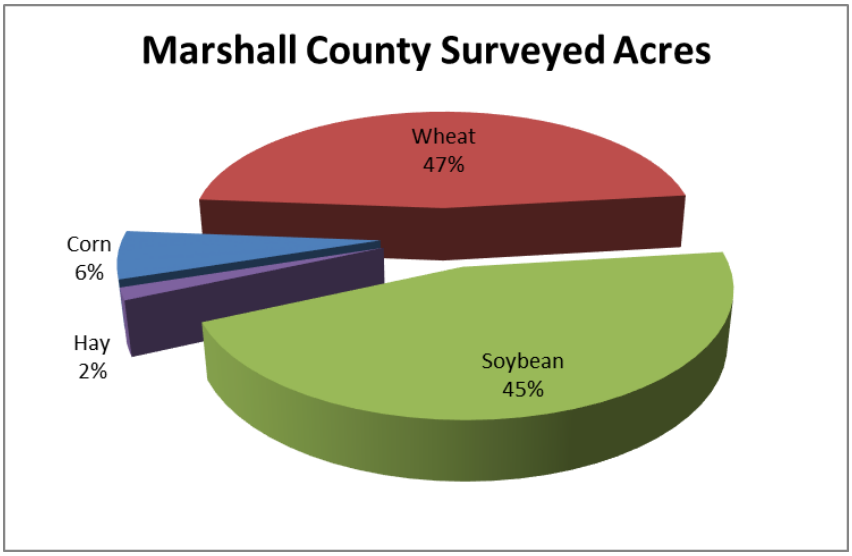

Table 51. Marshall County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Bromoxynil	39	1.0	0.19	0.19	1,526
Clopyralid	18	1.0	0.12	0.12	457
Fluroxypyr	18	1.0	0.12	0.12	457
Glyphosate	57	1.7	0.80	1.34	15,952
Pyrasulfotole	28	1.0	0.03	0.03	159
Insecticides					
Lambda-cyhalothrin	23	1.0	0.02	0.02	103
Fungicides					
Propiconazole	19	1.0	0.08	0.08	319

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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: Dimethenamid-p, Flucarbazone, Flumiclorac, Fomesafen, Imazethapyr, MCPA, Mesosulfuron-methyl, Mesotrione, Pendimethalin, Pinoxaden, Propoxycarbazone, S-metolachlor, Thifensulfuron, Tribenuron, and Triencarbazone-methyl.
Insecticides applied but not published included the following: Chlorpyrifos.
Fungicides applied but not published included the following: Metconazole, Pyraclostrobin, and Trifloxystrobin.

Norman County

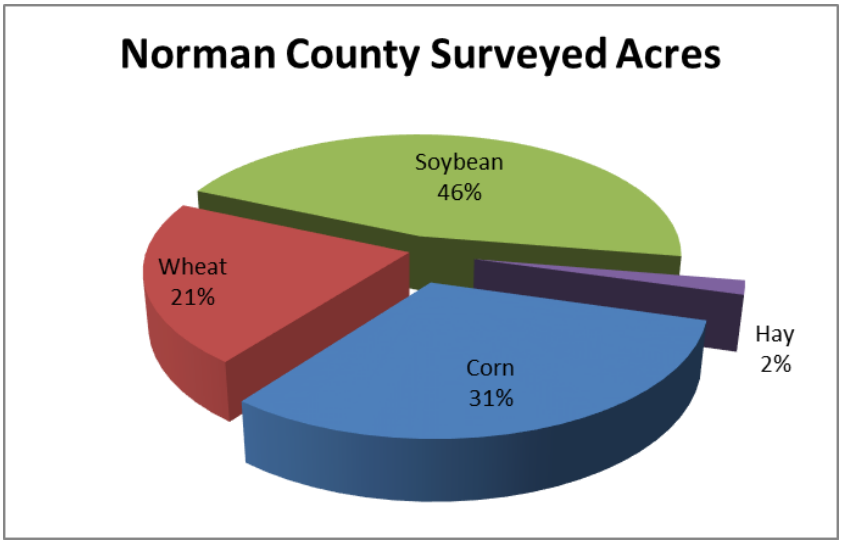

Table 52. Norman County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Bromoxynil	8	1.0	0.19	0.19	532
Clopyralid	9	1.0	0.11	0.11	343
Fluroxypyr	8	1.0	0.11	0.11	311
Glyphosate	76	1.6	0.94	1.54	40,720
Pyrasulfotole	7	1.0	0.03	0.03	69
Insecticide					
Lambda-cyhalothrin	6	1.0	0.02	0.02	43
Fungicide					
Propiconazole	10	1.0	0.09	0.09	299
Pyraclostrobin	7	1.4	0.08	0.11	269

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Clethodim, Cloransulam, Dicamba, Diflufenzopyr, Dimethenamid-p, Fenoxaprop, Florasulam, Fluazifop, Flumetsulam Fomesafen, Glufosinate-ammonium, Imazethapyr, Lactofen, MCPA, Mesotrione, Metribuzin, Pinoxaden, Pyroxsulam, S-metolachlor, Saflufenacil, Sulfentrazone, Tembotrione, Thifensulfuron, Topramezone, Tribenuron, and Triencarbazone-methyl.
Insecticides applied but not published included the following: Ceta-cyfluthrin, Chlorpyrifos, and Imidacloprid.
Fungicides applied but not published included the following: Metconazole, Prothioconazole, Tebuconazole, and Trifloxystrobin.

Pennington County

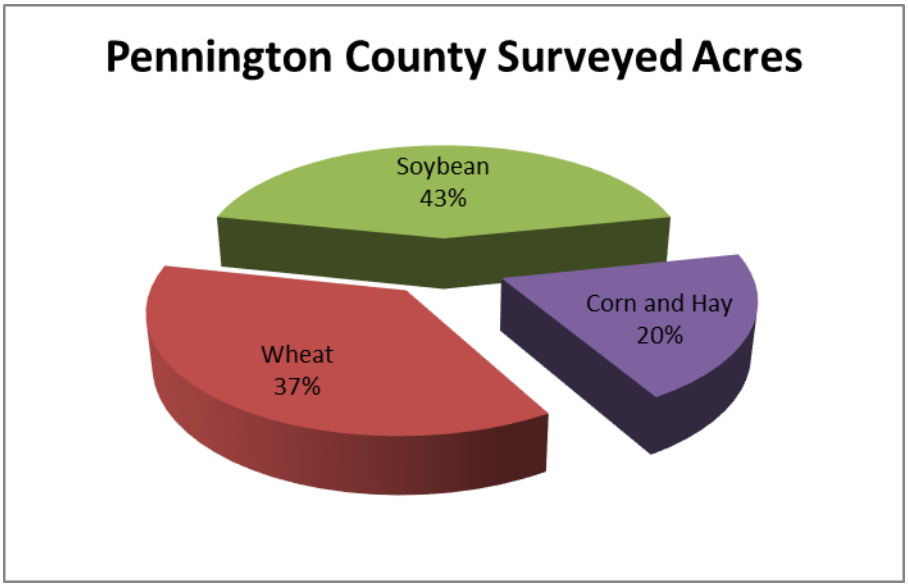

Table 53. Pennington County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Herbicides			(a.i.)	(a.i.)	(a.i.)
Bromoxynil	25	1.0	0.18	0.18	525
Glyphosate	49	1.8	0.97	1.71	9,902
Pyrasulfotole	21	1.0	0.03	0.03	70

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Acetochlor, Atrazine, Clopyralid, Dicamba, Diflufenzopyr, Flumetsulam, Flumioxazin, Fluroxypyr , Glufosinate-ammonium , Imazamox, MCPA , Pinoxaden, S-metolachlor, Tembotrione, Thifensulfuron, Tribenuron, and Triencarbazone-methyl.
Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, Esfenvalerate, Lambda-cyhalothrin, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Fluoxastrobin**,** Propiconazole**,** Prothioconazole**,** Pyraclostrobin**,** and Tebuconazole.

Polk County

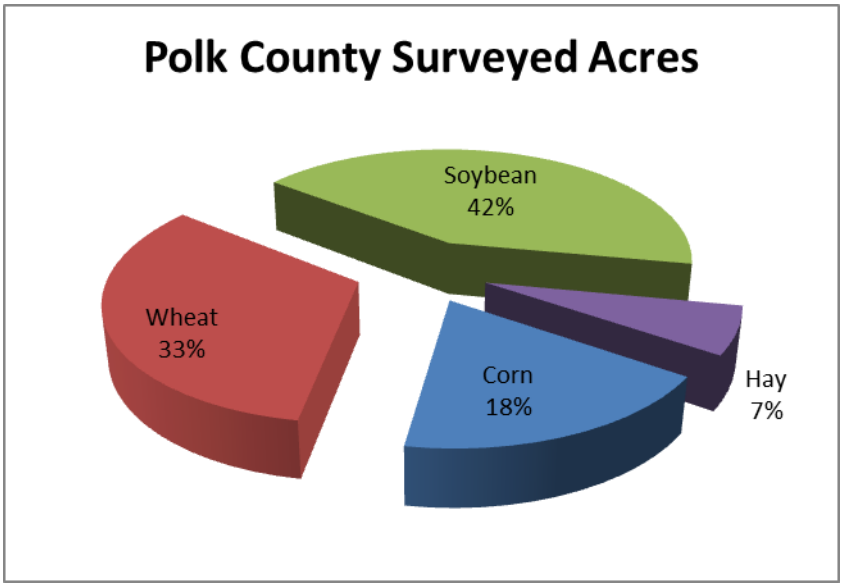

Table 54. Polk County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Herbicides			(a.i.)	(a.i.)	(a.i.)
Bromoxynil	15	1.0	0.20	0.20	630
Glyphosate	50	1.6	1.02	1.67	17,908
MCPA	10	1.0	0.34	0.34	724
Insecticides					
Chlorpyrifos	20	1.0	0.33	0.33	1,418
Fungicides					
Propiconazole	7	1.0	0.05	0.05	81

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Diflufenzopyr, Fenoxaprop, Fluroxypyr, Fluthiacet-methyl, Imazamox, Nicosulfuron, Pinoxaden, Pyrasulfotole, Tembotrione, and Triencarbazone-methyl.
Insecticides applied but not published included the following: Bifenthrin, Chlorethoxyfos, Gamma-cyhalothrin, and Lambda-cyhalothrin.
Fungicides applied but not published included the following: Prothioconazole, Tebuconazole, and Trifloxystrobin.

Red Lake County

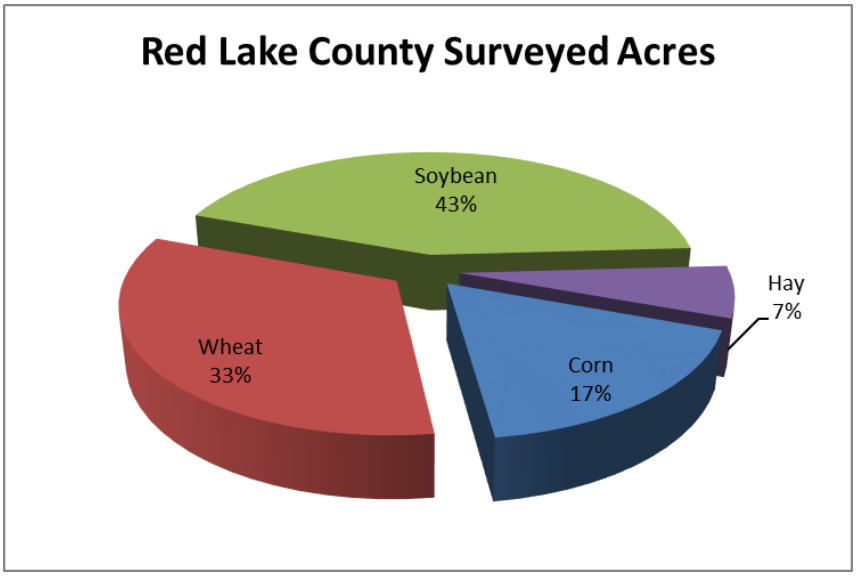

Table 55. Red Lake County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Bromoxynil	28	1.0	0.20	0.20	1,012
Glyphosate	46	1.4	0.85	1.23	10,054
MCPA	7	1.0	0.29	0.29	362
Pyrasulfotole	19	1.1	0.04	0.04	130
Insecticides					
Lambda-cyhalothrin	7	1.0	0.01	0.01	17
Fungicides					
Propiconazole	8	1.0	0.04	0.04	65
Pyraclostrobin	6	1.2	0.08	0.09	92
Tebuconazole	9	1.0	0.08	0.08	128

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Carfentrazone, Clethodim, Clopyralid, Cloransulam, Dicamba, Fenoxaprop, Flucarbazone, Flumetsulam, Flumioxazin, Fluroxypyr, Imazamox, Imazethapyr, Pendimethalin, Phenmedipham, Pinoxaden, S-metolachlor, Saflufenacil, Sulfentrazone, Tembotrione, Thifensulfuron, and Tribenuron.
Insecticides applied but not published included the following: Chlorpyrifos and Zeta-cypermethrin.
Fungicides applied but not published included the following: Metconazole, Prothioconazole, and Trifloxystrobin.

Roseau County

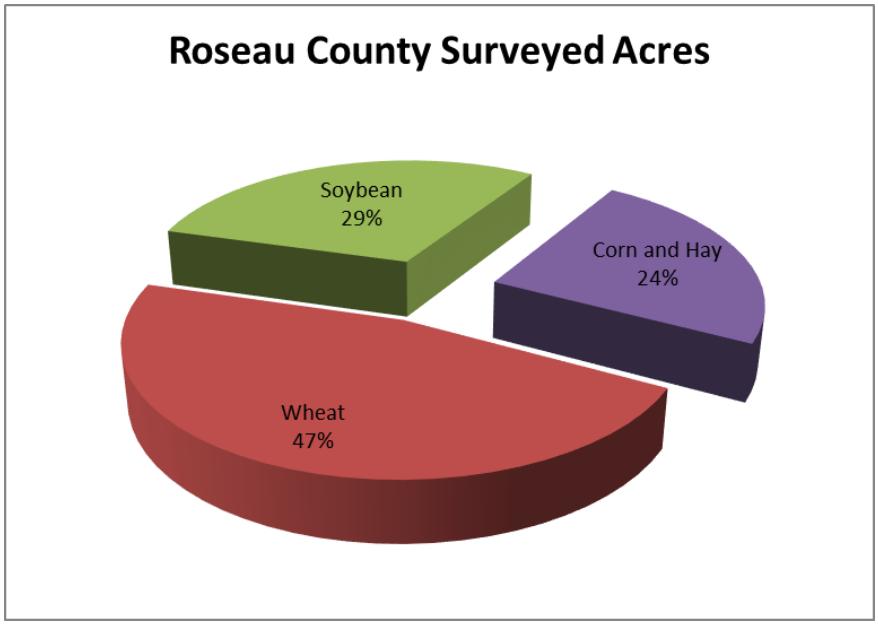

Table 56. Roseau County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Herbicides			(a.i.)	(a.i.)	(a.i.)
Glyphosate	32	1.8	0.88	1.55	5,813
Fungicides					
Pyraclostrobin	14	1.0	0.08	0.08	125

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Clodinafop-propargyl, Clopyralid, Dicamba, Diflufenzopyr, Dimethenamid-p, Fenoxaprop, Flucarbazone, Fluroxypyr, Fluthiacet-methyl, Glufosinate-ammonium, MCPA, Pinoxaden, Pyrasulfotole, Thifensulfuron, Tribenuron, and Triencarbazone-methyl.
Insecticides applied but not published included the following: Esfenvalerate and Lambda-cyhalothrin.
Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Prothioconazole, Tebuconazole, and Trifloxystrobin.

Traverse County

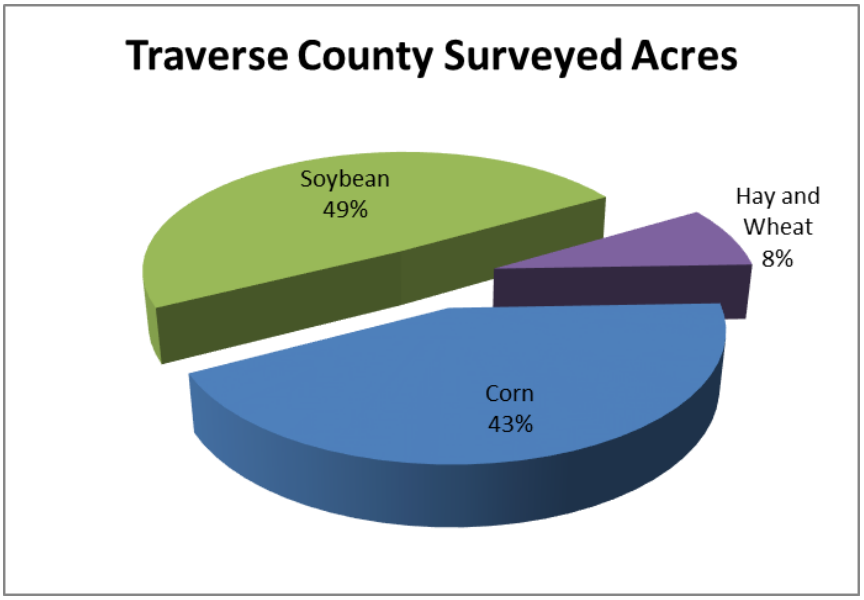

Table 57. Traverse County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Bromoxynil	7	1.0	0.17	0.17	324
Clopyralid	7	1.0	0.07	0.07	134
Glyphosate	77	1.5	0.89	1.31	28,221
Mesotrione	14	1.0	0.07	0.07	278

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Clethodim, Cloransulam, Dicamba, Diflufenzopyr, Dimethenamid-p, Fenoxaprop, Flumetsulam, Flumioxazin, Fluroxypyr, Fomesafen, Glufosinate-ammonium, MCPA, Pyrasulfotole, S-metolachlor, Saflufenacil, Tembotrione, Thifensulfuron, Topramezone, and Triencarbazone-methyl.
Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, Esfenvalerate, and Lambda-cyhalothrin.
Fungicides applied but not published included the following: Azoxystrobin, Metconazole, Propiconazole, Pyraclostrobin, and Trifloxystrobin.

Wilkin County

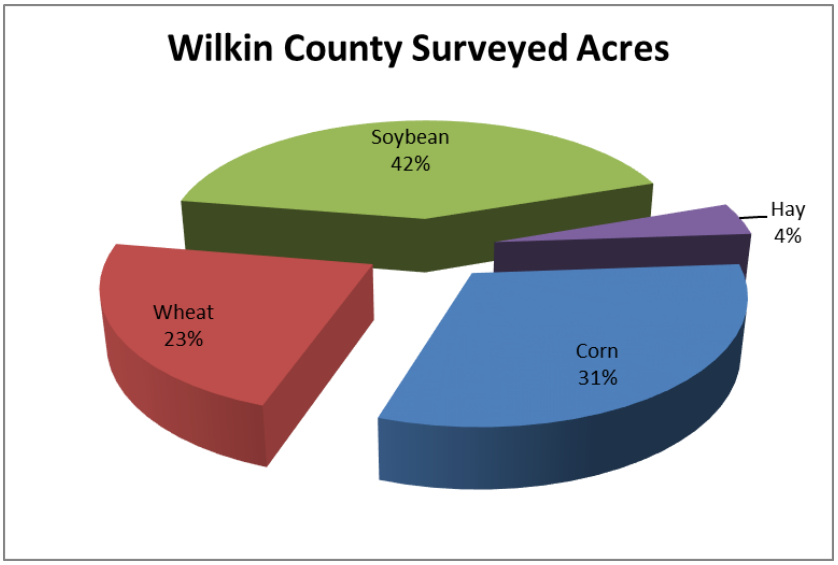

Table 58. Wilkin County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Bromoxynil	17	1.0	0.20	0.20	670
Dimethenamid-p	13	1.0	0.56	0.56	1,445
Glufosinate-ammonium	11	1.5	0.41	0.61	1,261
Glyphosate	55	1.7	0.88	1.45	15,440
Pyrasulfotole	16	1.1	0.03	0.03	103
Triencarbazone-methyl	8	1.0	0.00	0.00	7

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Acetochlor, Clethodim, Clopyralid, Dicamba, Diflufenzopyr, Fenoxaprop, Flumetsulam, Flumioxazin, Fluroxypyr, Fomesafen, MCPA, Mesotrione, S-metolachlor, Saflufenacil, and Tembotrione.
Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, Lambda-cyhalothrin, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Metconazole, Propiconazole, Prothioconazole, Pyraclostrobin, Tetraconazole, and Trifloxystrobin.

PMA 4 County Data

Becker County

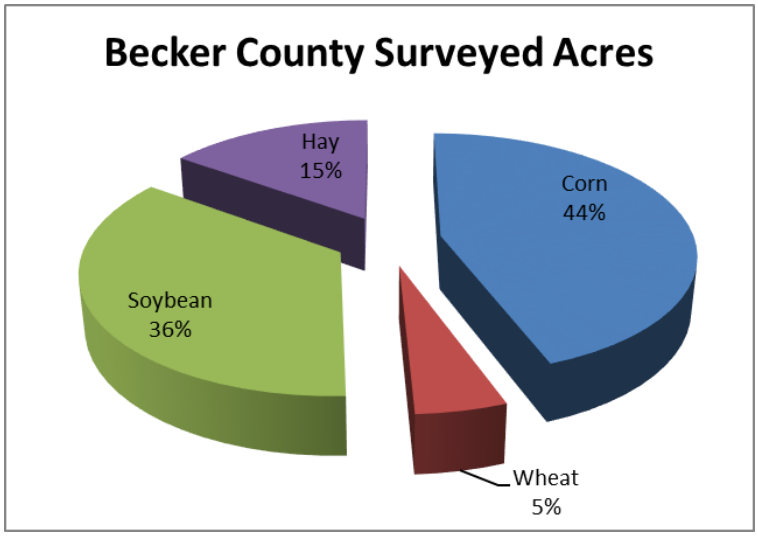

Table 59. Becker County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	7	1.0	1.31	1.31	1,670
Clopyralid	7	1.0	0.10	0.10	124
Flumetsulam	7	1.0	0.04	0.04	51
Glyphosate	72	1.3	0.98	1.25	16,799
Insecticides					
Chlorpyrifos	8	1.3	0.19	0.25	379
Lambda-cyhalothrin	6	1.4	0.01	0.02	24

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Aminopyralid, Atrazine, Bromoxynil, Fluazifop, Fluthiacet-methyl, Fomesafen, Glufosinate-ammonium, Imazethapyr, MCPA, Mesotrione, Pendimethalin, Pyrasulfotole, S-metolachlor, Sulfentrazone, Thifensulfuron, and Tribenuron.
Insecticides applied but not published included the following: Beta-cyfluthrin, Bifenthrin, Gamma-cyhalothrin, Imidacloprid, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Prothioconazole, Pyraclostrobin, Tebuconazole, and Tetraconazole.

Benton County

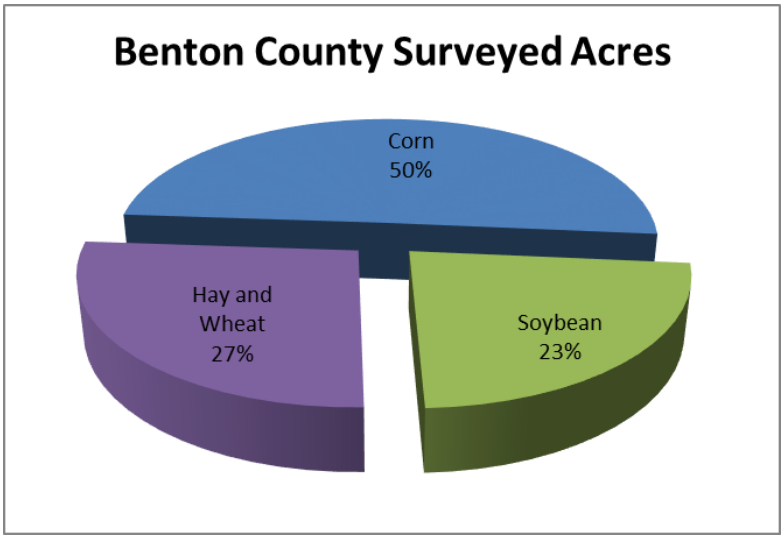

Table 60. Benton County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Herbicides			(a.i.)	(a.i.)	(a.i.)
Acetochlor	21	1.0	0.78	0.78	890
Clopyralid	19	1.0	0.08	0.08	67
Flumetsulam	19	1.0	0.03	0.03	26
Glyphosate	59	1.2	1.05	1.27	3,543

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Clethodim, Cloransulam, Dicamba, Diflufenzopyr, Imazethapyr, Mesotrione, Nicosulfuron, S-metolachlor, Tembotrione, Thifensulfuron, and Triencarbazone-methyl.
Insecticides applied but not published included the following: Lambda-cyhalothrin.

Cass County

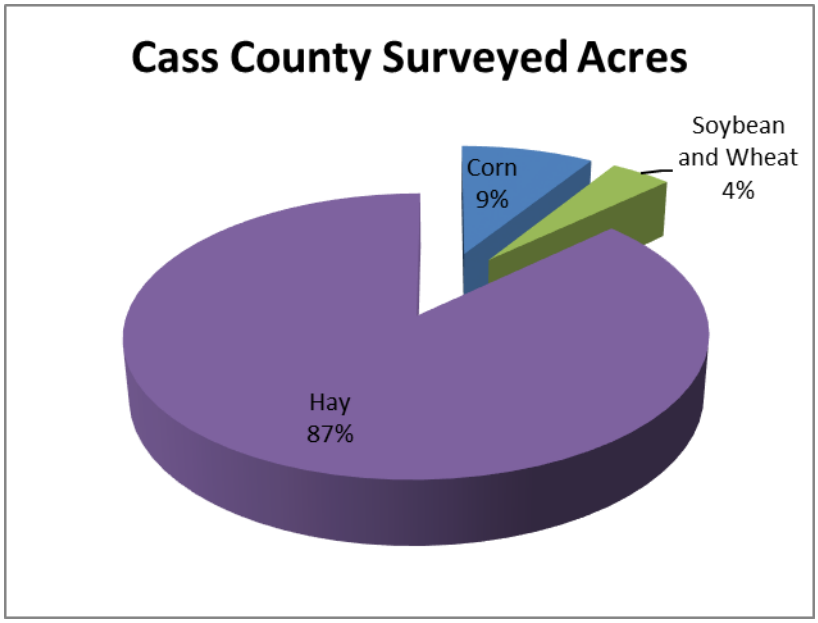

Table 61. Cass County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Herbicides			(a.i.)	(a.i.)	(a.i.)
Glyphosate	4	1.1	0.91	0.96	187

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Dimethenamid-p, Flumetsulam, Pinoxaden, Primisulfuron, and S-metolachlor.

Crow Wing County

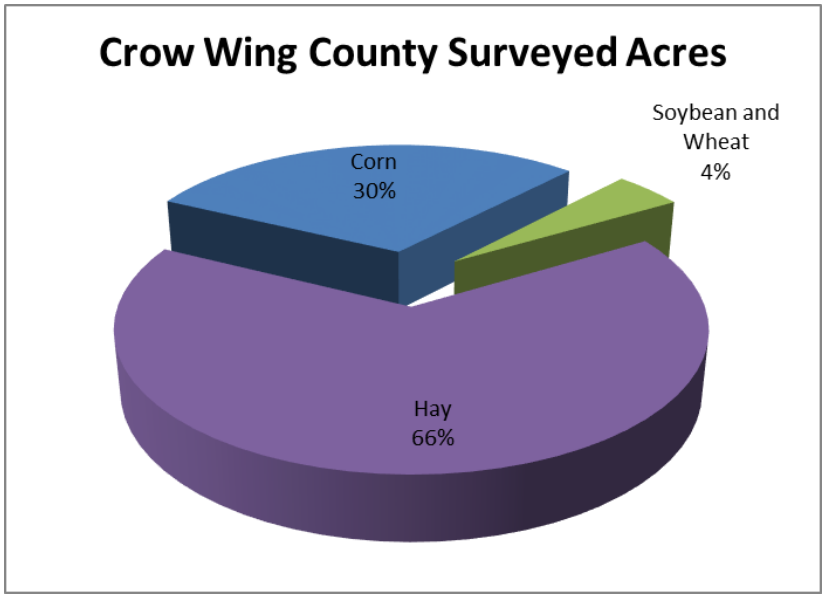

Table 62. Crow Wing County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Glyphosate	32	1.8	0.92	1.63	1,515

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Acetochlor, Atrazine, Clopyralid, Flumetsulam, Fluthiacet-methyl, Mesotrione, and S-metolachlor.

Douglas County

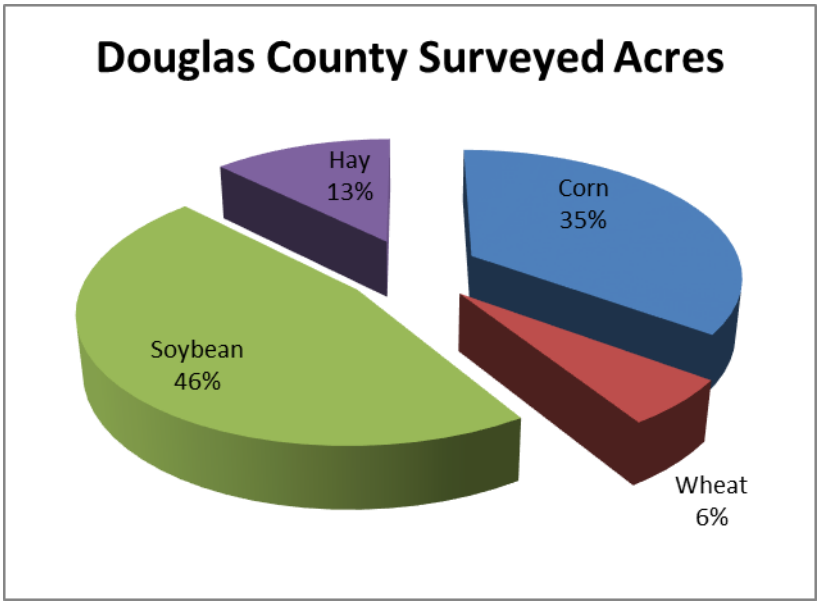

Table 63. Douglas County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Glyphosate	69	1.4	1.00	1.35	5,252
MCPA	4	1.0	0.19	0.19	41
Insecticides					
Chlorpyrifos	6	1.0	0.26	0.26	93
Lambda-cyhalothrin	19	1.0	0.02	0.02	22

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Chlorimuron, Clethodim, Clopyralid, Dicamba, Diflufenzopyr, Dimethenamid-p, Fenoxaprop, Fluazifop, Flumetsulam, Fluthiacet-methyl, Glufosinate-ammonium, Imazethapyr, Lactofen, Mesotrione, Pyrasulfotole, S-metolachlor, Saflufenacil, Tembotrione, Triencarbazone-methyl, and Trifluralin.
Insecticides applied but not published included the following: Bifenthrin, Esfenvalerate, and Gamma-cyhalothrin.
Fungicides applied but not published included the following: Thiamethoxam, Pyraclostrobin, and Tebuconazole.

Hubbard County

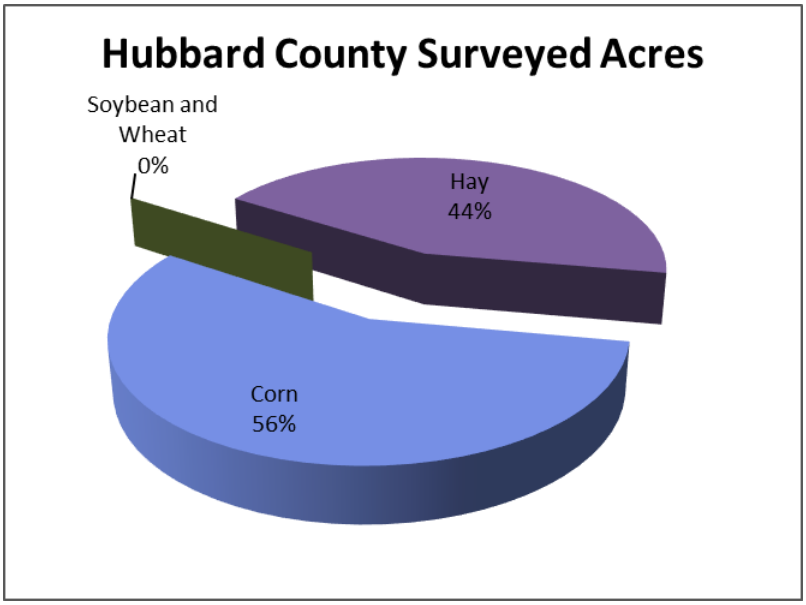

Table 64. Hubbard County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Glyphosate	42	1.0	1.08	1.12	3,179

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Dicamba, Diflufenzopyr, and Dimethenamid-p.
Insecticides applied but not published included the following: Chlorpyrifos.
Fungicides applied but not published included the following: Prothioconazole and Tebuconazole.

Kandiyohi County

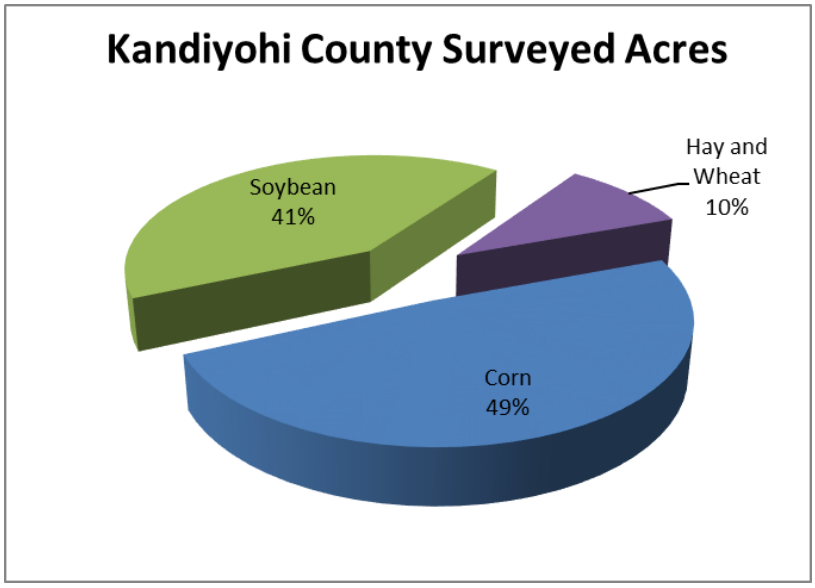

Table 65. Kandiyohi County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	25	1.0	1.60	1.60	3,556
Dicamba	5	1.0	0.11	0.11	50
Diflufenzopyr	5	1.0	0.04	0.04	20
Glyphosate	68	1.4	0.98	1.39	8,331
Insecticides					
Chlorpyrifos	8	1.0	0.52	0.52	350

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Clopyralid, Cloransulam, Flumetsulam, Fomesafen, Nicosulfuron, S-metolachlor, Sulfentrazone, and Tembotrione.
Insecticides applied but not published included the following: Bifenthrin, Esfenvalerate, Lambda-cyhalothrin, Thiamethoxam, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Propiconazole and Trifloxystrobin.

Morrison County

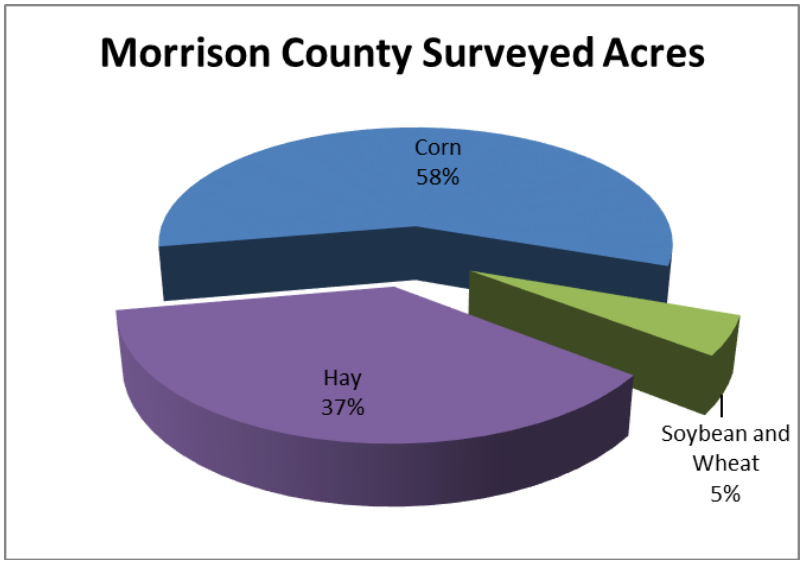

Table 66. Morrison County pesticide applications and rates

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

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Atrazine, Clethodim, Cloransulam, Dimethenamid-p, Pinoxaden, and Topramezone.
Insecticides applied but not published included the following: Lambda-cyhalothrin and Tefluthrin.

Otter Tail County

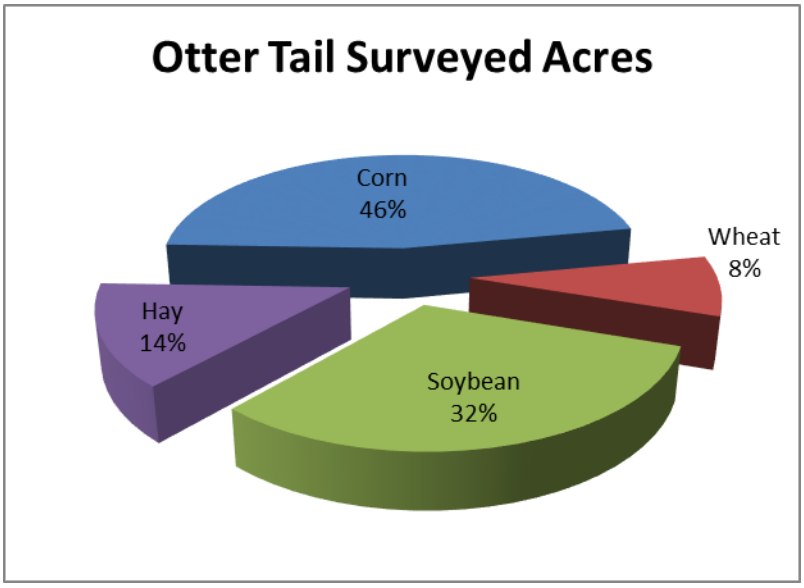

Table 67. Otter Tail County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Bromoxynil	9	1.0	0.19	0.19	207
Glyphosate	66	1.5	0.98	1.51	11,941

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Acetochlor, Atrazine, Clopyralid, Dicamba, Diflufenzopyr, Dimethenamid-p, Florasulam, Fluazifop, Flumetsulam, Fluroxypyr, Imazethapyr, MCPA, Mesotrione, Pyrasulfotole, Pyroxsulam, S-metolachlor, and Triencarbazone-methyl.
Insecticides applied but not published included the following: Beta-cyfluthrin, Bifenthrin, Chlorpyrifos, Gamma-cyhalothrin, Imidacloprid, Lambda-cyhalothrin, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Prothioconazole and Tebuconazole.

Pope County

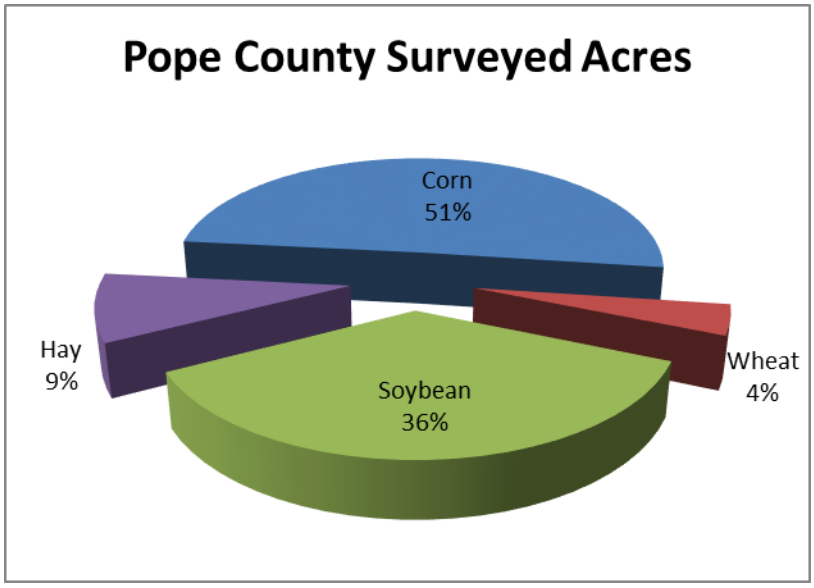

Table 68. Pope County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	9	1.0	1.22	1.22	2,067
Clopyralid	6	1.0	0.07	0.07	87
Flumetsulam	6	1.0	0.03	0.03	33
Glyphosate	85	1.3	0.99	1.27	19,651
Mesotrione	6	1.0	0.09	0.09	99
Insecticides					
Lambda-cyhalothrin	21	1.0	0.02	0.02	75
Fungicides					
Pyraclostrobin	6	1.0	0.38	0.38	410

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Bromoxynil, Carfentrazone, Clethodim, Dicamba, Diflufenzopyr, Dimethenamid-p, Fenoxaprop, Flumiclorac, Fluroxypyr, Fluthiacet-methyl, Fomesafen, Imazamox, MCPA, Picloram, Pinoxaden, Pyrasulfotole, S-metolachlor, Saflufenacil, Tembotrione, Thifensulfuron, Tribenuron, And Triencarbazone-methyl.
Insecticides applied but not published included the following: Beta-cyfluthrin, Bifenthrin, Chlorpyrifos, Esfenvalerate, Imidacloprid, Thiamethoxam, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Fluoxastrobin, Fluxapyroxad, Propiconazole, Prothioconazole, Tebuconazole, and Trifloxystrobin.

Sherburne County

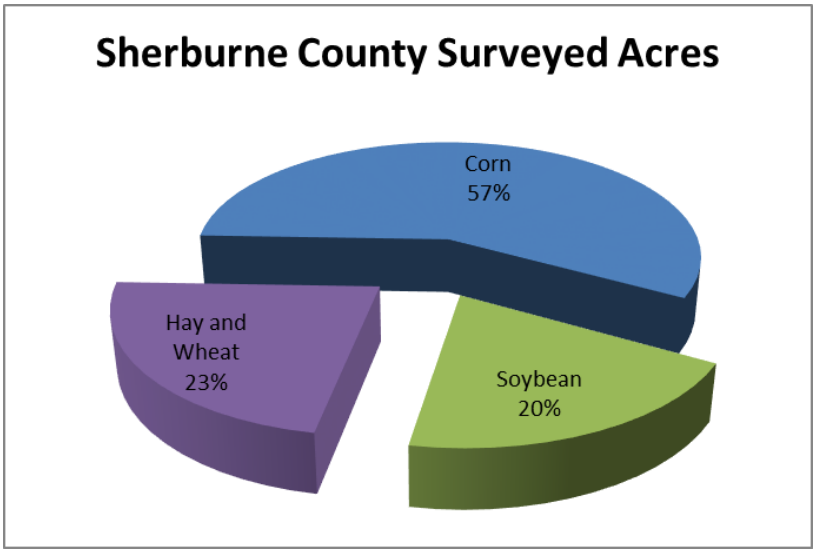

Table 69. Sherburne County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Glyphosate	70	1.1	0.87	0.99	3,273

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Acetochlor, Atrazine, Bromoxynil, Dimethenamid-p, Fenoxaprop, Fomesafen, Mesotrione, Metribuzin, Pyrasulfotole, S-metolachlor, and Saflufenacil.
Insecticides applied but not published included the following: Chlorpyrifos, Cyfluthrin, Gamma-cyhalothrin, Phostebupirim, and Tefluthrin.
Fungicides applied but not published included the following: Metconazole, Prothioconazole, Pyraclostrobin, and Tebuconazole.

Stearns County

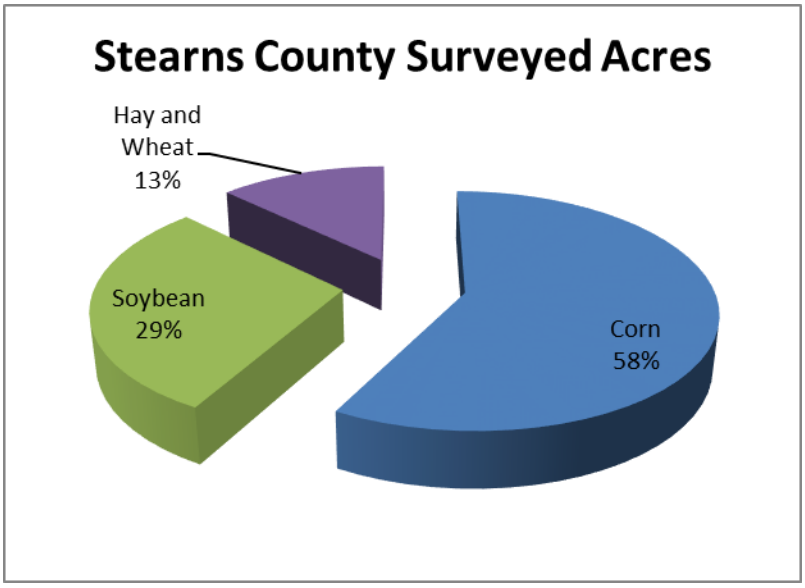

Table 70. Stearns County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	33	1.0	0.75	0.75	2,471
Clopyralid	34	1.0	0.06	0.06	211
Flumetsulam	34	1.0	0.02	0.02	85
Glyphosate	79	1.5	0.87	1.34	10,670
S-metolachlor	7	1.1	0.93	0.98	677

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Carfentrazone, Clethodim, Cloransulam, Dicamba, Diflufenzopyr, Imazethapyr, Mesotrione, Sulfentrazone, and Tembotrione.
Insecticides applied but not published included the following: Chlorpyrifos, Gamma-cyhalothrin, Lambda-cyhalothrin, Tefluthrin, Terbufos, and Thiamethoxam.
Fungicides applied but not published included the following: Propiconazole, Pyraclostrobin, and Tebuconazole.

Todd County

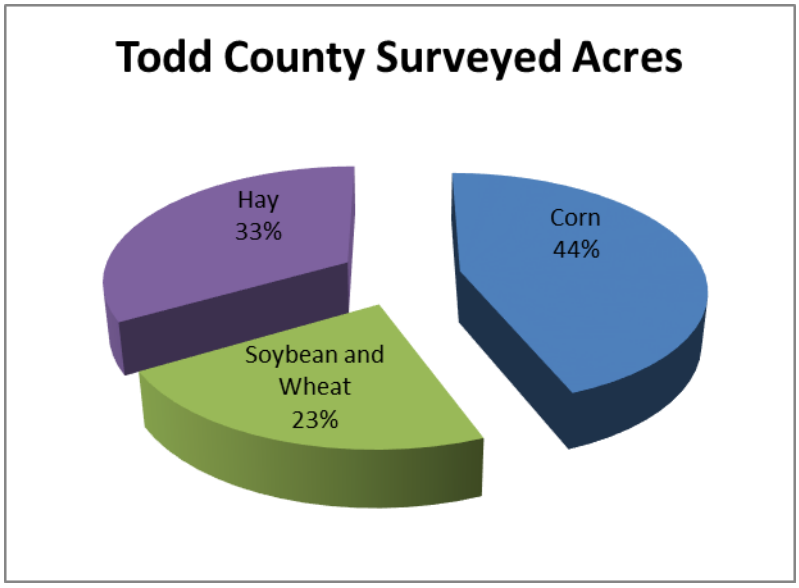

Table 71. Todd County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Glyphosate	42	1.2	0.94	1.11	1,810

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Acetochlor, Atrazine, Bromoxynil, Clopyralid, Dicamba, Diflufenzopyr, Fenoxaprop, Flumetsalam, Flumetsulam, Glufosinate-ammonium, Mesotrione, Pendimethalin, Pyrasulfotole, and S-metolachlor.
Insecticides applied but not published included the following: Chlorpyrifos, Gamma-cyhalothrin, Lambda-cyhalothrin, and Thiamethoxam.
Fungicides applied but not published included the following: Prothioconazole, Pyraclostrobin, and Tebuconazole.

Wadena County

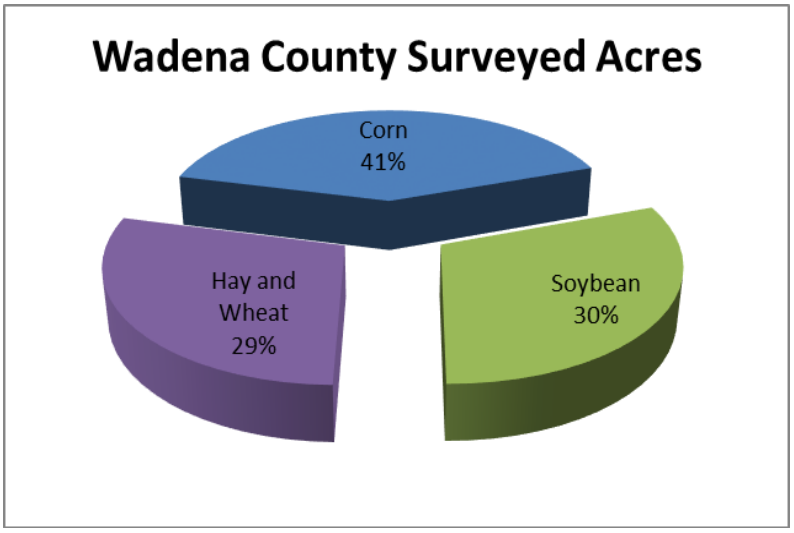

Table 72. Wadena County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Herbicides			(a.i.)	(a.i.)	(a.i.)
Glyphosate	67	1.2	0.97	1.12	5,302

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Cloransulam, Dicamba, Diflufenzopyr, Flumetsalam, Flumetsulam, Glufosinate-ammonium, Mesotrione, S-metolachlor, and Sulfentrazone.
Insecticides applied but not published included the following: Bifenthrin, Chlorethoxyfos, Chlorpyrifos, and Lambda-cyhalothrin.
Fungicides applied but not published included the following: Propiconazole, Pyraclostrobin, and Trifloxystrobin.

PMA 5 County Data

Aitkin County

No data is publishable for Atkin County.

Herbicides applied but not published included the following: Acetochlor, Bromoxynil, Clopyralid, Fenoxaprop, Flumetsulam, Glyphosate, Imazamox, Imazethapyr, Pendimethalin, and Pyrasulfotole.
Insecticides applied but not published included the following: Beta-cyfluthrin and Imidacloprid.

Chisago County

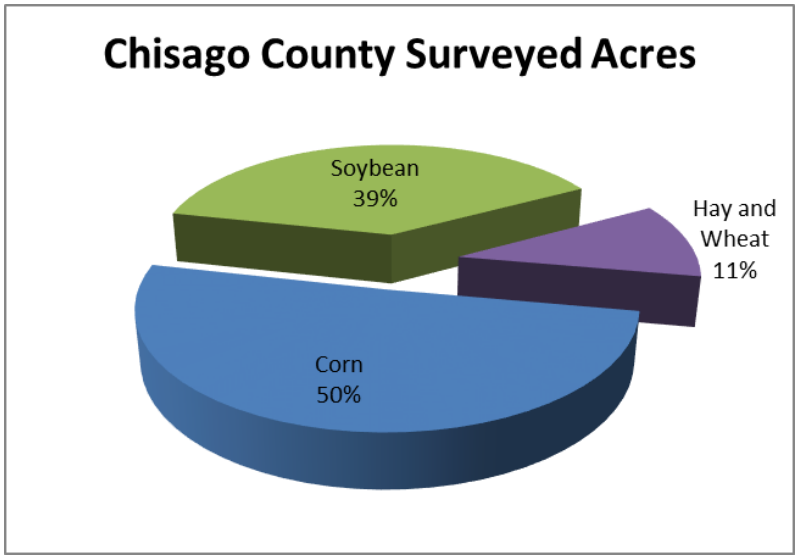

Table 73. Chisago County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	11	1.0	1.52	1.52	1232
Glyphosate	49	1.3	0.88	1.18	4,277
Mesotrione	9	1.0	0.10	0.10	68
S-metolachlor	24	1.0	1.01	1.01	1770

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Atrazine, Clethodim, Dicamba, Diflufenzopyr, Ethalfluralin, Fluazifop, Fomesafen, Glufosinate-ammonium, Halosulfuron, Imazethapyr, Lactofen, Tembotrione, and Topramezone.
Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, Lambda-cyhalothrin, Permethrin, and Tefluthrin.
Fungicides applied but not published include the following: Pyraclostrobin.

Isanti County

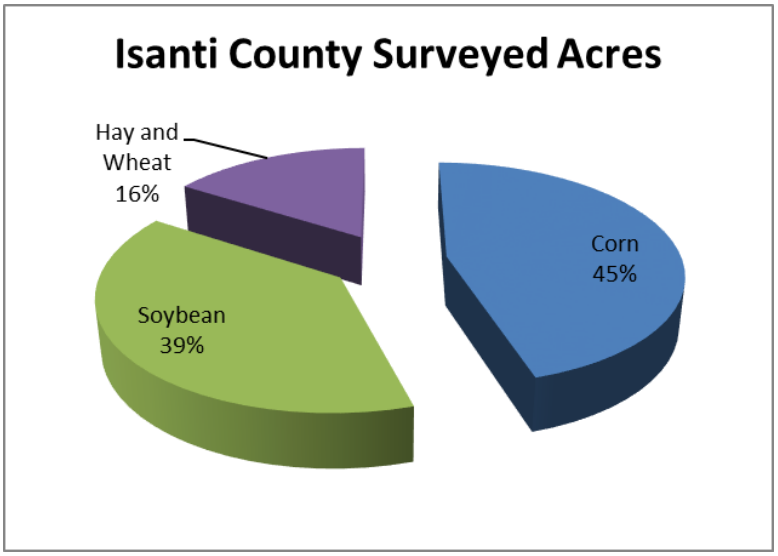

Table 74. Isanti County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Herbicides			(a.i.)	(a.i.)	(a.i.)
Acetochlor	21	1.0	1.59	1.59	2,478
Glyphosate	83	1.2	0.99	1.17	7,059

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Clopyralid, Dimethenamid-p, Ethalfluralin, Fluazifop, Flumetsulam, Imazethapyr, Mesotrione, and S-metolachlor.
Insecticides applied but not published included the following: Chlorpyrifos, Esfenvalerate, and Lambda-cyhalothrin.
Fungicides applied but not published include the following: Pyraclostrobin.

Kanabec County

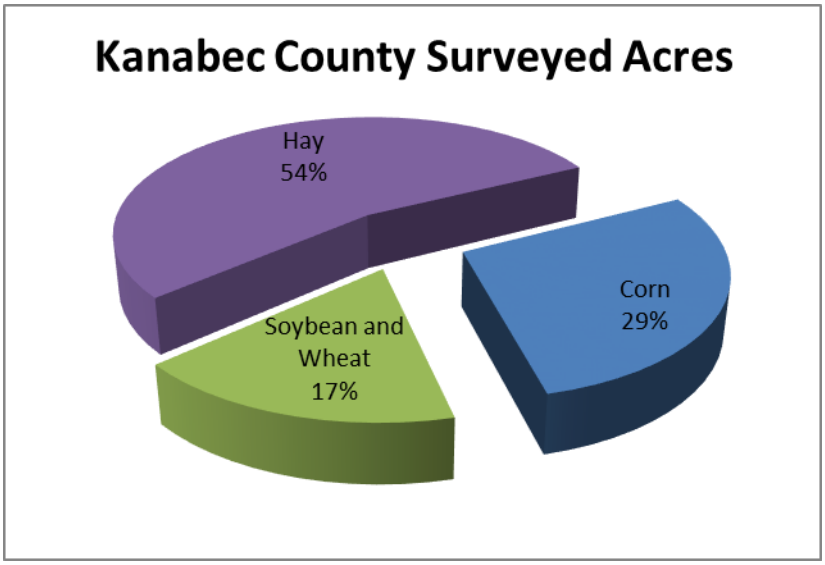

Table 75. Kanabec County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Herbicides			(a.i.)	(a.i.)	(a.i.)
Glyphosate	43	1.0	0.84	0.87	1,081

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

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

Mille Lacs County

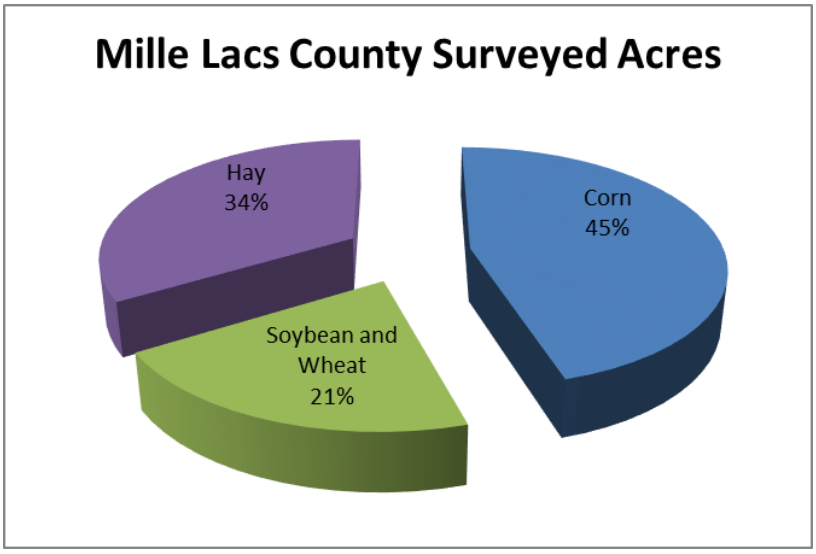

Table 76. Mille Lacs pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	26	1.0	1.07	1.07	834
Glyphosate	56	1.3	1.03	1.37	2,302

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Flumetsulam, Fluthiacet-methyl, Halosulfuron, Imazamox, Mesotrione, Quizalofop, S-metolachlor, and Topramezone.
Insecticides applied but not published included the following: Bifenthrin, Lambda-cyhalothrin, and Thiamethoxam.
Fungicides applied but not published included the following: Pyraclostrobin.

Pine County

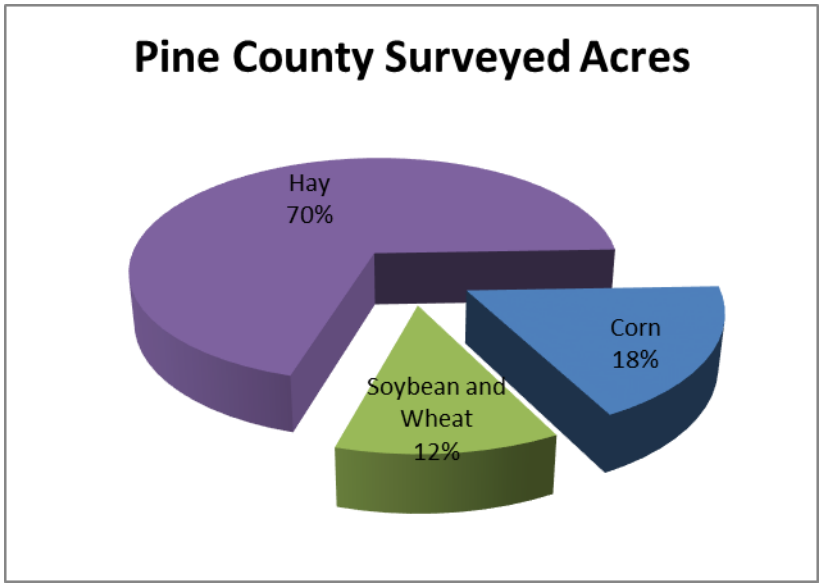

Table 77. Pine County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Herbicides			(a.i.)	(a.i.)	(a.i.)
Glyphosate	31	1.2	0.91	1.07	1,943

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Chlorimuron, Mesotrione, Metribuzin, S-metolachlor, Tembotrione, Thifensulfuron, and Triencarbazone-methyl.
Insecticides applied but not published included the following: Chlorpyrifos and Lambda-cyhalothrin.
Fungicides applied but not published included the following: Tetraconazole.

PMA 6 County Data

Big Stone County

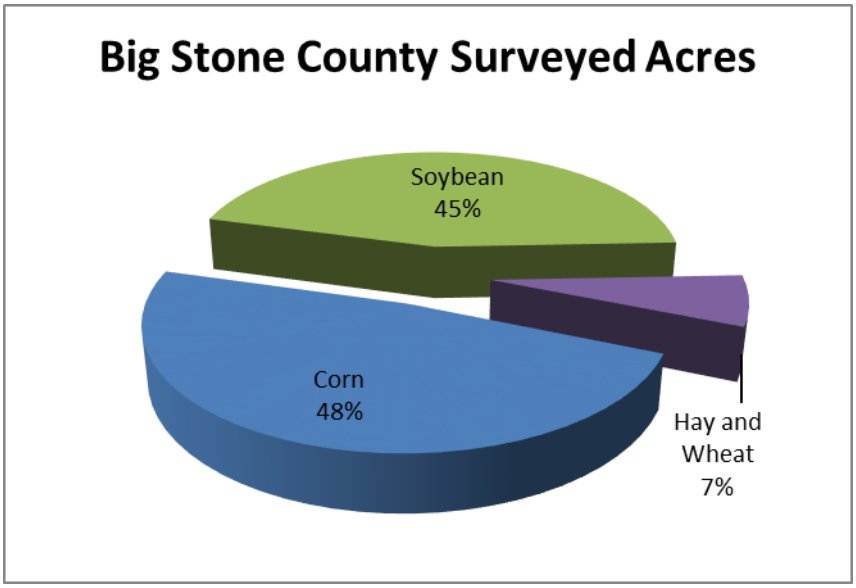

Table 78. Big Stone County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	17	1.0	1.18	1.18	2,529
Glyphosate	89	1.5	1.00	1.50	16,927
Mesotrione	25	1.0	0.09	0.09	281
S-metolachlor	10	1.0	1.01	1.01	1,244
Insecticides					
Lambda-cyhalothrin	8	1.0	0.02	0.02	21
Fungicides					
Pyraclostrobin	4	1.0	0.09	0.09	47

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Cloransulam, Dimethenamid-p, Fenoxaprop, Florasulam, Fluazifop, Flufenacet, Flumetsulam, Flumioxazin, Fluroxypyr, Fluthiacet-methyl, Fomesafen, Glufosinate-ammonium, Imazamox, Imazethapyr, Lactofen, Metribuzin, Pyrasulfotole, Pyroxsulam, Sulfentrazone, and Triencarbazone-methyl.
Insecticides applied but not published included the following: Beta-cyfluthrin, Bifenthrin, Chlorpyrifos, Gamma-cyhalothrin, and Imidacloprid.
Fungicides applied but not published included the following: Propiconazole, Prothioconazole, Tebuconazole, and Trifloxystrobin.

Chippewa County

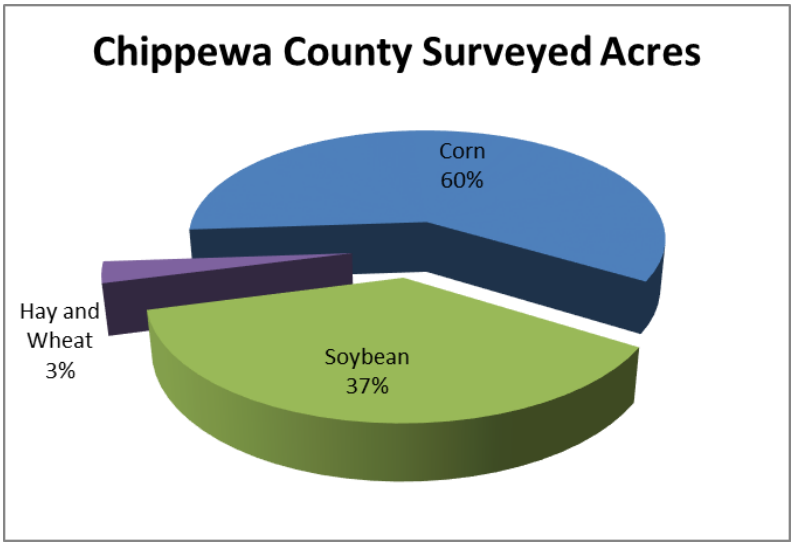

Table 79. Chippewa County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	23	1.0	0.96	0.96	3,626
Clopyralid	19	1.0	0.07	0.07	233
Dimethenamid-p	18	1.0	0.60	0.60	1,786
Flumetsulam	19	1.0	0.03	0.03	96
Glyphosate	87	1.5	1.00	1.47	21,310
Saflufenacil	18	1.0	0.07	0.07	198
Insecticides					
Chlorpyrifos	11	1.0	0.37	0.37	693

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Bromoxynil, Cloransulam, Dicamba, Diflufenzopyr, Florasulam, Fluazifop, Fluroxypyr, Fluthiacet-methyl, Fomesafen, MCPA, Phenmedipham, Pyroxsulam, Quizalofop, S-metolachlor, Sulfentrazone, Tembotrione, Thifensulfuron, and Trifluralin.
Insecticides applied but not published included the following: Beta-cyfluthrin, Bifenthrin, Esfenvalerate, Gamma-cyhalothrin, Imidacloprid, Lambda-cyhalothrin, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Metconazole, Propiconazole, Prothioconazole, Pyraclostrobin, Tebuconazole, and Trifloxystrobin.

Lac Qui Parle County

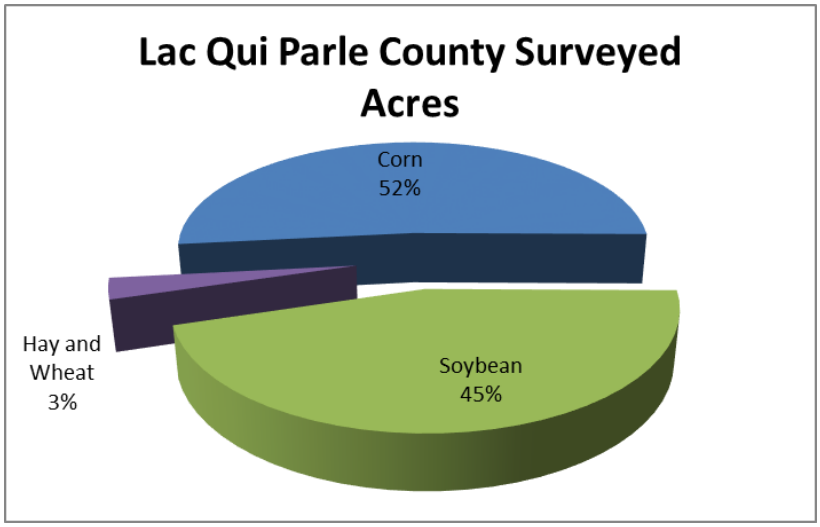

Table 80. Lac Qui Parle County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	30	1.1	1.07	1.15	3,838
Clopyralid	25	1.0	0.08	0.08	221
Cloransulam	20	1.0	0.03	0.03	57
Flumetsulam	25	1.0	0.03	0.03	91
Glyphosate	88	1.3	0.98	1.25	12,341
Mesotrione	18	1.0	0.10	0.10	200
S-metolachlor	14	1.0	1.08	1.08	1,717
Sulfentrazone	20	1.0	0.20	0.20	452
Insecticides					
Chlorpyrifos	15	1.0	0.33	0.33	568
Lambda-cyhalothrin	24	1.0	0.02	0.02	58

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Fluazifop, Fluthiacet-methyl, Fomesafen, Halosulfuron, Lactofen, Pendimethalin, Pinoxaden, Thifensulfuron, and Trifluralin.
Insecticides applied but not published included the following: Beta-cyfluthrin, Bifenthrin, Cyfluthrin, Gamma-cyhalothrin, Imidacloprid, Phostebupirim, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Pyraclostrobin, and Trifloxystrobin.

Stevens County

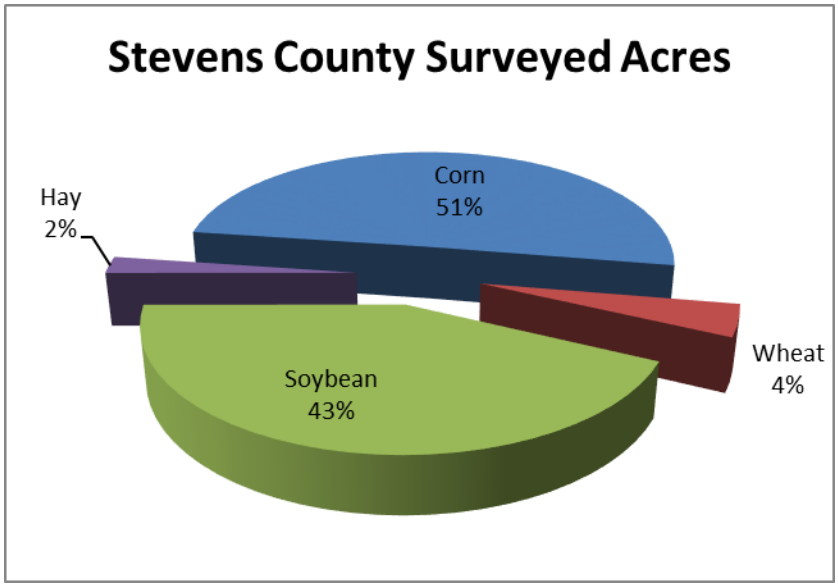

Table 81. Stevens County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Herbicides			(a.i.)	(a.i.)	(a.i.)
Acetochlor	20	1.0	0.93	0.93	4,483
Bromoxynil	3	1.0	0.23	0.23	147
Clopyralid	21	1.0	0.07	0.07	359
Flumetsulam	20	1.0	0.03	0.03	143
Glyphosate	85	1.5	1.00	1.48	29,843
Mesotrione	5	1.0	0.09	0.09	102
Insecticides					
Chlorpyrifos	7	1.0	0.39	0.39	675
Lambda-Cyhalothrin	9	1.0	0.02	0.02	49
Fungicides					
Pyraclostrobin	6	1.0	0.08	0.08	110

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Clethodim, Cloransulam, Dicamba, Diflufenzopyr, Dimethenamid-p, Fenoxaprop, Fluazifop, Flumioxazin, Fluroxypyr, Fomesafen, Imazamox, Imazethapyr, Lactofen, MCPA, Phenmedipham, Pinoxaden, Pyrasulfotole, S-metolachlor, Saflufenacil, Simazine, Sulfentrazone, Tembotrione, Thifensulfuron, and Triencarbazone-methyl.
Insecticides applied but not published included the following: Bifenthrin, Cyfluthrin, Esfenvalerate, and Phostebupirim.
Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Prothioconazole, Tebuconazole, and Trifloxystrobin.

Swift County

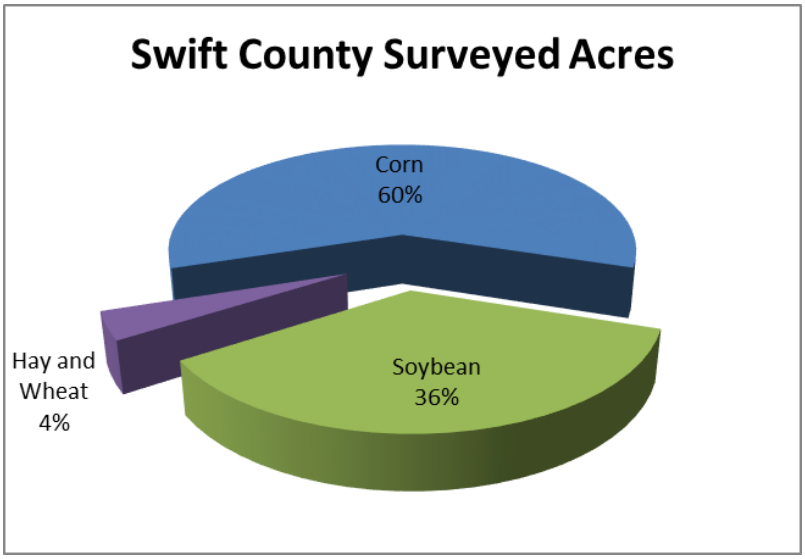

Table 82. Swift County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	18	1.0	1.03	1.03	3,969
Clopyralid	17	1.0	0.08	0.08	275
Dimethenamid-p	3	1.0	0.43	0.43	310
Flumetsulam	17	1.0	0.03	0.03	114
Glyphosate	82	1.3	0.98	1.31	23,352
Saflufenacil	4	1.0	0.05	0.05	38
Insecticides					
Lambda-cyhalothrin	12	1.0	0.02	0.02	58
Fungicides					
Pyraclostrobin	6	1.0	0.36	0.36	445

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Bromoxynil, Cloransulam, Dicamba, Diflufenzopyr, Fenoxaprop, Flumioxazin, MCPA, Mesotrione, Pendimethalin, Pyrasulfotole, S-metolachlor, Sulfentrazone, Tembotrione, and Triencarbazone-methyl.
Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, and Esfenvalerate.
Fungicides applied but not published included the following: Azoxystrobinm, Fluxapyroxad, Propiconazole, Prothioconazole, Tebuconazole, and Trifloxystrobin.

Yellow Medicine County

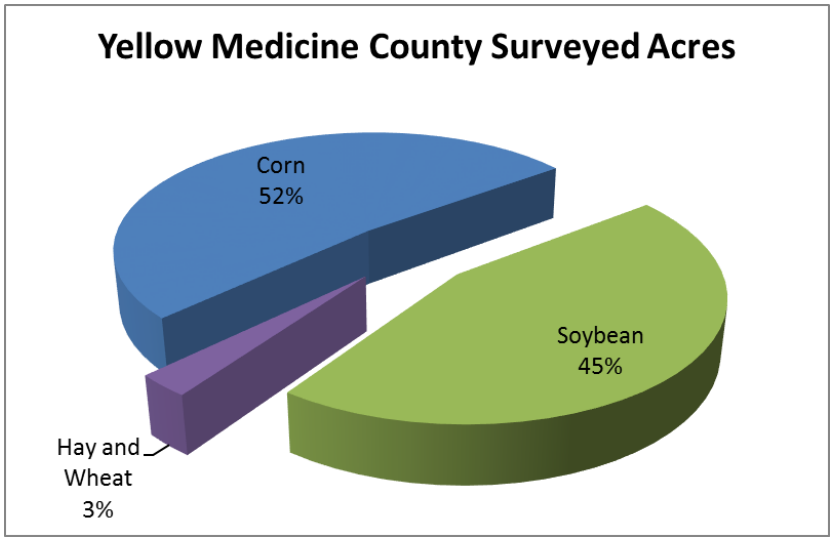

Table 83. Yellow Medicine County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	16	1.0	1.05	1.05	2,798
Clopyralid	12	1.0	0.07	0.07	148
Flumetsulam	12	1.0	0.03	0.03	61
Glyphosate	88	1.3	0.99	1.29	18,909
Insecticides					
Chlorpyrifos	15	1.0	0.43	0.43	1,090
Fungicides					
Propiconazole	12	1.0	0.04	0.04	73
Trifloxystrobin	12	1.0	0.04	0.04	80

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Atrazine, Bromoxynil, Chlorimuron, Clethodim, Cloransulam, Dicamba, Diflufenzopyr, Dimethenamid-p, Fenoxaprop, Flufenacet, Flumioxazin, Fluthiacet-methyl, Fomesafen, Imazamox, MCPA, Mesotrione, Metribuzin, Pinoxaden, Pyrasulfotole, S-metolachlor, Saflufenacil, Sulfentrazone, Tembotrione, Thifensulfuron, and Triencarbazone-methyl.
Insecticides applied but not published included the following: Beta-cyfluthrin, Bifenthrin, Chlorethoxyfos, Esfenvalerate, Gamma-cyhalothrin, Imidacloprid, and Lambda-cyhalothrin.
Fungicides applied but not published included the following: Pyraclostrobin and Tetraconazole.

PMA 7 County Data

Lincoln County

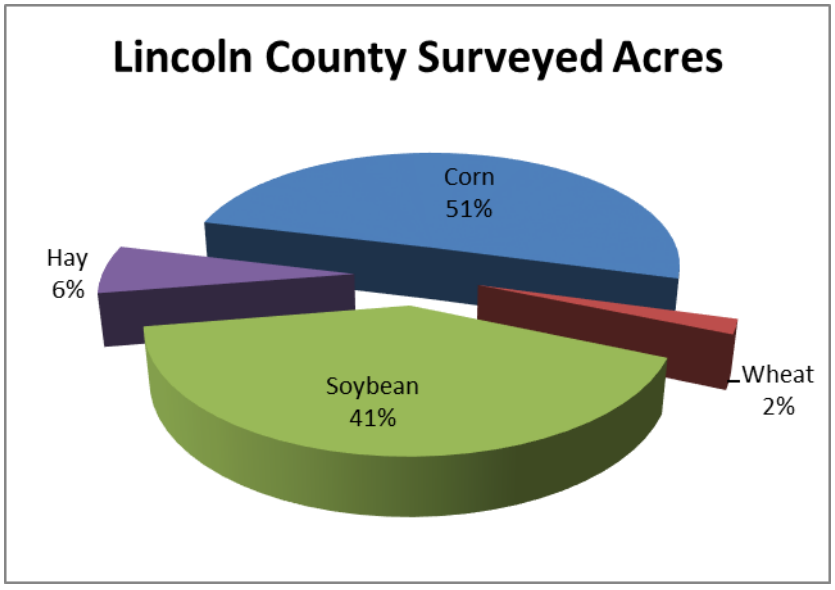

Table 84. Lincoln County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	25	1.0	1.11	1.11	3,839
Clopyralid	17	1.0	0.07	0.07	172
Flumetsulam	15	1.0	0.03	0.03	61
Glyphosate	84	1.3	0.93	1.21	14,122
Mesotrione	3	1.0	0.08	0.08	30
Insecticides					
Chlorpyrifos	16	1.0	0.42	0.42	953
Lambda-cyhalothrin	24	1.0	0.02	0.02	68
Fungicides					
Pyraclostrobin	13	1.0	0.09	0.09	160

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Bromoxynil, Clethodim, Cloransulam, Dicamba, Diflufenzopyr, Dimethenamid-p, Fenoxaprop, Fluazifop, Fomesafen, MCPA, Pendimethalin, Pinoxaden, Pyrasulfotole, S-metolachlor, Saflufenacil, Sulfentrazone, Tembotrione and Trifluralin.
Insecticides applied but not published included the following: Bifenthrin, Gamma-cyhalothrin, and Tefluthrin.
Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Prothioconazole, Tebuconazole, and Trifloxystrobin.

Lyon County

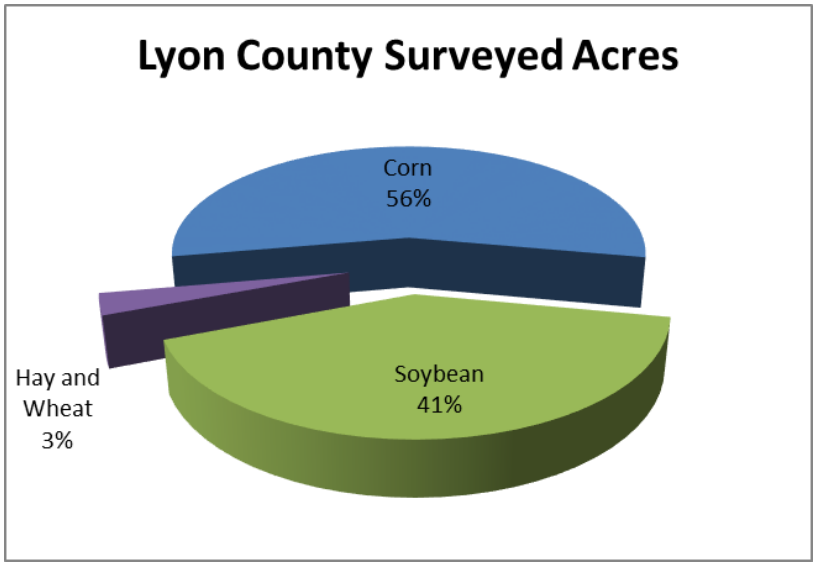

Table 85. Lyon County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	36	1.0	1.18	1.18	4,343
Clopyralid	24	1.0	0.08	0.08	193
Cloransulam	10	1.0	0.02	0.02	17
Flumetsulam	23	1.0	0.03	0.03	78
Glyphosate	79	1.3	0.96	1.25	10,035
Mesotrione	13	1.0	0.12	0.12	156
Sulfentrazone	10	1.0	0.14	0.14	135
Insecticides					
Bifenthrin	9	1.0	0.06	0.06	60
Chlorpyrifos	6	1.0	0.29	0.29	186
Lambda-cyhalothrin	6	1.0	0.02	0.02	13

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Bentazon, Clethodim, Fomesafen, Glufosinate-ammonium, Imazethapyr, Quizalofop, S-metolachlor, Saflufenacil, Tembotrione, and Topramezone.
Insecticides applied but not published included the following: Cyfluthrin, Esfenvalerate, Gamma-cyhalothrin, Phostebupirim, Tefluthrin, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, and Pyraclostrobin.

Murray County

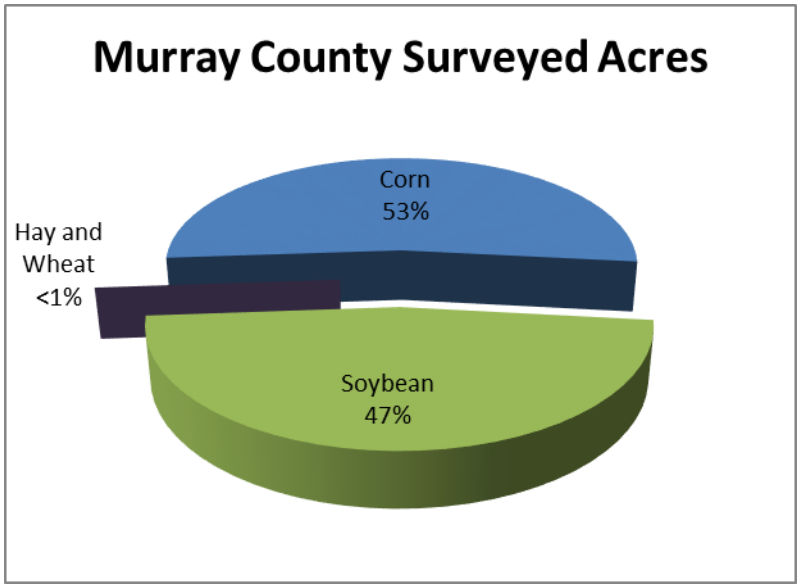

Table 86. Murray County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	19	1.0	1.09	1.09	2,591
Glyphosate	82	1.4	1.04	1.42	14,529
Imazethapyr	5	1.0	0.07	0.07	45
Mesotrione	27	1.0	0.09	0.09	323
S-metolachlor	14	1.0	0.99	0.99	1,684

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Bromoxynil, Clethodim, Clopyralid, Cloransulam, Dimethenamid-p, Flumetsulam, Fluthiacet-methyl, Fomesafen, Glufosinate-ammonium, Imazethapyr, Saflufenacil, Sulfentrazone, Tembotrione, and Topramezone.
Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, Cyfluthrin, Gamma-cyhalothrin, Lambda-cyhalothrin, Phostebupirim, Tefluthrin, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Pyraclostrobin.

Nobles County

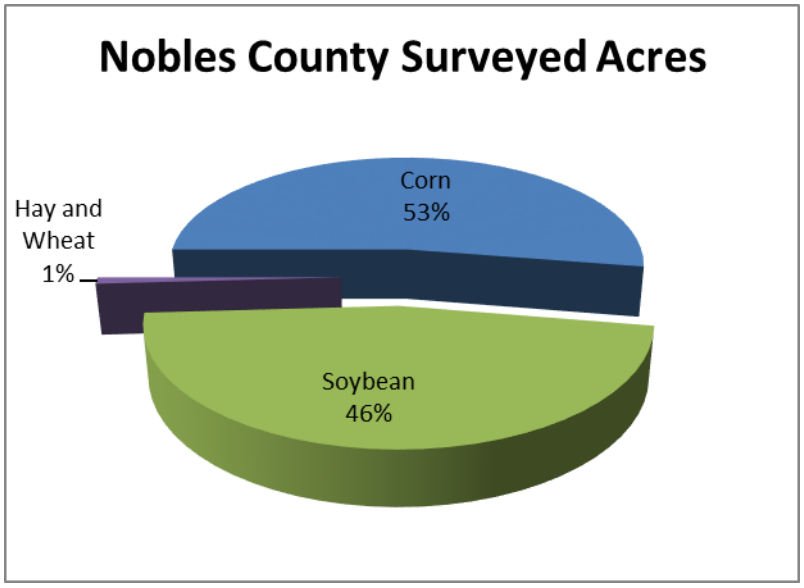

Table 87. Nobles County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	27	1.0	1.28	1.28	4,687
Clopyralid	14	1.0	0.08	0.08	151
Cloransulam	19	1.0	0.03	0.03	70
Flumetsulam	14	1.0	0.03	0.03	63
Glyphosate	91	1.2	1.05	1.31	16,365
Sulfentrazone	19	1.0	0.20	0.20	524
Insecticides					
Bifenthrin	7	1.0	0.08	0.08	81
Chlorpyrifos	12	1.0	0.35	0.35	556
Lambda-cyhalothrin	5	1.0	0.03	0.03	18
Fungicides					
Pyraclostrobin	17	1.0	0.09	0.09	222

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Dimethenamid-p, Fluazifop, Flumiclorac, Fomesafen, Glufosinate-ammonium, Imazethapyr, Mesotrione, and Topramezone.
Insecticides applied but not published included the following: Beta-cyfluthrin, Cyfluthrin, Esfenvalerate, Gamma-cyhalothrin, Imidacloprid, Permethrin, Phostebupirim, Terbufos, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Azoxystrobin, Chlorothalonil, Metconazole, and Tetraconazole.

Pipestone County

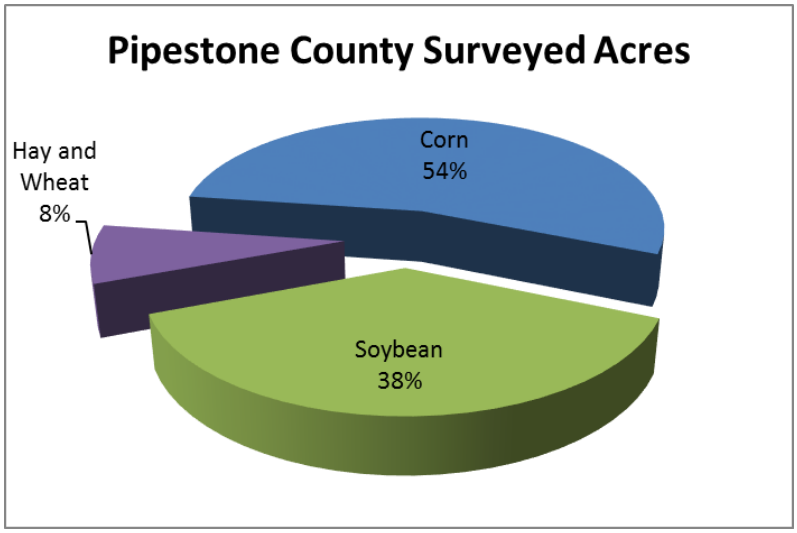

Table 88. Pipestone County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	24	1.0	0.98	0.98	2,745
Glyphosate	81	1.3	0.92	1.24	11,841
Mesotrione	7	1.0	0.09	0.09	73
S-metolachlor	9	1.0	0.99	0.99	1,070
Insecticides					
Lambda-cyhalothrin	4	1.0	0.02	0.02	9

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Clopyralid, Cloransulam, Dimethenamid-p, Florasulam, Flumetsulam, Fluroxypyr, Fomesafen, Imazethapyr, Metribuzin, Pendimethalin, Pyroxsulam, Rimsulfuron, Saflufenacil, Sulfentrazone, and Thifensulfuron.
Insecticides applied but not published include the following: Beta-cyfluthrin, Bifenthrin, Chlorpyrifos, Cyfluthrin, Gamma-cyhalothrin, Imidacloprid, Phostebupirim, Tefluthrin, and Thiamethoxam.
Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Prothioconazole, Pyraclostrobin, and Tebuconazole.

Rock County

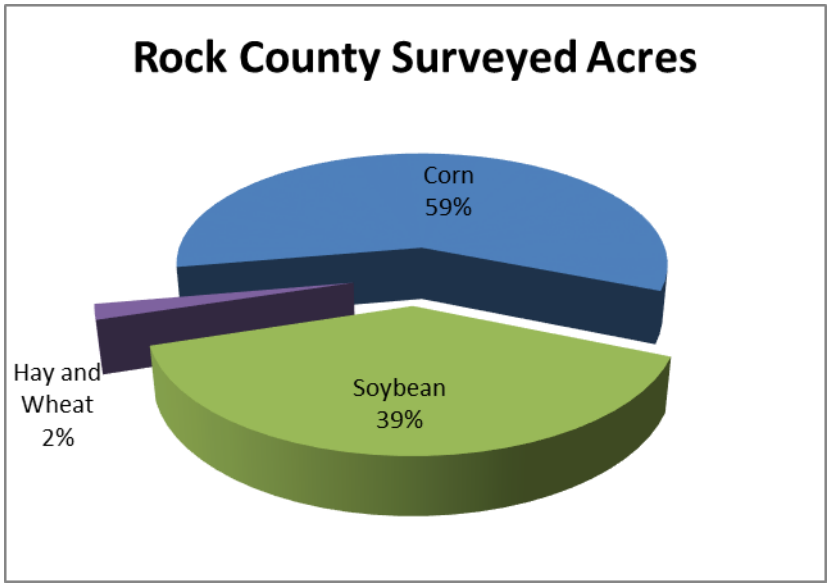

Table 89. Rock County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	23	1.0	1.31	1.31	2,551
Clopyralid	16	1.0	0.09	0.09	122
Flumetsulam	16	1.0	0.04	0.04	50
Glyphosate	79	1.2	1.02	1.19	8,018
Mesotrione	32	1.0	0.09	0.09	253
Insecticides					
Lambda-cyhalothrin	11	1.0	0.02	0.02	18

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Aminopyralid, Atrazine, Clethodim, Cloransulam, Dimethenamid-p, Fluazifop, Flumioxazin, Lactofen, Pendimethalin, S-metolachlor, Saflufenacila, and Sulfentrazone.
Insecticides applied but not published included the following: Chlorpyrifos, Cyfluthrin, Phostebupirim, and Tefluthrin.
Fungicides applied but not published included the following: Azoxystrobin, Fluxapyroxad, Propiconazole, Pyraclostrobin, Tetraconazole, and Trifloxystrobin.

PMA 8 County Data

Blue Earth County

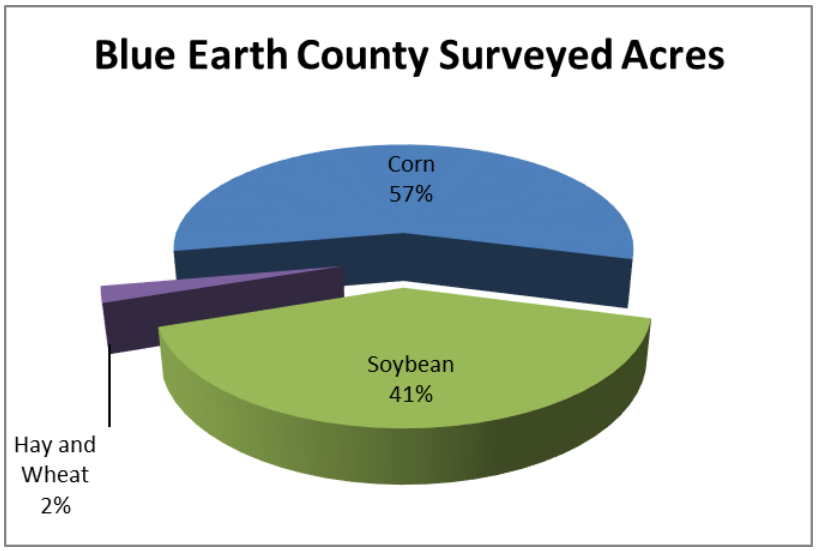

Table 90. Blue Earth County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Glyphosate	79	1.3	0.92	1.16	9,724
Mesotrione	24	1.0	0.07	0.07	191
S-metolachlor	34	1.0	0.81	0.81	2,937
Insecticides					
Lambda-cyhalothrin	9	1.0	0.02	0.02	18

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Acetochlor, Atrazine, Clopyralid, Cloransulam, Dicamba, Diflufenzopyr, Dimethenamid-p, Fluazifop, Flufenacet, Flumetsulam, Flumioxazin, Fomesafen, Glufosinate-ammonium, Lactofen, Metribuzin, Nicosulfuron, Primisulfuron, Rimsulfuron, Saflufenacil, Sulfentrazone, Tembotrione, and Trifluralin.
Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, Tefluthrin, and Thiamethoxam.
Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Pyraclostrobin, and Trifloxystrobin.

Brown County

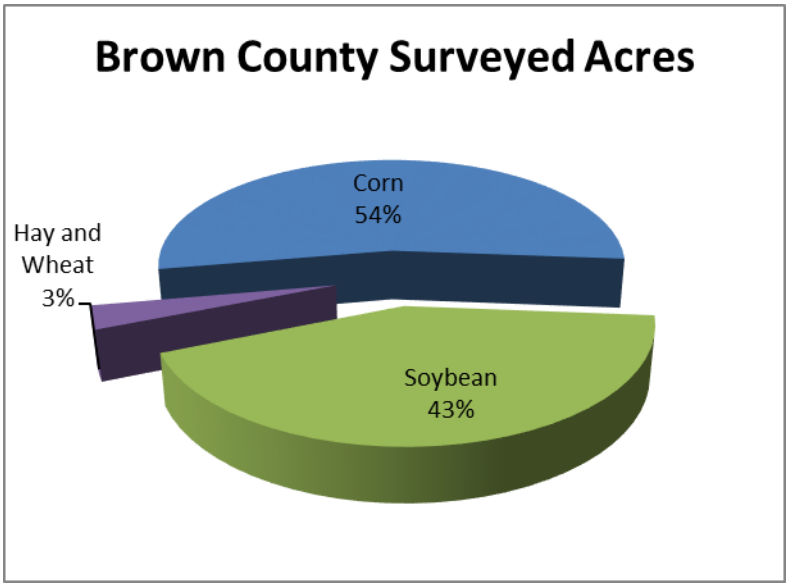

Table 91. Brown County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	25	1.0	1.08	1.08	4,581
Clethodim	9	1.0	0.05	0.05	81
Clopyralid	20	1.0	0.07	0.07	234
Cloransulam	12	1.0	0.02	0.02	45
Flumetsulam	19	1.0	0.03	0.03	92
Glyphosate	76	1.3	1.01	1.29	16,450
Mesotrione	6	1.2	0.08	0.09	87
Sulfentrazone	12	1.0	0.17	0.17	357
Insecticides					
Bifenthrin	11	1.0	0.05	0.05	94
Lambda-cyhalothrin	10	1.0	0.02	0.02	38
Fungicides					
Pyraclostrobin	6	1.0	0.10	0.10	105

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Dicamba, Diflufenzopyr, Dimethenamid-p, Fluazifop, Fluroxypyr, Fluthiacet-methyl, Fomesafen, Glufosinate-ammonium, Imazethapyr, MCPA, Pendimethalin, Phenmedipham, S-metolachlor, Saflufenacil, Tembotrione, and Trifluralin.
Insecticides applied but not published included the following: Chlorpyrifos, Cyfluthrin, Gamma-cyhalothrin, Phostebupirim, Tefluthrin, Thiamethoxam, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Metconazole.

Cottonwood County

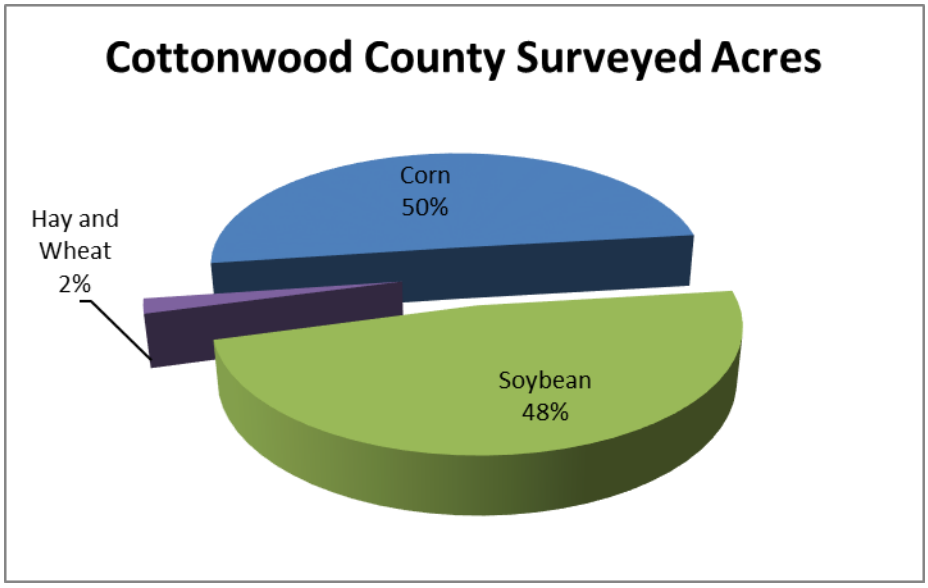

Table 92. Cottonwood County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
2,4-D	7	1.0	0.37	0.37	354
Acetochlor	16	1.0	1.32	1.32	2,988
Cloransulam	10	1.0	0.03	0.03	41
Glyphosate	88	1.4	0.95	1.33	16,834
Mesotrione	17	1.0	0.10	0.10	249
S-metolachlor	9	1.0	0.83	0.83	1,096
Sulfentrazone	14	1.0	0.21	0.21	434
Insecticides					
Bifenthrin	10	1.0	0.07	0.07	101
Chlorpyrifos	10	1.0	0.49	0.49	720

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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: Aminopyralid, Atrazine, Chlorimuron, Clethodim, Clopyralid, Dicamba, Diflufenzopyr, Dimethenamid-p, Flumetsulam, Fluthiacet-methyl, Fomesafen, Imazamox, Imazethapyr, Lactofen, Metribuzin, Nicosulfuron, Rimsulfuron, Saflufenacil, Tembotrione, Thifensulfuron, Triencarbazone-methyl, and Trifluralin.
Insecticides applied but not published included the following: Cyfluthrin, Esfenvalerate, Gamma-cyhalothrin, Lambda-cyhalothrin, Phostebupirim, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Prothioconazole, Pyraclostrobin, and Tebuconazole.

Faribault County

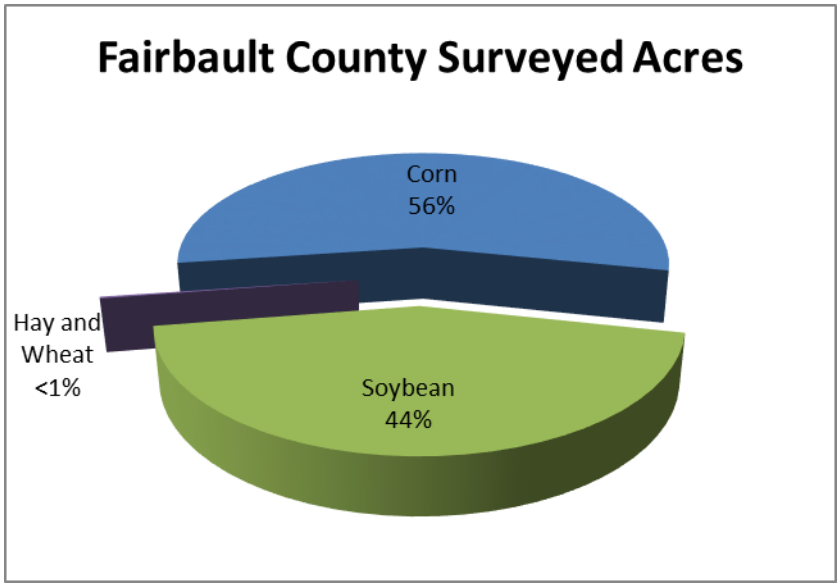

Table 93. Faribault County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	29	1.0	1.19	1.19	8,865
Clopyralid	19	1.0	0.09	0.09	443
Dimethenamid-p	9	1.0	0.59	0.59	1,315
Flumetsulam	19	1.0	0.04	0.04	183
Glyphosate	86	1.3	0.93	1.21	26,864
Insecticides					
Bifenthrin	10	1.4	0.06	0.08	198
Chlorpyrifos	8	1.0	0.44	0.44	863
Lambda-cyhalothrin	6	1.0	0.03	0.03	50
Fungicides					
Pyraclostrobin	27	1.0	0.15	0.15	1,004

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Atrazine, Clethodim, Cloransulam, Fluazifop, Fluthiacet-methyl, Fomesafen, Imazamox, Mesotrione, Nicosulfuron, Rimsulfuron, S-metolachlor, Saflufenacil, Sulfentrazone, Tembotrione, Thifensulfuron, and Topramezone.
Insecticides applied but not published included the following: Beta-cyfluthrin, Gamma-cyhalothrin, Imidacloprid, Tefluthrin, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Azoxystrobin, Fluoxastrobin, Fluxapyroxad, Metconazole, Propiconazole, Prothioconazole, and Tebuconazole.

Freeborn County

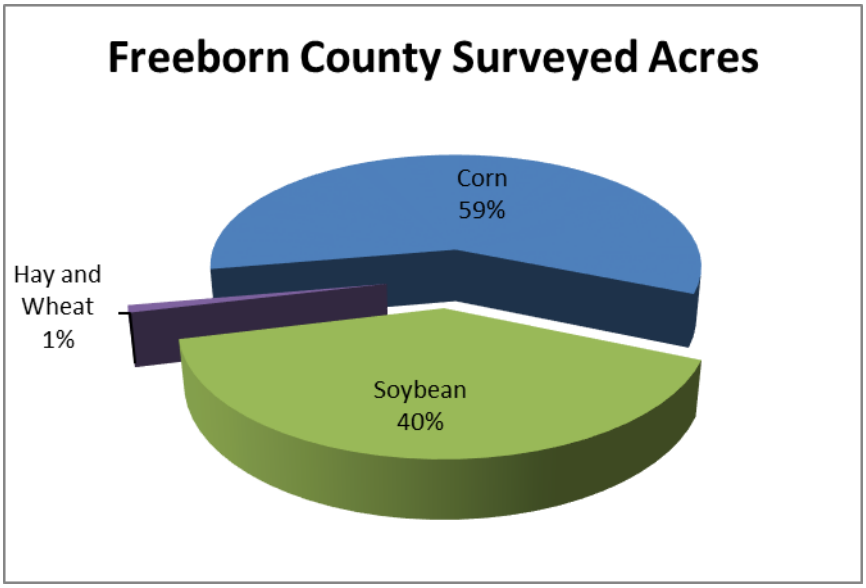

Table 94. Freeborn County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	16	1.0	1.15	1.15	2,786
Glyphosate	94	1.5	0.92	1.34	18,708

[1] Data in this column is calculated from "raw" data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Atrazine, Bentazon, Clethodim, Clopyralid, Dicamba, Diflufenzopyr, Dimethenamid-p, Flumetsulam, Fomesafen, Imazethapyr, Mesotrione, S-metolachlor, Sulfentrazone, Tembotrione, and Topramezone.
Insecticides applied but not published included the following: Beta-cyfluthrin, Bifenthrin, Chlorpyrifos, Esfenvalerate, Imidacloprid, Lambda-cyhalothrin, Tefluthrin, and Thiamethoxam.
Fungicides applied but not published included the following: Azoxystrobin, Metconazole, Propiconazole, Pyraclostrobin, and Trifloxystrobin.

Jackson County

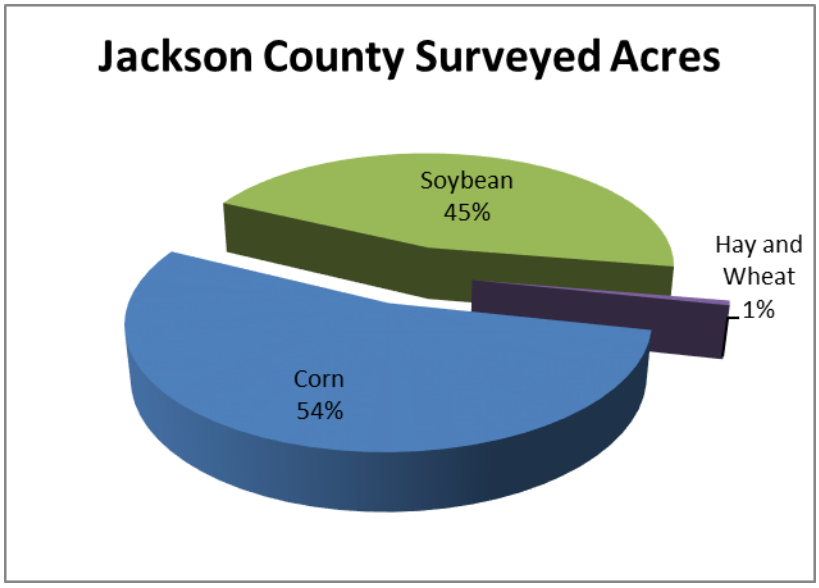

Table 95. Jackson County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	23	1.0	1.34	1.34	5,043
Clopyralid	5	1.0	0.08	0.08	70
Fomesafen	13	1.0	0.19	0.19	398
Glyphosate	89	1.2	0.94	1.10	15,605
Mesotrione	36	1.0	0.07	0.07	385
Sulfentrazone	9	1.0	0.18	0.18	258
Insecticides					
Bifenthrin	16	1.0	0.06	0.06	144
Chlorpyrifos	15	1.0	0.43	0.43	1,058

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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 thefollowing: 2,4-D, Atrazine, Cloransulam, Dicamba, Diflufenzopyr, Dimethenamid-p, Fenoxaprop, Fluazifop, Flumetsulam, Flumioxazin, Glufosinate-ammonium, Imazethapyr, S-metolachlor, Saflufenacil, and Topramezone.
Insecticides applied but not published included the following: Beta-cyfluthrin, Cyfluthrin, Esfenvalerate, Gamma-cyhalothrin, Imidacloprid, Lambda-cyhalothrin, Phostebupirim, Tefluthrin, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Azoxystrobin, Metconazole, Propiconazole, Prothioconazole, Pyraclostrobin, and Tebuconazole.

Le Sueur County

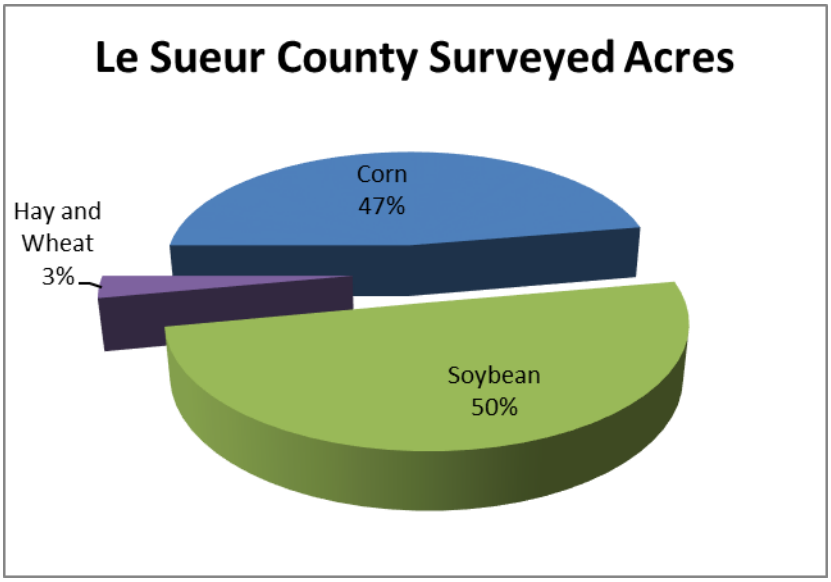

Table 96. Le Sueur County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Glyphosate	78	1.3	0.84	1.13	7,057
Mesotrione	18	1.0	0.04	0.04	60
S-metolachlor	16	1.0	0.77	0.77	978
Insecticides					
Lambda-cyhalothrin	8	1.0	0.02	0.02	14

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Acetochlor, Atrazine, Bromoxynil, Chlorimuron, Clopyralid, Cloransulam, Dicamba, Diflufenzopyr, Dimethenamid-p, Fenoxaprop, Fluazifop, Flufenacet, Flumetsulam, Flumiclorac, Fluthiacet-methyl, Fomesafen, Imazethapyr, Lactofen, Metribuzin, Nicosulfuron, Pyrasulfotole, Saflufenacil, Sulfentrazone, and Thifensulfuron.
Insecticides applied but not published included the following: Chlorpyrifos, Gamma-cyhalothrin, and Thiamethoxam.
Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Prothioconazole, Pyraclostrobin, Tebuconazole, and Trifloxystrobin.

Martin County

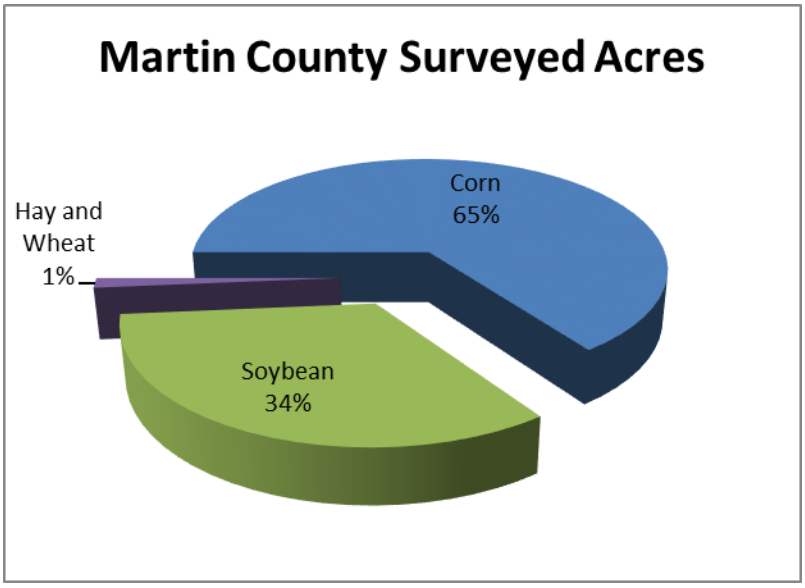

Table 97. Martin County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Herbicides			(a.i.)	(a.i.)	(a.i.)
Acetochlor	29	1.0	0.97	0.97	5,647
Clopyralid	23	1.0	0.07	0.07	297
Flumetsulam	23	1.0	0.03	0.03	123
Glyphosate	84	1.5	0.89	1.33	22,093

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Atrazine, Clethodim, Cloransulam, Dicamba, Diflufenzopyr, Dimethenamid-p, Fluazifop, Flumioxazin, Fluthiacet-methyl, Fomesafen, Imazethapyr, Lactofen, Mesotrione, S-metolachlor, Saflufenacil, Sulfentrazone, and Tembotrione.
Insecticides applied but not published included the following: Beta-cyfluthrin, Bifenthrin, Chlorpyrifos, Cyfluthrin, Esfenvalerate, Gamma-cyhalothrin, Imidacloprid, Lambda-cyhalothrin, Phostebupirim, and Tefluthrin.
Fungicides applied but not published included the following: Azoxystrobin, Metconazole, Propiconazole, Prothioconazole, Pyraclostrobin, Tebuconazole, and Trifloxystrobin.

McLeod County

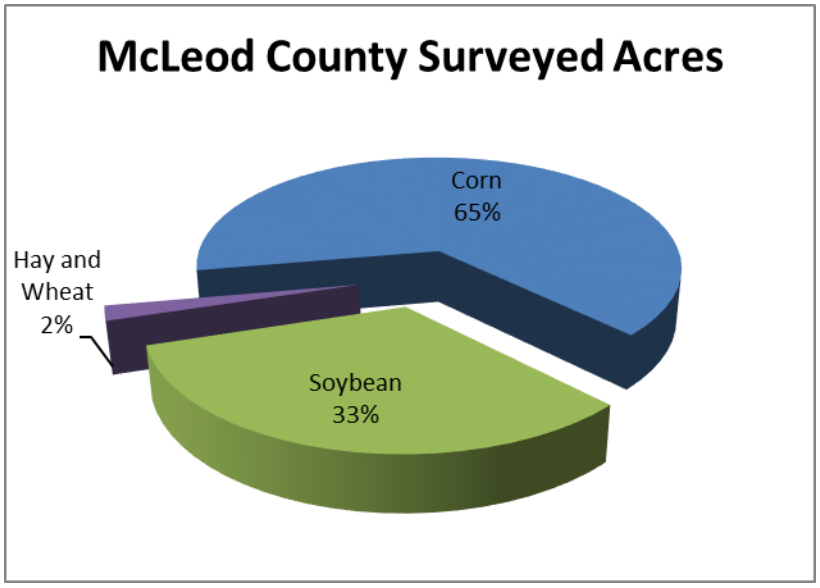

Table 98. McLeod County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	25	1.0	1.13	1.13	3,044
Glyphosate	83	1.4	0.95	1.28	11,444
Mesotrione	15	1.0	0.07	0.07	113
Insecticides					
Lambda-cyhalothrin	25	1.0	0.02	0.02	58

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Clopyralid, Cloransulam, Dicamba, Diflufenzopyr, Dimethenamid-p, Flufenacet, Flumetsulam, Flumioxazin, Glufosinate-ammonium, Lactofen, Metribuzin, S-metolachlor, Sulfentrazone, and Topramezone.
Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, Cyfluthrin, Esfenvalerate, Gamma-cyhalothrin, Phostebupirim, and Thiamethoxam.
Fungicides applied but not published included the following: Propiconazole, Prothioconazole, Pyraclostrobin, Tebuconazole, and Trifloxystrobin.

Meeker County

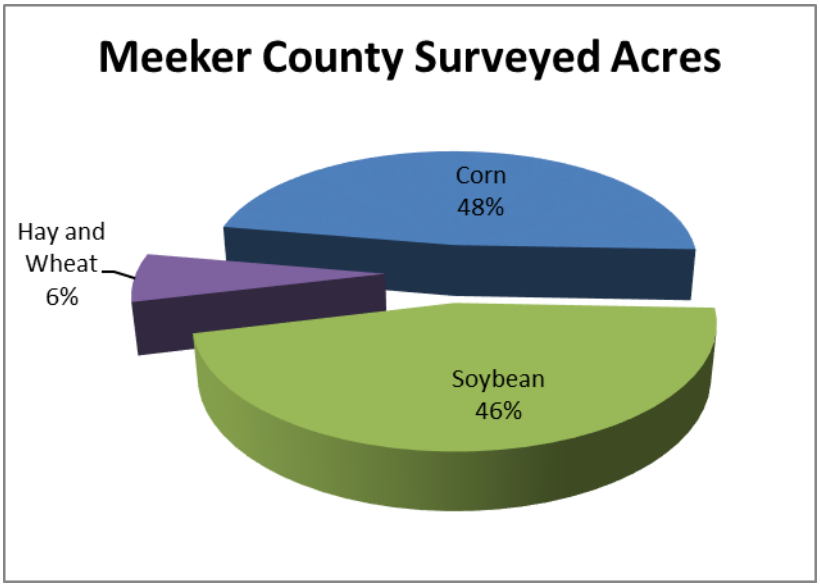

Table 99. Meeker County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Herbicides			(a.i.)	(a.i.)	(a.i.)
Dicamba	23	1.0	0.14	0.14	391
Diflufenzopyr	23	1.0	0.05	0.05	157
Glyphosate	82	1.7	1.06	1.83	18,295
Insecticides					
Chlorpyrifos	6	1.0	0.47	0.47	325
Lambda-cyhalothrin	7	1.0	0.02	0.02	16

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Acetochlor, Clethodim, Clopyralid, Cloransulam, Flumetsulam, Fluthiacet-methyl, Fomesafen, Imazethapyr, Sethoxydim, Sulfentrazone, and Tembotrione.
Insecticides applied but not published included the following: Beta-cyfluthrin, Bifenthrin, Gamma-cyhalothrin, Imidacloprid, and Thiamethoxam.
Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Pyraclostrobin, and Trifloxystrobin.

Nicollet County

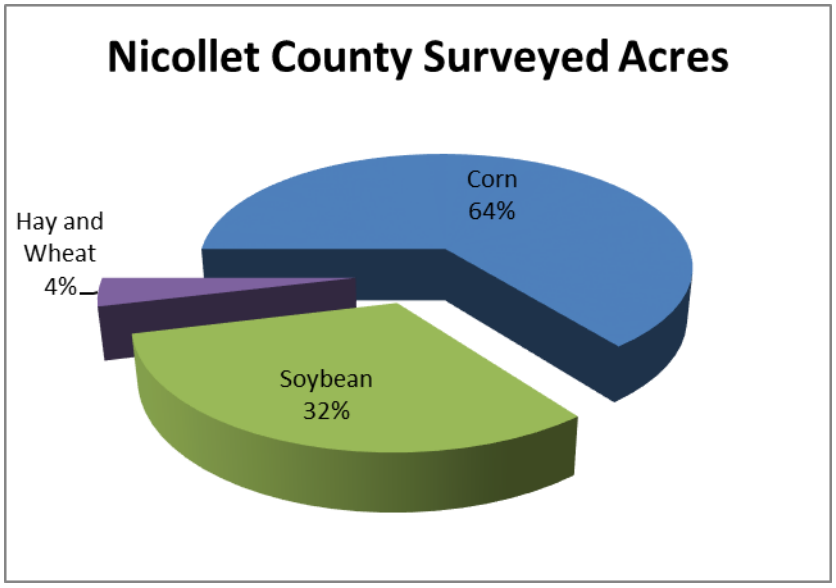

Table 100. Nicollet County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Glyphosate	89	1.3	0.94	1.20	12,744
Mesotrione	28	1.0	0.08	0.08	262
S-metolachlor	34	1.0	0.84	0.84	3,412
Insecticides					
Bifenthrin	41	1.0	0.06	0.06	316
Lambda-cyhalothrin	2	1.0	0.02	0.02	4
Fungicides					
Pyraclostrobin	13	1.0	0.46	0.46	709

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Bentazon, Clethodim, Clopyralid, Cloransulam, Dimethenamid-p, Flumetsulam, Fluthiacet-methyl, Fomesafen, Glufosinate-ammonium, Imazamox, Imazethapyr, Lactofen, Nicosulfuron, Rimsulfuron, Saflufenacil, Sulfentrazone, Tembotrione, Topramezone, and Triencarbazone-methyl.
Insecticides applied but not published included the following: Beta-cyfluthrin, Chlorpyrifos, Cyfluthrin, Imidacloprid, Phostebupirim, Tefluthrin, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Azoxystrobin, Fluxapyroxad, Prothioconazole, Tebuconazole, and Tetraconazole.

Redwood County

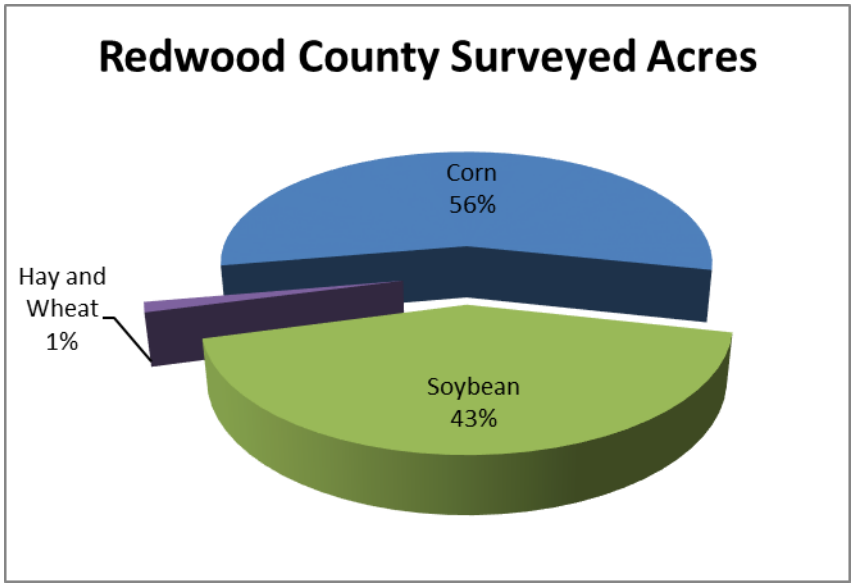

Table 101. Redwood County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	26	1.0	1.39	1.39	6,520
Clopyralid	11	1.0	0.09	0.09	175
Flumetsulam	11	1.0	0.04	0.04	72
Glyphosate	77	1.3	0.97	1.26	17,592
Sulfentrazone	8	1.0	0.13	0.13	177
Insecticides					
Bifenthrin	5	1.0	0.06	0.06	60
Chlorpyrifos	7	1.0	0.45	0.45	607

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Cloransulam, Dicamba, Diflufenzopyr, Dimethenamid-p, Fluazifop, Flumioxazin, Fomesafen, Glufosinate-ammonium, Imazethapyr, Lactofen, Mesotrione, S-metolachlor, Saflufenacil, Tembotrione, Thifensulfuron, Topramezone, Tribenuron, and Trifluralin.
Insecticides applied but not published included the following: Beta-cyfluthrin, Cyfluthrin, Imidacloprid, Lambda-cyhalothrin, Phostebupirim, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Fluxapyroxad, Pyraclostrobin, and Tetraconazole.

Renville County

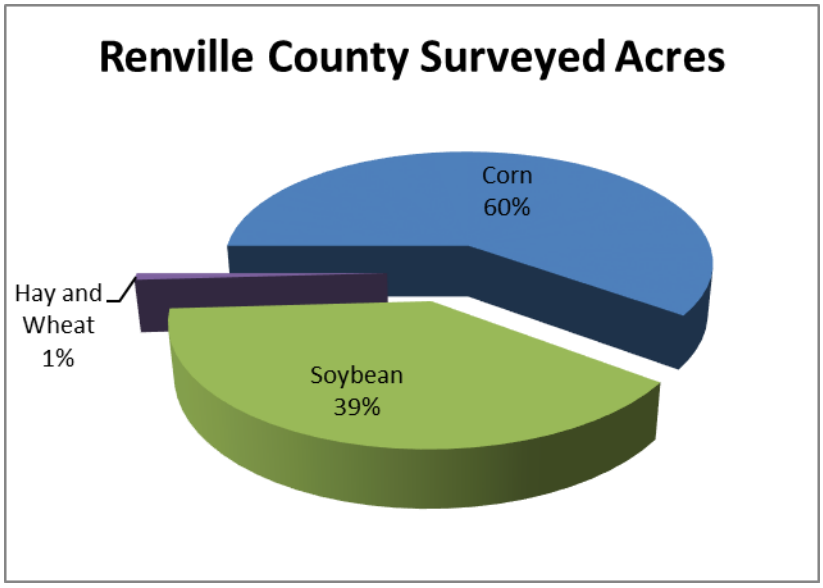

Table 102. Renville County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	25	1.0	1.62	1.62	6,341
Dicamba	10	1.0	0.16	0.16	258
Diflufenzopyr	10	1.0	0.07	0.07	103
Glyphosate	79	1.4	0.99	1.38	17,148
Fungicides					
Pyraclostrobin	17	1.0	0.08	0.08	229

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Bromoxynil, Clopyralid, Cloransulam, Dimethenamid-p, Fenoxaprop, Flumetsulam, Flumioxazin, Fluthiacet-Methyl, Fomesafen, Mesotrione, Pendimethalin, Pyrasulfotole, S-metolachlor, Saflufenacil, Sulfentrazone, Tembotrione, Topramezone, and Triencarbazone-methyl.
Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, Esfenvalerate, Gamma-cyhalothrin, Lambda-cyhalothrin, Tefluthrin, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Chlorothalonil, Metconazole, Propiconazole, Prothioconazole, Tebuconazole, Tetraconazole, and Trifloxystrobin.

Rice County

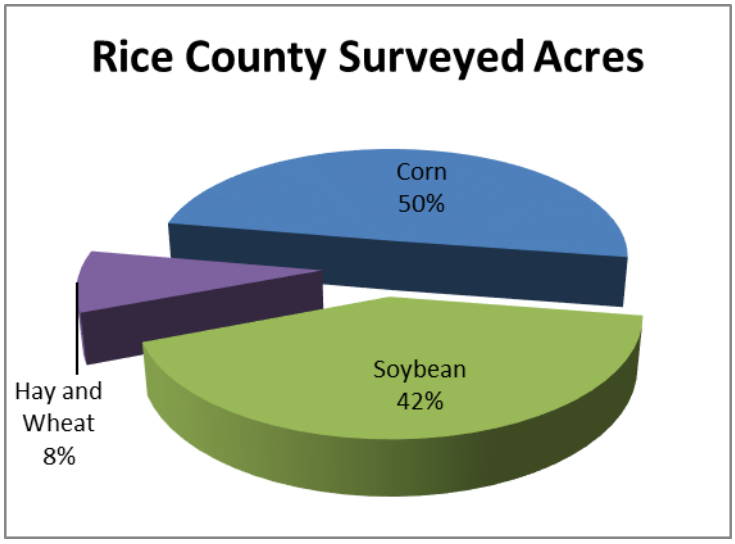

Table 103. Rice County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Glyphosate	75	1.4	0.97	1.31	11,519
Mesotrione	9	1.0	0.08	0.08	90
S-metolachlor	10	1.0	0.88	0.88	989
Insecticides					
Lambda-cyhalothrin	9	1.0	0.02	0.02	7

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Acetochlor, Atrazine, Bromoxynil, Clethodim, Clopyralid, Cloransulam, Fluazifop, Flumetsulam, Fluthiacet-methyl, Fomesafen, Lactofen, MCPA, and Sulfentrazone.
Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, Cyfluthrin, Esfenvalerate, Phostebupirim, Tefluthrin, and Thiamethoxam.
Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, and Trifloxystrobin.

Sibley County

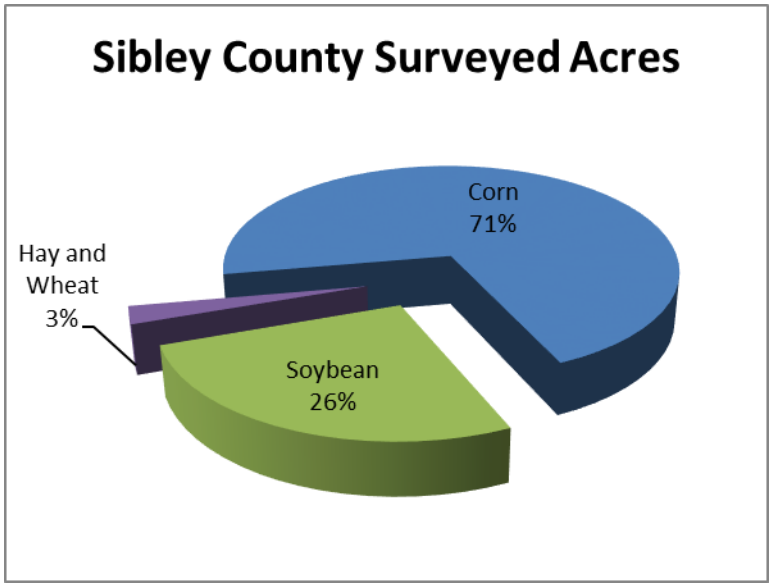

Table 104. Sibley County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Herbicides			(a.i.)	(a.i.)	(a.i.)
Acetochlor	34	1.0	1.05	1.05	2,905
Glyphosate	71	1.2	0.91	1.13	6,444
Mesotrione	24	1.0	0.07	0.07	134
Insecticides					
Chlorpyrifos	10	1.0	0.48	0.48	393
Lambda-cyhalothrin	8	1.0	0.02	0.02	14

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Atrazine, Bromoxynil, Clopyralid, Cloransulam, Dicamba, Dimethenamid-p, Flumetsulam, Flumioxazin, Fluthiacet-methyl, Imazethapyr, Nicosulfuron, Pyrasulfotole, Rimsulfuron, S-metolachlor, Saflufenacil, Sulfentrazone, Topramezone, Triencarbazone-methyl, and Trifluralin.
Insecticides applied but not published included the following: Beta-cyfluthrin, Bifenthrin, Gamma-cyhalothrin, Imidacloprid, Tefluthrin, and Thiamethoxam.
Fungicides applied but not published included the following: Azoxystrobin, Fluoxastrobin, Propiconazole, Pyraclostrobin, Tetraconazole, and Trifloxystrobin.

Steele County

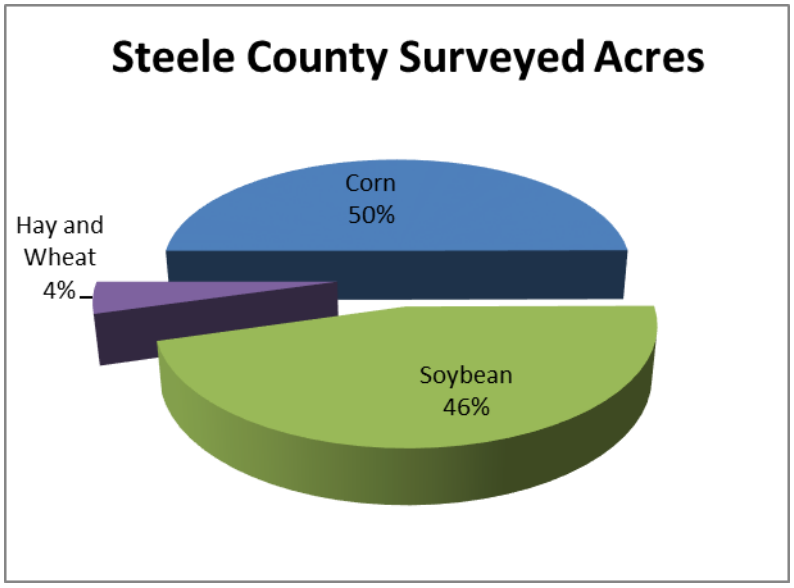

Table 105. Steele County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Herbicides			(a.i.)	(a.i.)	(a.i.)
Acetochlor	13	1.3	1.99	2.63	3,656
Glyphosate	72	1.5	0.95	1.41	10,682
Mesotrione	10	1.0	0.09	0.09	103
S-metolachlor	11	1.0	1.34	1.34	1,567
Insecticides					
Lambda-cyhalothrin	20	1.0	0.02	0.02	92
Fungicides					
Pyraclostrobin	7	1.0	0.08	0.08	121

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Clopyralid, Dimethenamid-p, Flumetsulam, Fluthiacet-methyl, Glufosinate-ammonium, Lactofen, MCPA, Pendimethalin, Rimsulfuron, Saflufenacil, Tembotrione, and Topramezone.
Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, Esfenvalerate, Gamma-cyhalothrin, Tefluthrin, Thiamethoxam, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Azoxystrobin, Metconazole, and Propiconazole.

Waseca County

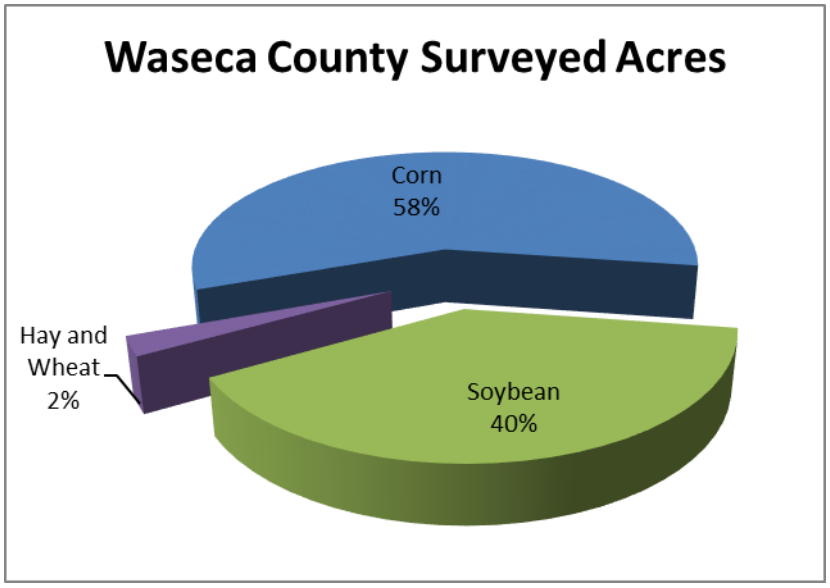

Table 106. Waseca County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Herbicides			(a.i.)	(a.i.)	(a.i.)
Acetochlor	19	1.0	1.35	1.35	1,983
Glyphosate	94	1.4	0.86	1.21	8,724
Mesotrione	5	1.0	0.08	0.08	33
S-metolachlor	9	1.0	0.77	0.77	507
Insecticides					
Lambda-cyhalothrin	15	1.0	0.02	0.02	21

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Atrazine, Clethodim, Clopyralid, Cloransulam, Flumetsulam, Fomesafen, Glufosinate-ammonium, Imazethapyr, Metribuzin, Saflufenacil, and Sulfentrazone.
Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, Cyfluthrin, Gamma-cyhalothrin, Phostebupirim, Tefluthrin, Thiamethoxam, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Azoxystrobin, Fluoxastrobin, Fluxapyroxad, Propiconazole, Prothioconazole, Pyraclostrobin, Tebuconazole, and Trifloxystrobin.

Watonwan County

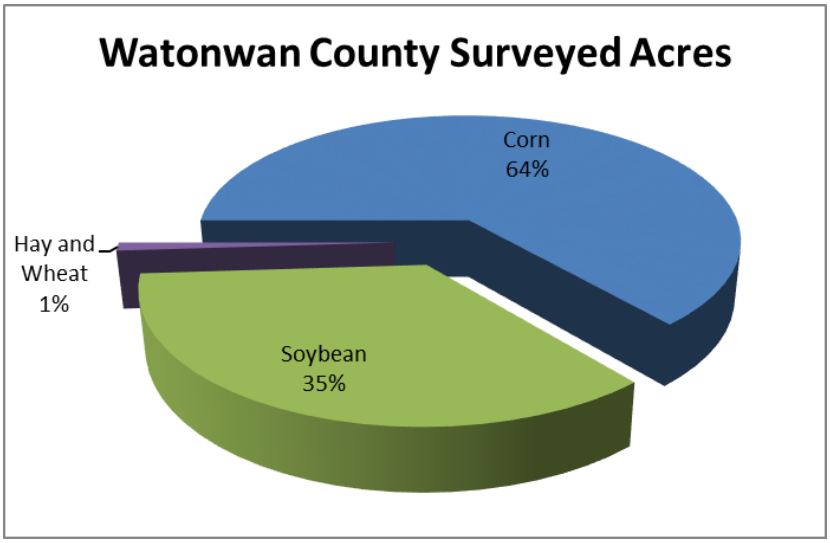

Table 107. Watonwan County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Herbicides			(a.i.)	(a.i.)	(a.i.)
Acetochlor	35	1.0	1.49	1.49	5,618
Glyphosate	92	1.2	1.04	1.27	12,800

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Cloransulam, Dimethenamid-p, Flumetsulam, Fluthiacet-methyl, Fomesafen, Glufosinate-ammonium, Mesotrione, S-metolachlor, Sulfentrazone, and Thifensulfuron.
Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, Gamma-cyhalothrin, Lambda-cyhalothrin, Terbufos, and Thiamethoxam.
Fungicides applied but not published included the following: Azoxystrobin, Chlorothalonil, Fluxapyroxad, Metconazole, and Pyraclostrobin.

Wright County

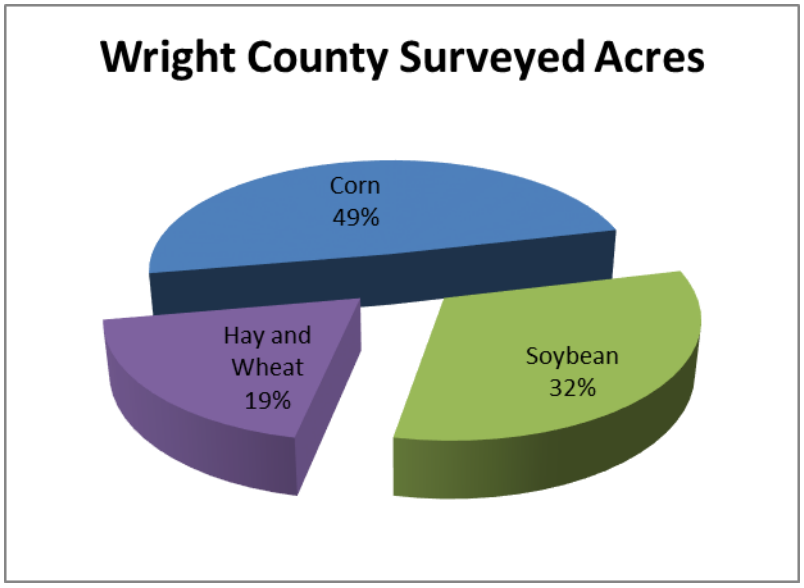

Table 108. Wright County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Glyphosate	77	1.3	1.04	1.33	3,554

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: 2,4-D, Acetochlor, Clethodim, Clopyralid, Dicamba, Diflufenzopyr, Fluazifop, Flumetsulam, Flumiclorac, Fluthiacet-methyl, MCPA, and Rimsulfuron.
Insecticides applied but not published included the following: Chlorpyrifos, Gamma-cyhalothrin, Lambda-cyhalothrin, and Thiamethoxam.
Fungicides applied but not published included the following: Azoxystrobin, Fluxapyroxad, Propiconazole, Pyraclostrobin, and Trifloxystrobin.

PMA 9 County Data

Dodge County

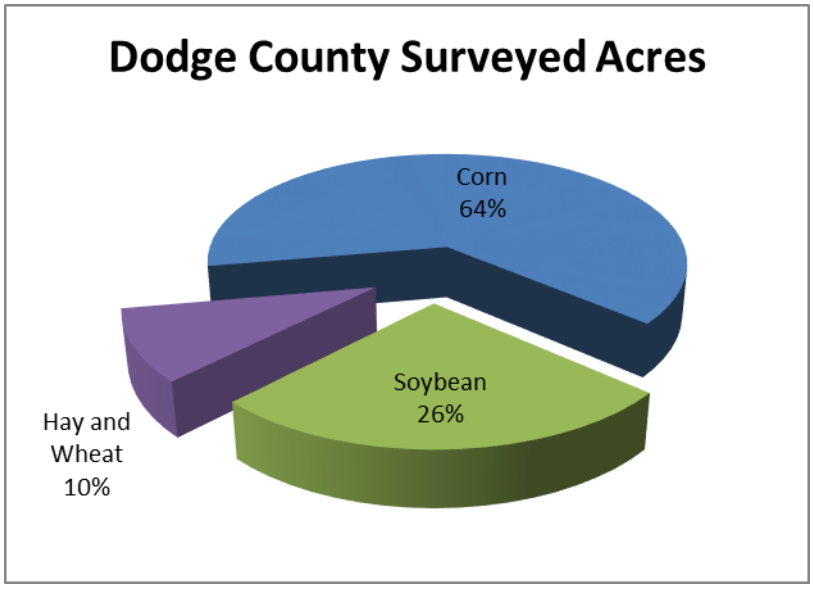

Table 109. Dodge County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Dimethenamid-p	16	1.0	0.38	0.38	849
Glyphosate	81	1.1	0.91	0.97	10,992
Saflufenacil	18	1.0	0.04	0.04	102
Insecticides					
Bifenthrin	25	1.0	0.08	0.08	278
Chlorpyrifos	16	1.0	0.35	0.35	765
Lambda-cyhalothrin	25	1.0	0.01	0.01	39
Fungicides					
Pyraclostrobin	20	1.0	0.10	0.10	280

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Cloransulam, Dicamba, Diflufenzopyr, Fluazifop, Flumetsulam, Fomesafen, Imazethapyr, Mesotrione, Pendimethalin, S-metolachlor, Sulfentrazone, and Tembotrione.
Insecticides applied but not published included the following: Chlorethoxyfos, Esfenvalerate, Gamma-cyhalothrin, Tefluthrin, and Thiamethoxam.
Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Prothioconazole, Tebuconazole, and Trifloxystrobin.

Fillmore County

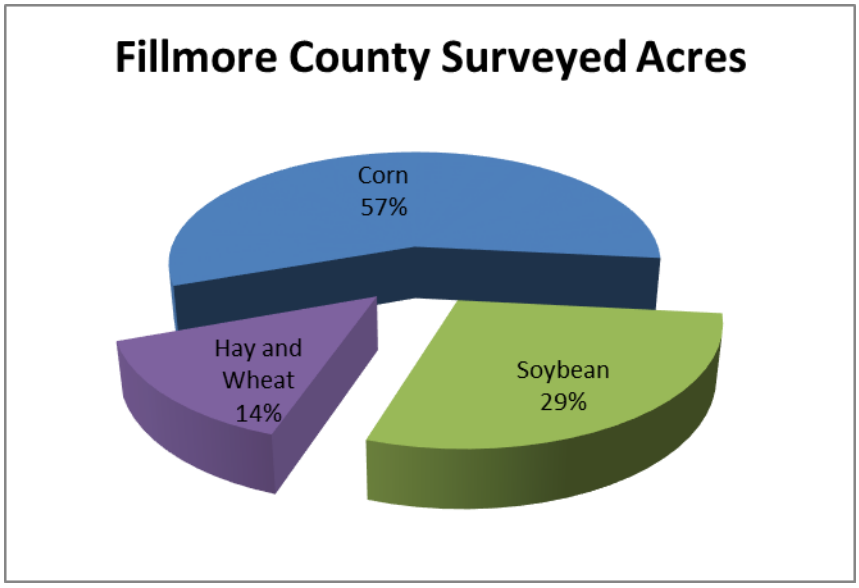

Table 110. Fillmore County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Herbicides			(a.i.)	(a.i.)	(a.i.)
Glyphosate	82	1.3	1.13	1.42	10,933
Mesotrione	15	1.0	0.09	0.09	136
S-metolachlor	15	1.0	0.95	0.95	1,345

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Clopyralid, Cloransulam, Dicamba, Diflufenzopyr, Dimethenamid-p, Flumetsulam, Flumiclorac, Fluthiacet-methyl, Halosulfuron, Imazethapyr, Primisulfuron, Saflufenacil, and Sulfentrazone.
Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, Lambda-cyhalothrin, Tefluthrin, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Azoxystrobin, Metconazole, Propiconazole, Pyraclostrobin, and Trifloxystrobin.

Goodhue County

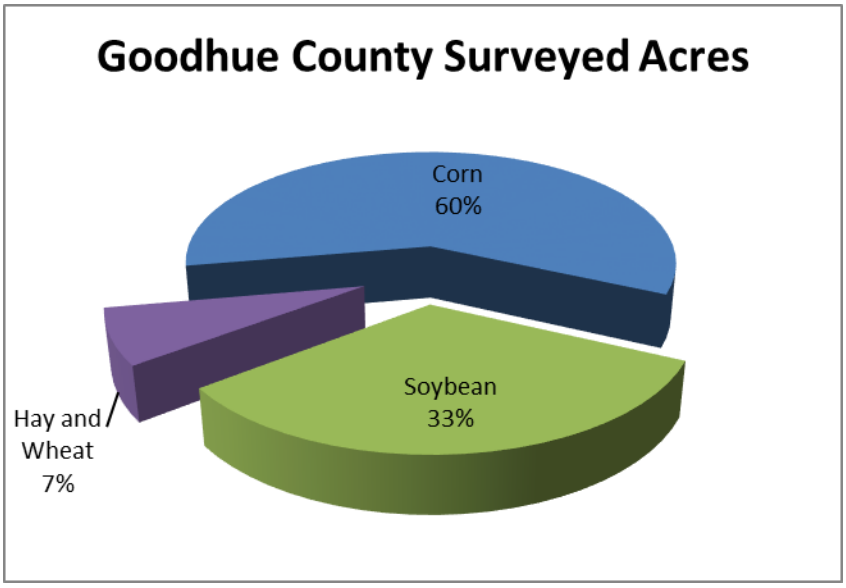

Table 111. Goodhue County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	33	1.0	1.06	1.06	4,354
Atrazine	10	1.0	0.50	0.50	620
Clopyralid	27	1.0	0.09	0.09	303
Dicamba	14	1.0	0.15	0.15	263
Flumetsulam	27	1.0	0.04	0.04	121
Glyphosate	87	1.1	0.98	1.11	11,919
Insecticides					
Bifenthrin	7	1.0	0.04	0.04	39
Lambda-cyhalothrin	9	1.0	0.02	0.02	26
Thiamethoxam	4	1.0	0.03	0.03	15

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Diflufenzopyr, Dimethenamid-p, Fluazifop, Fluthiacet-methyl, Imazamox, Imazethapyr, Lactofen, Mesotrione, Nicosulfuron, S-metolachlor, Saflufenacil, Tembotrione, Thifensulfuron, and Triencarbazone-methyl.
Insecticides applied but not published included the following: Chlorethoxyfos, Chlorpyrifos, Esfenvalerate, Gamma-cyhalothrin, and Tefluthrin.
Fungicides applied but not published included the following: Azoxystrobin, Metconazole, Propiconazole, Prothioconazole, Tebuconazole, and Trifloxystrobin.

Houston County

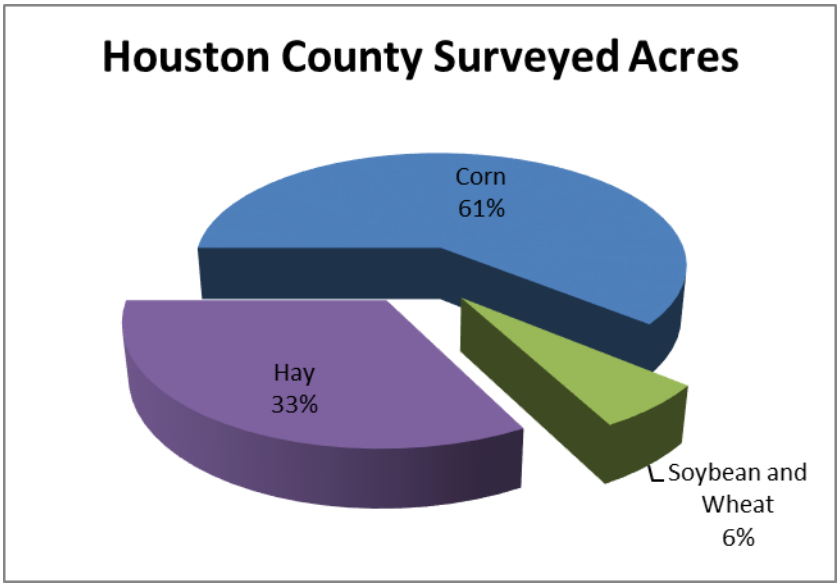

Table 112. Houston County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Herbicides			(a.i.)	(a.i.)	(a.i.)
Glyphosate	58	1.2	1.00	1.16	2,587

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Clethodim, Clopyralid, Cloransulam, Dicamba, Diflufenzopyr, Dimethenamid-p, Flumetsulam, Fluthiacet-methyl, Imazethapyr, Mesotrione, and S-metolachlor.
Insecticides applied but not published included the following: Beta-cyfluthrin, Bifenthrin, Dimethoate, Lambda-cyhalothrin, and Thiamethoxam.
Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Pyraclostrobin, and Trifloxystrobin.

Mower County

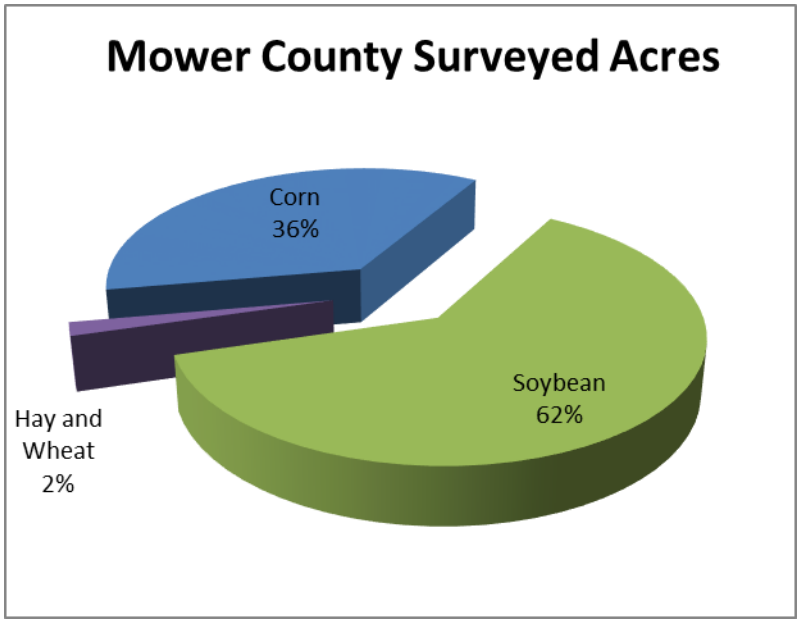

Table 113. Mower County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	13	1.0	0.99	0.99	1,938
Clopyralid	9	1.0	0.07	0.07	95
Flumetsulam	9	1.0	0.03	0.03	39
Glyphosate	94	1.1	0.92	1.01	14,073
Fungicides					
Pyraclostrobin	37	1.0	0.10	0.10	528

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Atrazine, Bromoxynil, Clethodim, Cloransulam, Dicamba, Diflufenzopyr, Dimethenamid-p, Fluazifop, Fomesafen, Glufosinate-ammonium, Imazethapyr, Lactofen, Mesotrione, Metribuzin, Pyrasulfotole, S-metolachlor, Saflufenacil, Sulfentrazone, Tembotrione, Thifensulfuron, Triencarbazone-methyl, and Trifluralin.
Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, Cyfluthrin, Esfenvalerate, Lambda-cyhalothrin, Phostebupirim, Tefluthrin, and Thiamethoxam.
Fungicides applied but not published included the following: Azoxystrobin and Metconazole.

Olmsted County

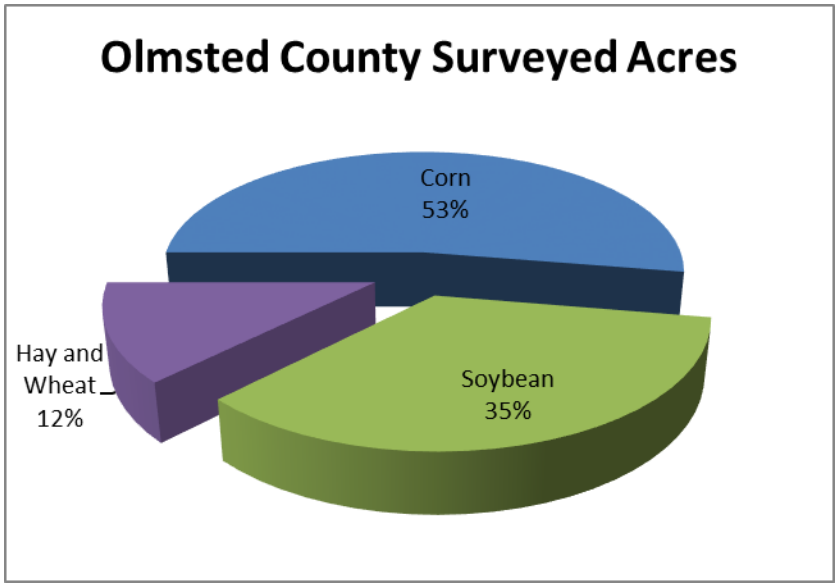

Table 114. Olmsted County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Herbicides			(a.i.)	(a.i.)	(a.i.)
Glyphosate	78	1.4	0.94	1.35	6,683
Insecticides					
Lambda-cyhalothrin	8	1.0	0.02	0.02	12

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Clethodim, Flufenacet, Imazamox, Imazethapyr, Mesotrione, Metribuzin, S-metolachlor, Saflufenacil, Tembotrione, and Thifensulfuron.
Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, Esfenvalerate, Gamma-cyhalothrin, Tefluthrin, Thiamethoxam, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Chlorothalonil, Propiconazole, Pyraclostrobin, and Trifloxystrobin.

Wabasha County

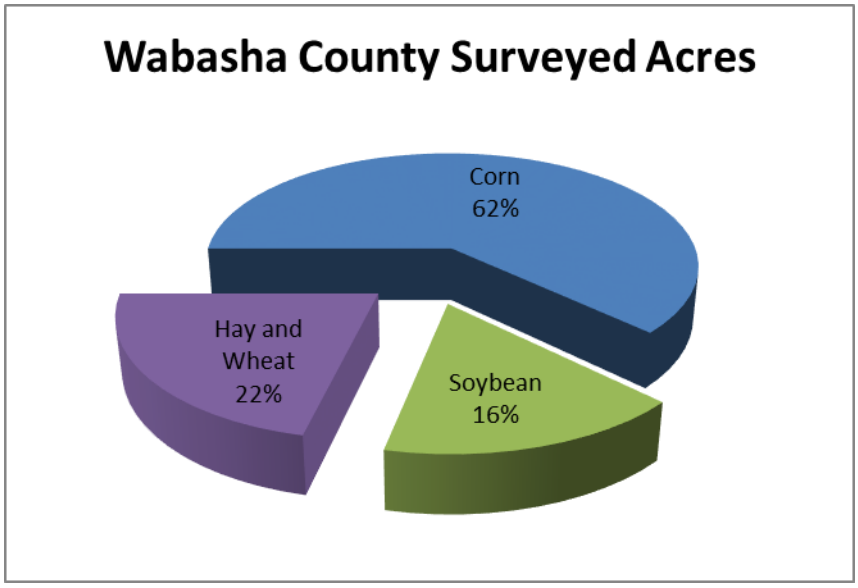

Table 115. Wabasha County pesticide applications and rates.

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Glyphosate	77	1.2	0.93	1.13	6,814
Insecticides					
Lambda-cyhalothrin	13	1.0	0.02	0.02	17

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Acetochlor, Atrazine, Clopyralid, Dimethenamid-p, Fluazifop, Flumetsulam, Imazethapyr, Mesotrione, S-metolachlor, Saflufenacil, Tembotrione, and Triencarbazone-methyl.
Insecticides applied but not published included the following: Bifenthrin, Chlorethoxyfos, Chlorpyrifos, Cyfluthrin, Gamma-cyhalothrin, Phostebupirim, Tefluthrin, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Propiconazole, Pyraclostrobin, Tetraconazole, and Trifloxystrobin.

Winona County

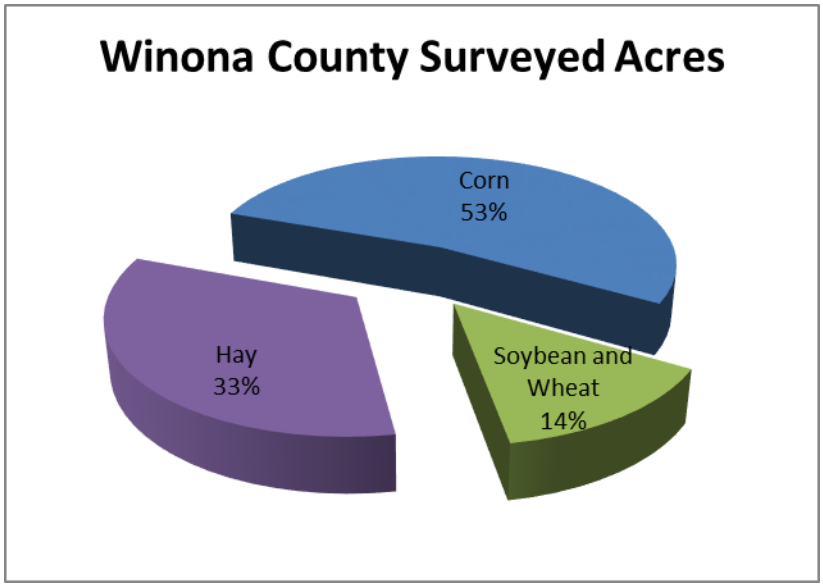

Table 116. Winona County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	28	1.0	0.79	0.79	1,157
Clopyralid	27	1.0	0.06	0.06	87
Flumetsulam	27	1.0	0.03	0.03	36
Glyphosate	65	1.1	0.84	0.89	3,010

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Cloransulam, Dimethenamid-p, Halosulfuron, Imazethapyr, Nicosulfuron, Primisulfuron, Rimsulfuron, Saflufenacil, and Sulfentrazone.
Insecticides applied but not published included the following: Cyfluthrin, Lambda-cyhalothrin, Phostebupirim, Tefluthrin, and Terbufos.
Fungicides applied but not published included the following: Azoxystrobin, Propiconazole, Pyraclostrobin, and Trifloxystrobin.

PMA 10 County Data

Anoka County

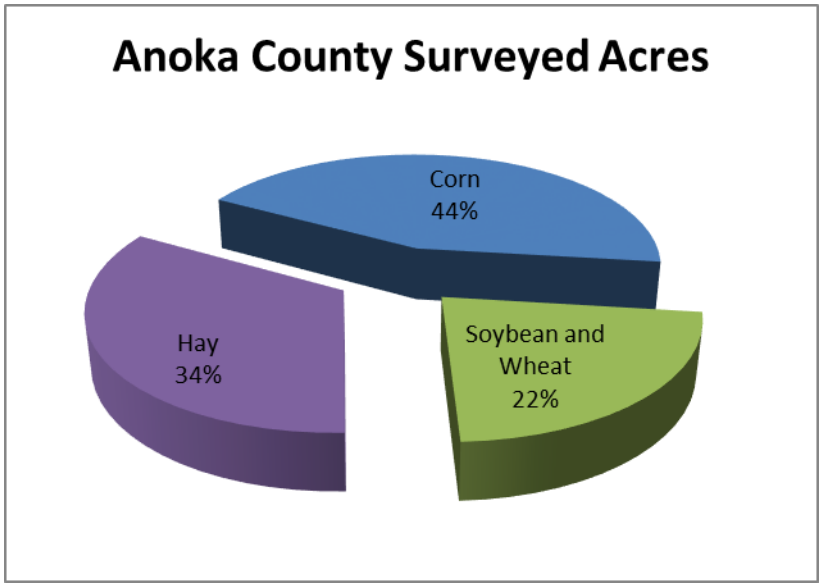

Table 117. Anoka County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Glyphosate	50	1.3	1.04	1.38	2,320

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Acetochlor, Atrazine, Clopyralid, Dicamba, Dimethenamid-p, Flumetsulam, Fluthiacet-methyl, Glufosinate-ammonium, Imazethapyr, Pendimethalin, and Saflufenacil.
Insecticides applied but not published included the following: Lambda-cyhalothrin.

Carver County

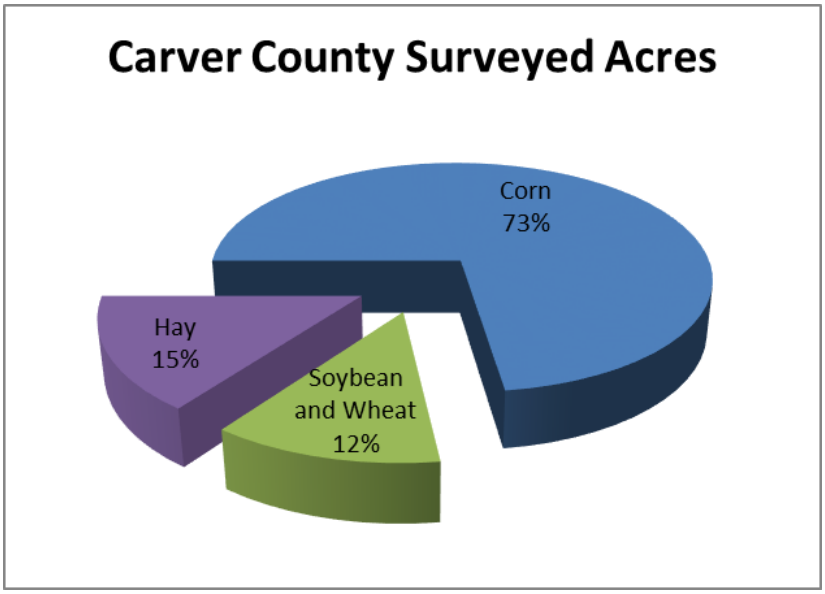

Table 118. Carver County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Acetochlor	55	1.0	1.02	1.02	3,867
Glyphosate	66	1.0	0.97	1.00	4,543
Insecticides					
Lambda-cyhalothrin	5	1.0	0.03	0.03	9

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Atrazine, Clethodim, Clopyralid, Cloransulam, Dicamba, Diflufenzopyr, Dimethenamid-p, Fluazifop, Flumetsulam, Fomesafen, Imazethapyr, Mesotrione, Pendimethalin, Phenmedipham, S-metolachlor, Saflufenacil, Tembotrione, and Thifensulfuron.
Insecticides applied but not published included the following: Esfenvalerate and Thiamethoxam.
Fungicides applied but not published included the following: Propiconazole, Prothioconazole, Pyraclostrobin, Tebuconazole, Tetraconazole, and Trifloxystrobin.

DakotaCounty

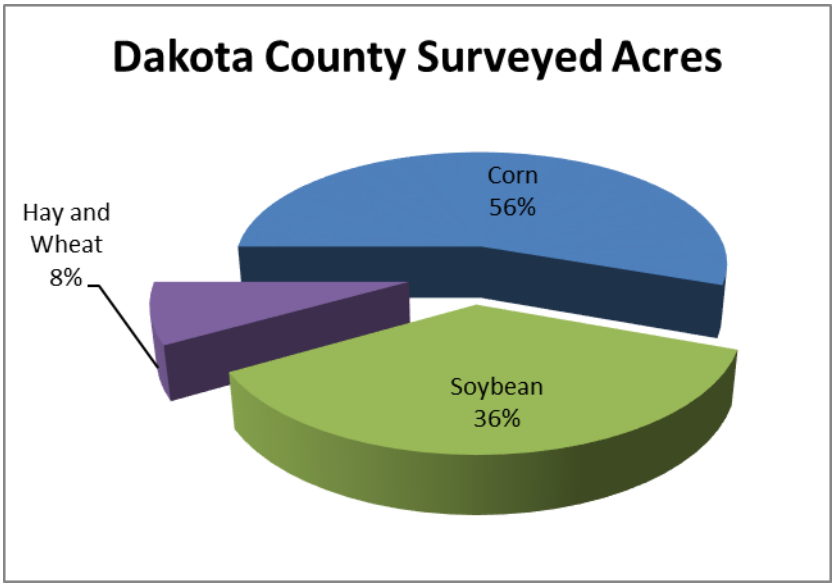

Table 119. Dakota County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Herbicides			(a.i.)	(a.i.)	(a.i.)
Glyphosate	76	1.3	0.93	1.21	6,225

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 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, Flumetsulam, Glufosinate-ammonium, Mesotrione, Nicosulfuron, Rimsulfuron, S-metolachor, and Trifluralin.
Insecticides applied but not published included the following: Lambda-cyhalothrin.

Scott County

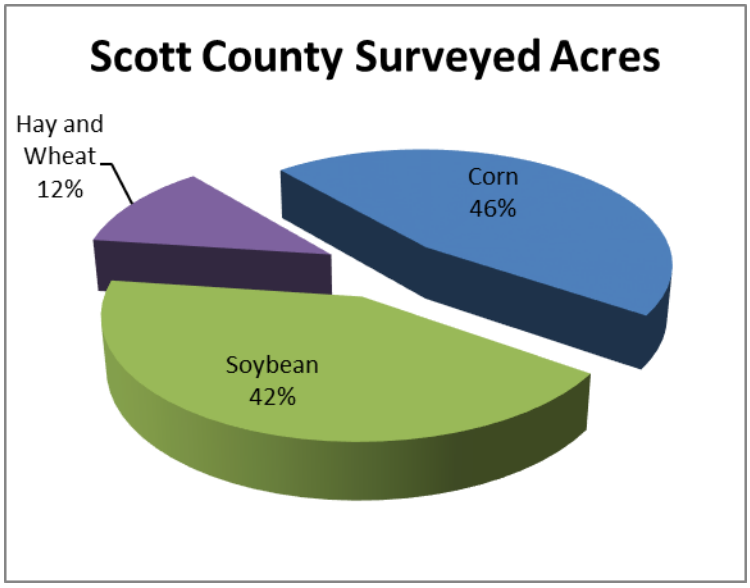

Table 120. Scott County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre*	*Pounds per Acre*	*Total Pounds*
Herbicides			(a.i.)	(a.i.)	(a.i.)
Glyphosate	81	1.1	1.06	1.14	4,924

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Acetochlor, Atrazine, Clopyralid, Cloransulam, Flumetsulam, Fomesafen, Imazethapyr, Lactofen, Mesotrione, S-metolachlor, Saflufenacil, and Sulfentrazone.
Insecticides applied but not published included the following: Bifenthrin, Esfenvalerate, Lambda-cyhalothrin, and Zeta-cypermethrin.
Fungicides applied but not published included the following: Propiconazole and Trifloxystrobin.

Washington County

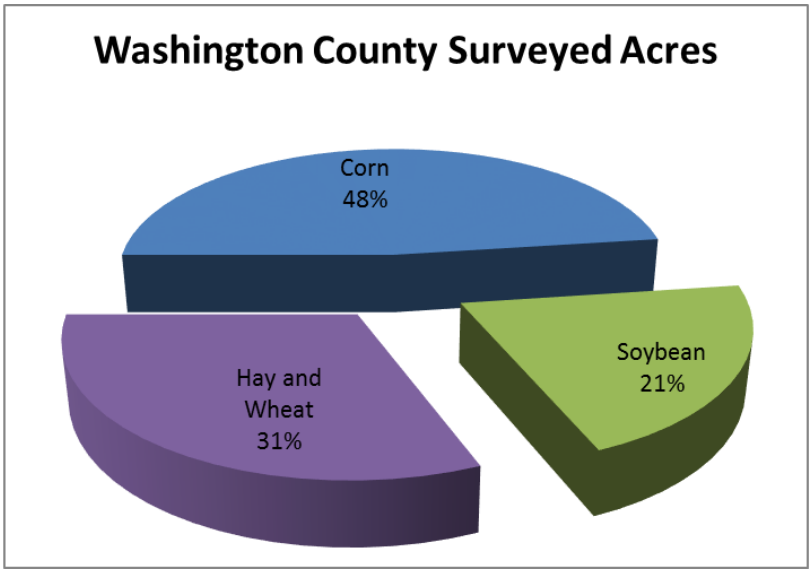

Table 121. Washington County pesticide applications and rates

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Appli-cations	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year[1]
	Percent	*Number*	*Pounds per Acre* (a.i.)	*Pounds per Acre* (a.i.)	*Total Pounds* (a.i.)
Herbicides					
Glyphosate	65	1.3	1.08	1.39	6,653

[1] Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this county. Data in this table and the selection of survey participants was not statistically "weighted" in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or county levels.

Herbicides applied but not published included the following: Acetochlor, Atrazine, Bromoxynil, Chlorimuron, Clethodim, Clopyralid, Dicamba, Dimethenamid-p, Flumetsulam, Glufosinate-ammonium, Imazethapyr, Mesotrione, Pinoxaden, Pyrasulfotole, S-metolachlor, Tembotrione, and Thifensulfuron.
Insecticides applied but not published included the following: Bifenthrin, Chlorpyrifos, Cyfluthrin, Lambda-cyhalothrin, and Phostebupirim.
Fungicdes applied but not published included the following: Azoxystrobin and Pyraclostrobin.

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 2013 Cropping Year
Minnesota Pesticide Use Survey Instrument For 2013 Cropping Year

1. ACREAGE

REPORT FOR THE FARM YOU OPERATE *(Include Land Rented From Others, Exclude Land Rented Out)*				
2013 Crop	**Total Acres Planted**	**Total Acres Treated With Fungicide**	**Total Acres Treated With Herbicide**	**Total Acres Treated With Insecticide**
CORN	201	202	203	204
WHEAT *(Durum, other Spring, Winter*)	206	207	208	209
SOYBEANS	211	212	213	214
ALL HAY	216	217	218	219

2. USAGE OF INDIVIDUAL PESTICIDES ON 2013 CROPS - Include applications after September 1, 2010 on crops for 2013 harvest. ***(Please report below the acres treated with each individual chemical during 2013 by crop and/or land use. If pesticides were applied in combination, report each separately. Exclude seed treatment and inoculants.)***

NAME OF PESTICIDE USED *(Please list chemicals used. If necessary, refer to the enclosed list)*	**Office Use**	**Acres Treated**	**No. of Applications**	**Rate**	**Unit Code:** 1 Pounds 12 Gallons 13 Quarts 14 Pints 15 Ounces 30 Grams
CORN					
	301	302	303	304	305
	306	307	308	309	310
	311	312	313	314	315
	316	317	318	319	320

	321	322	323	324	325
	326	327	328	329	330
	331	332	333	334	335
	336	337	338	339	340
	341	342	343	344	345
	346	347	348	349	350
	351	352	353	354	355
	356	357	358	359	360
	361	362	363	364	365
	366	367	368	369	370
NAME OF PESTICIDE USED (Please list chemicals used. If necessary, refer to the enclosed list)	**Office Use**	**Acres Treated**	**No. of Applications**	**Rate**	**Unit Code:** 1 Pounds 12 Gallons 13 Quarts 14 Pints 15 Ounces 30 Grams
WHEAT (Durum, other Spring, Winter)					
	401	402	403	404	405
	406	407	408	409	410
	411	412	413	414	415
	416	417	418	419	420
	421	422	423	424	425
	426	427	428	429	430
	431	432	433	344	345
	436	437	438	439	440
	441	442	443	444	445
	446	447	448	449	450
	451	452	453	454	455
	456	457	458	459	460
NAME OF PESTICIDE USED *(Please list chemicals used. If necessary, refer to the enclosed list)*	**Office Use**	**Acres Treated**	**No. of Applications**	**Rate**	**Unit Code:** 1 Pounds 12 Gallons 13 Quarts 14 Pints 15 Ounces 30 Grams
SOYBEAN					
	501	502	503	504	505
	506	507	508	509	510
	511	512	513	514	515
	516	517	518	519	520

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

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

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

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

Appendix 2. Additional Project Background Information

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

The first pilot[9] 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, arealy-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[10] 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

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

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.