Herbicide Selection and Management Practices Associated with Minnesota's 2010 Corn Production

Minnesota Department of Agriculture
USDA, NASS, Minnesota Field Office

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Abstract

The Minnesota Department of Agriculture (MDA) is responsible for the development and promotion of herbicide Best Management Practices (BMPs) which optimize production and profitability while protecting the state's water resources. The MDA is also responsible for monitoring pesticide use and for promoting the adoption of associated BMPs. This survey was designed and conducted in partnership with the National Agricultural Statistics Service (NASS) to specifically assess the status of BMP awareness and adoption in relation to the use of corn herbicides.

In Minnesota, the corn herbicide active ingredients atrazine and acetochlor (and their breakdown products) are detected frequently in groundwater and surface water resources. While atrazine does not exceed the applicable drinking water standards in groundwater, in 2001 and 2005 acetochlor concentrations in two southern Minnesota watersheds exceeded water quality standards to protect aquatic life. The MDA has invested considerable staff time in water monitoring, development of BMP education programs, and BMP assessment. Atrazine and acetochlor are the main focus of this survey. Phone enumerators located at NASS contacted over 4,000 producers in early 2011. From this pool, approximately 2,700 farmers who raised corn during the 2010 growing season shared valuable information on herbicide selection and management.

The general purpose of this survey was to ask farmers about fundamental herbicide use practices such as record keeping, reading the label, scouting, responsibility for making decisions on product selection and timing, and knowledge about physical characteristics (soil texture, depth to groundwater, use of buffer strips, etc.). More specific questions related to atrazine and acetochlor included the use of split applications, reduced rates, and incorporation.

These types of surveys help MDA understand regulatory compliance, adoption of voluntary practices, potential informational roadblocks, and opportunities for future technical assistance.

Every other year, the MDA has partnered with NASS to produce a detailed report on pesticide use and rates used on the state's four major crops. Readers are encouraged to visit the most recent report, "2009 Pesticide Usage on Four Major Minnesota Crops" at http://www.mda.state.mn.us/news/publications/chemfert/2009pesticideuse.pdf

Acknowledgements

This survey was a cooperative effort by the Minnesota Department of Agriculture (MDA), the United States Department of Agriculture (USDA), National Agricultural Statistics Service (NASS), and the NASS Field Offices in Minnesota and North Dakota. The detailed information about herbicide use practices could not have been collected without the cooperation of the thousands of farmers who voluntarily responded to the survey in the midst of their busy lives, and for this we are extremely grateful. Similarly, the assistance of agricultural chemical dealers and cooperatives is much appreciated. Special thanks go to Doug Hartwig and Dan Lofthus, Director and Deputy Director, respectively of the NASS Minnesota Field Office, Darin Jantzi,

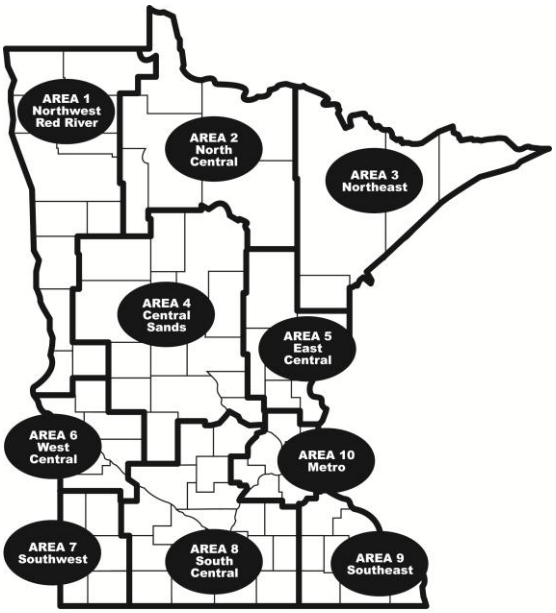
Director of the NASS North Dakota Field Office and their respective staff for assistance with survey design, data collection and processing. The MDA is ultimately responsible for the representations of data provided in this report and for the design of the survey mechanism used to collect that data. Excellent participation and good record keeping practices by Minnesota farmers and agricultural chemical dealerships played a vital part in providing complete and detailed herbicide information.

2010 Herbicide Use Practices Summary and Highlights

This report summarizes survey results for a number of important practices associated with herbicide use on Minnesota's 2010 corn acres. Over 2,600 producers participated in the telephone survey and herbicide information was collected for 694,194 corn acres, representing 9 percent of Minnesota's 7,700,000 corn acres. Survey questions focused on the 96 percent of the respondents that used herbicides for weed control. The survey targeted a variety of practices including herbicide selection and associated management practices (e.g., MDA's herbicide BMPs). This is the fourth herbicide survey performed by the MDA and NASS to collect information on herbicide management practices on Minnesota corn acres.

Survey Design and Implementation

Ten Pesticide Monitoring Areas (noted as "PMA" throughout the report), were previously developed by MDA staff. Counties were clustered based on similarities in geology, soils, and crops. These areas also define the general boundaries of the monitoring regions used by the MDA water resource monitoring program. More information about PMA designations can be found at http://www.mda.state.mn.us/chemicals/pesticides/~/media/Files/chemicals/2009gwmnetdesign.ashx Regional pesticide use information is used to help design and implement specific water quality monitoring and pesticide educational programs.



NASS developed a sampling population of 7,000 farms by randomly drawing from its entire database of all corn growers in Minnesota. Of those sampled 2,673 farmers that raised corn in 2010 completed the survey. The definition of "corn" for purposes of this report includes both grain and silage and excludes sweet corn and popcorn. All growers were asked four basic questions regarding herbicide selection and management. The remaining questions were for those farmers who used atrazine or acetochlor.

Due to the low intensity of row crop agriculture in portions of northern Minnesota, farmers in PMA 2 and PMA 3 were not surveyed.

Introduction

Data Collection Process and History

The MDA is required by state law to monitor pesticide use on a biennial basis. Minn. Stat. § 18B.064. In pursuit of fulfilling that responsibility, the MDA began exploring the possibility of using the existing framework of the 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[1] was conducted in 2001 by expanding the existing Agricultural Resource Management Study (ARMS) developed by NASS. The normal number of participating Minnesota corn farms in an ARMS survey is about 150. The pilot increased the number of personal interviews to approximately 600 and most of the enhancements were focused on the southern third of the state. The pilot provided reliable regionally-enhanced data on pesticide product choices and application rates. Additionally, useful information on primary sources of pesticide management information, scouting, timing, and other pesticide management related information was obtained.

In neighboring North Dakota, the USDA, NASS, the 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. With the goal of expanding to a statewide scale while reducing costs, a second pilot[2] 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 or telephone style surveys have been unsuccessful at quantifying pesticide rates. Due to the numerous formulations, different application rates and units of measure (i.e. Active Ingredient [AI] can be expressed in pounds, ounces, pints or quarts), complications can quickly develop. Another major complicating factor may result due to the farmer using the services of a commercial pesticide applicator. If the farmer did not apply the product, the likelihood that the farmer would be familiar with the product and rate decreases significantly.

The second pilot survey was conducted in 2003 to test two methods of collecting pesticide rate information. “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 information that was provided. “Method Two” was used in neighboring Grant County, where another 150 farm operators were contacted, and when farm records were incomplete, follow-up calls were made to the pesticide dealer to complete the survey. The number of surveys with complete data sets significantly increased with the additional assistance

[1] “Expanded Minnesota Agricultural Statistics Pesticide Use Data”, 2003, by NASS and MDA.
[2] Unpublished data. From the September 20, 2003 EPA Report.

from the dealerships. Eighty-three percent of the surveys were complete in Grant County, where dealer follow-up calls were made, compared to forty-six percent in Douglas County. Equally impressive was the overall support by the local dealerships.

Subsequently, statewide surveys are conducted using "Method Two" from the pilot project conducted in Douglas and Grant Counties.

Farmers are interviewed over the phone in April and May. These are "cold calls," meaning that the farmers did not get any type of notification about the survey prior to the contact. Consequently, all information collected using this approach is based upon either the participant's memory or information readily available during the interview. The interviews typically last five to ten minutes.

Survey questions can be found in Appendix 1. Corresponding question numbers (noted as "Q" followed by the survey question number) are incorporated throughout the report and also in the table captions. The reader is encouraged to reference the survey to help interpret the results.

Questions are grouped into four categories including:

1. **General information**. Who applied the product, label and active ingredients, and record-keeping;
2. **Scouting for weeds and related practices**. Scouting, mapping, weed type, density, and herbicide resistant corn varieties;
3. **Water resources**. Physical distances from ground water, surface water and buffers, and irrigation management plans; and
4. **General practices.** Herbicide rotations and dealer involvement in herbicide management.

After obtaining some very general NASS information (Q.1), participants were then asked if they grew corn during the 2010 cropping season (Q.2). The interview process ended if they had not produced field or silage corn. Participants were then asked to identify the number of corn acres planted (Q.3). Table 1 includes the number of respondents and associated corn acres by county and Pesticide Monitoring Area. Also, included in Table 1 is the NASS total corn acres for Minnesota (2010) and the percentage of acres surveyed.

Data Reporting and Limitations

The primary purpose of this survey was to obtain an understanding of basic herbicide management practices associated with corn production. Participants were asked to identify the herbicides used in very generic terms. Some knowledge of the herbicides used (i.e. soil applied, post-emergent, etc.) is essential to understand the current management strategies associated with them. It is important to note that the MDA and its partners provide a highly detailed herbicide use and application rate report on a biennial basis[3].

[3] "2009 Pesticide Usage on Four Major Minnesota Crops" found on the MDA website at: http://www.mda.state.mn.us/en/Global/MDADocs/chemfert/others/2009pesticideuse.aspx

Due to the simplified method used to collect what is typically considered complex data, it is imperative that the reader understand the limitations of the data sets. Many surveys conducted by NASS employ advanced sampling strategies which are designed to statistically represent a non-homogenous population, thus "weighting" the data to account for sample size, county size, and crop acreage, etc. Such strategies can be very expensive and are not without their own limitations.[4] This survey did not employ such strategies; rather, corn farmers were randomly selected from across Minnesota. Therefore, weighting across areas or counties was not performed. The MDA can be contacted to further discuss interpretation of the survey data.

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

Table 1. Summary of respondents and corresponding corn acres by county and PMAs.

County	Pesticide Monitoring Area (PMA)	Number of Respondents	2010 Planted Corn Acres	Surveyed Corn Acres	Percentage of Acres Surveyed
Clay	1	26	101,000	11,443	11%
Grant	1	16	100,500	6,282	6%
Kittson	1	3	**	290	**
Mahnomen	1	4	33,700	1,050	3%
Marshall	1	7	7,500	729	8%
Norman	1	23	72,000	8,523	12%
Polk	1	4	44,200	2,534	6%
Red Lake	1	5	12,200	729	6%
Roseau	1	6	**	2,575	**
Traverse	1	12	124,000	7,044	6%
Wilkin	1	17	76,300	9,959	13%
Totals/Average	**1**	**123**	**571,400**	**51,158**	**9%**
Becker	4	17	40,600	2,707	7%
Benton	4	31	57,000	3,848	4%
Cass	4	8	**	702	**
Crow Wing	4	7	7,200	547	8%
Douglas	4	30	58,000	4,437	8%
Hubbard	4	4	**	246	**
Kandiyohi	4	42	156,500	15,809	10%
Morrison	4	89	90,000	8,162	9%
Otter Tail	4	87	142,500	19,880	13%
Pope	4	35	105,500	12,429	12%
Sherburne	4	16	28,500	5,181	18%
Stearns	4	169	202,500	24,936	12%
Todd	4	72	67,500	7,699	11%
Wadena	4	14	20,000	1,664	8%
Totals/Average	**4**	**621**	**975,800**	**108,247**	**11%**
Aitkin	5	5	2,600	380	15%
Chisago	5	20	27,200	4,320	16%
Isanti	5	21	32,900	5,142	16%
Kanabec	5	10	12,800	986	7%
Mille Lacs	5	25	22,500	2,931	13%
Pine	5	22	18,300	1,405	8%
Totals/Average	**5**	**103**	**116,300**	**15,164**	**13%**
Big Stone	6	16	87,200	4,580	5%
Chippewa	6	33	148,500	19,716	13%
Lac Qui Parle	6	43	170,500	18,158	11%
Stevens	6	28	137,000	11,249	8%
Swift	6	30	181,000	10,962	6%
Yellow Medicine	6	46	190,000	17,676	9%
Totals/Average	**6**	**196**	**914,200**	**82,341**	**9%**

Table 1 (continued). Summary of respondents and corresponding corn acres by county and PMAs.

County	Pesticide Monitoring Area (PMA)	Number of Respondents	2010 Planted Corn Acres[§]	Surveyed Corn Acres	Percentage of Acres Surveyed
Lincoln	7	38	109,000	13,158	12%
Lyon	7	42	183,500	12,315	7%
Murray	7	38	176,500	9,957	6%
Nobles	7	62	200,500	14,916	7%
Pipestone	7	36	111,000	7,231	7%
Rock	7	28	136,000	5,618	4%
Totals/Average	7	244	916,500	63,195	7%
Blue Earth	8	46	186,000	12,641	7%
Brown	8	49	160,000	12,476	8%
Cottonwood	8	48	172,000	18,221	11%
Faribault	8	48	212,500	23,285	11%
Freeborn	8	48	194,000	21,411	11%
Jackson	8	46	196,500	13,666	7%
Le Sueur	8	37	90,100	6,481	7%
Martin	8	56	215,500	19,158	9%
McLeod	8	37	113,500	8,222	7%
Meeker	8	37	122,500	7,919	6%
Nicollet	8	38	125,000	12,016	10%
Redwood	8	61	236,000	17,177	7%
Renville	8	68	252,500	23,838	9%
Rice	8	33	88,900	9,657	11%
Sibley	8	47	156,500	11,449	7%
Steele	8	31	111,000	10,771	10%
Waseca	8	50	118,000	17,692	15%
Watonwan	8	28	130,000	14,729	11%
Wright	8	40	75,100	5,112	7%
Totals/Average	8	848	2,955,600	265,921	9%
Dodge	9	24	120,500	6,831	6%
Fillmore	9	77	171,000	17,858	10%
Goodhue	9	84	154,000	15,828	10%
Houston	9	54	56,300	7,885	14%
Mower	9	48	196,500	16,278	8%
Olmsted	9	62	116,000	12,954	11%
Wabasha	9	49	86,800	7,861	9%
Winona	9	47	79,900	5,813	7%
Totals/Average	9	445	981,000	91,308	9%
Anoka	10	5	7,000	300	4%
Carver	10	21	58,200	3,320	6%
Dakota	10	29	86,000	6,818	8%
Scott	10	22	36,700	3,061	8%
Washington	10	16	19,600	3,361	17%
Totals/Average	10	93	207,500	16,860	8%

County	Pesticide Monitoring Area (PMA)	Number of Respondents	2010 Planted Corn Acres[§]	Surveyed Corn Acres	Percentage of Acres Surveyed
State	**All**	**2,673**	**7,233,900[5]**	**694,194**	**9%**

[§] Note: USDA/NASS Minnesota Corn Acreage Planted * Not reported by NASS

Statewide Herbicide Applications and Management on Corn

Ninety-six percent (96%) of the respondents reported using herbicides and those respondents managed 98% of the corn acres reported in this survey (Table 2). As previously stated, if herbicides were not used, the respondent's survey was then concluded.

Tables 3 through 30 contain information from all corn producers that used herbicides. Because, not all farmers answered every question, the sum of total acres and the sum of total respondents are sometimes less than the statewide averages.

Participants were then asked who made the application (Q. 4). Forty-eight (48%) of the respondents reported self-applied, 42% of the respondents reported custom applied and 10% of the respondents reported both self-applied and custom applied. Table 3 summarizes who applied the application and the responses are grouped by PMAs.

Farmers who applied their own herbicides averaged 386 acres of corn while farmers who had pesticides custom applied averaged 138 acres of corn. Farmers who both self-applied and custom applied herbicides raised an average of 334 acres of corn.

Table 2. Percentage of respondents that used corn herbicides.

Pesticide Monitoring Area	Do You Use Herbicides?	Percent of All Respondents
1 – Northwest Red River	Yes	95
1 – Northwest Red River	No	5
4 – Central Sands	Yes	93
4 – Central Sands	No	7
5 – East Central	Yes	93
5 – East Central	No	7
6 – West Central	Yes	97
6 – West Central	No	3
7 – Southwest	Yes	95
7 – Southwest	No	5
8 – South Central	Yes	98
8 – South Central	No	2

[5] Total is only the number of acres within the survey data, not the total acres of corn grown in Minnesota. Minnesota grew 7.7 million acres of corn in 2010.

Pesticide Monitoring Area	Do You Use Herbicides?	Percent of All Respondents
9 – Southeast	Yes	95
9 – Southeast	No	5
10 – Metro	Yes	98
10 – Metro	No	2
Statewide	Yes	96
Statewide	No	4

Table 3. "Did you: Apply herbicides yourself? Have herbicides custom applied? Both?" (Q.4)

Pesticide Monitoring Area	Application Type	Percent of Respondents	Average Corn Acres per Respondent
1 – Northwest Red River	Self-Applied	59	287
1 – Northwest Red River	Custom Applied	26	122
1 – Northwest Red River	Both	15	560
4 – Central Sands	Self-Applied	43	214
4 – Central Sands	Custom Applied	50	130
4 – Central Sands	Both	7	146
5 – East Central	Self-Applied	60	102
5 – East Central	Custom Applied	37	108
5 – East Central	Both	3	526
6 – West Central	Self-Applied	45	688
6 – West Central	Custom Applied	34	223
6 – West Central	Both	21	376
7 – Southwest	Self-Applied	51	395
7 – Southwest	Custom Applied	38	224
7 – Southwest	Both	11	559
8 – South Central	Self-Applied	46	459
8 – South Central	Custom Applied	38	235
8 – South Central	Both	16	299
9 – Southeast	Self-Applied	34	335
9 – Southeast	Custom Applied	58	125
9 – Southeast	Both	8	247
10 – Metro	Self-Applied	38	274
10 – Metro	Custom Applied	47	140
10 – Metro	Both	14	58
Statewide	Self-Applied	48	386
Statewide	Custom Applied	42	138
Statewide	Both	10	334

Farmers were asked, "Do you know the active ingredients (AI) of the herbicides you used in 2010?" (Q.5). Based upon previous surveys, most farmers identified the product name (i.e. "Roundup", etc.), but identifying the AI (i.e. glyphosate) was considerably more challenging. Of all statewide respondents (self-applicators and those that hired a custom applicator), 67% stated they knew the A.I. in their herbicide applications and 6% stated they knew some of the AI (Table 4). Seventy-eight percent of the farmers that applied the products themselves[6] were able to

[6] Farmers that applied pesticides themselves, referred to as "self-applicators," includes farmers that self-apply and farmers that self-apply and custom apply (both), but not farmers who only had herbicides custom applied.

identify the AI. It must be emphasized that farmers were asked these questions "on the spot" and were not given the opportunity to check their records during the telephone interview.

Table 4. "Do you know the active ingredients of the herbicides you used in 2010?" (Q.5)

Pesticide Monitoring Area	Knew the Active Ingredients	Percent of All Respondents	Percent of "Self-Applicators"
1 – Northwest Red River	Yes	84	90
1 – Northwest Red River	No	15	8
1 – Northwest Red River	Some	2	2
4 – Central Sands	Yes	66	78
4 – Central Sands	No	31	17
4 – Central Sands	Some	4	5
5 – East Central	Yes	68	77
5 – East Central	No	25	18
5 – East Central	Some	6	5
6 – West Central	Yes	69	73
6 – West Central	No	24	20
6 – West Central	Some	7	7
7 – Southwest	Yes	70	76
7 – Southwest	No	26	19
7 – Southwest	Some	4	4
8 – South Central	Yes	68	76
8 – South Central	No	24	17
8 – South Central	Some	8	7
9 – Southeast	Yes	59	75
9 – Southeast	No	33	18
9 – Southeast	Some	8	6
10 – Metro	Yes	68	75
10 – Metro	No	27	19
10 – Metro	Some	4	6
Statewide	Yes	67	77
Statewide	No	27	17
Statewide	Some	6	4

*Area or state totals may not add due to rounding

Producers were asked if they kept pesticide application records on the farm (Q.6). Sixty-eight percent of all statewide respondents kept all their herbicide records on the farm and 3% kept some records on the farm (Table 5). Eighty-seven percent of the farmers that applied their own herbicides kept records on the farm.

Table 5. "Do you keep herbicide application records on your farm?" (Q.6)

Pesticide Monitoring Area	Kept "On Farm" Pesticide Records	Percent of All Respondents	Percent of Self-Applicators
1 – Northwest Red River	Yes	83	90
1 – Northwest Red River	No	15	9
1 – Northwest Red River	Some	2	1
4 – Central Sands	Yes	62	81
4 – Central Sands	No	36	17
4 – Central Sands	Some	3	2
5 – East Central	Yes	59	72
5 – East Central	No	34	20
5 – East Central	Some	7	8
6 – West Central	Yes	75	91
6 – West Central	No	21	4
6 – West Central	Some	4	5
7 – Southwest	Yes	75	86
7 – Southwest	No	24	12
7 – Southwest	Some	2	2
8 – South Central	Yes	73	90
8 – South Central	No	24	8
8 – South Central	Some	3	2
9 – Southeast	Yes	60	86
9 – Southeast	No	37	13
9 – Southeast	Some	3	1
10 – Metro	Yes	68	90
10 – Metro	No	27	8
10 - Metro	Some	4	2
Statewide	Yes	68	87
Statewide	No	28	11
Statewide	Some	3	2

*Area or state totals may not add due to rounding

Participants were asked about the practice of reading the label (Q.7) and the results are provided in Table 6. Ninety-two percent of all statewide respondents who applied herbicide themselves usually read the label. This percentage drops to 66% for farmers who hired custom applicators.

Table 6. "Do you usually read the label for pesticide products applied on your farm?" (Q.7)

Pesticide Management Area	Response to "Reading the Label"	Percent of All Respondents	Percent of Self-Applicators
1 – Northwest Red River	Yes	83	97
1 – Northwest Red River	No	17	3
4 – Central Sands	Yes	59	93
4 – Central Sands	No	41	7
5 – East Central	Yes	72	90
5 – East Central	No	28	10
6 – West Central	Yes	72	89
6 – West Central	No	28	11
7 – Southwest	Yes	73	93
7 – Southwest	No	27	7
8 – South Central	Yes	69	81
8 – South Central	No	31	9
9 – Southeast	Yes	58	92
9 – Southeast	No	42	8
10 – Metro	Yes	65	92
10 – Metro	No	35	2
Statewide	Yes	66	92
Statewide	No	34	8

*Area or state totals may not add due to rounding

Participants were asked if they applied atrazine to their corn acres. A "Yes" response means they did use atrazine on at least **some** of their corn acres. A "No" response means they did not use atrazine on any of their corn acres. Table 7 details the responses to the question of whether atrazine was used and the percentage of farmers who knew if they applied atrazine (answered yes or no). Statewide, eleven percent of the respondents applied atrazine on some of their acres.

Table 7. "Was Atrazine applied on any of your corn acres in 2010, premixes included?" (Q.8)

Pesticide Monitoring Area	Atrazine Applied	Percent of All Respondents	Percent of Respondents That Reported Yes or No[§]
1 – Northwest Red River	Yes	3	2
1 – Northwest Red River	No	95	98
1 – Northwest Red River	Don't Know	3	
4 – Central Sands	Yes	10	11
4 – Central Sands	No	85	89
4 – Central Sands	Don't Know	6	
5 – East Central	Yes	19	20
5 – East Central	No	76	80
5 – East Central	Don't Know	5	
6 – West Central	Yes	10	10
6 – West Central	No	89	90
6 – West Central	Don't Know	2	
7 – Southwest	Yes	10	8
7 – Southwest	No	88	92
7 – Southwest	Don't Know	2	
8 – South Central	Yes	8	9
8 – South Central	No	89	91
8 – South Central	Don't Know	3	
9 – Southeast	Yes	21	33
9 – Southeast	No	74	67
9 – Southeast	Don't Know	5	
10 – Metro	Yes	20	27
10 – Metro	No	74	73
10 – Metro	Don't Know	7	
Statewide	Yes	11	13
Statewide	No	85	87
Statewide	Don't Know	4	

[§] Percent was calculated using only those respondents who answered yes or no to the question.
*Area or state totals may not add due to rounding

Five percent (or 137 farmers) of the producers were not aware whether their herbicide package included atrazine (as an AI). Of this subgroup, 46% (or 63 farmers) knew the product(s) in their package. Of the farmers that knew the product name(s), 48% (or 20 farmers) did apply an atrazine-containing product.

Tables 8-9 pertain to the farmers applying atrazine and included onlythose farmers who answered, "Yes", to the question: "Was atrazine applied on any of your corn acres?" Farmers who answered, "I don't know", were included if they were later determined to have applied atrazine through identification of the product name. These farmers were classified through Q.8, Q.9, and Q.10.

Table 8. "Was Atrazine incorporated on any of your corn acres in 2010, premixes included?" (Q.11)

Pesticide Monitoring Area	Was Atrazine Incorporated?	Percent of Respondents
1 – Northwest Red River	Yes	0
1 – Northwest Red River	No	100
4 – Central Sands	Yes	24
4 – Central Sands	No	76
5 – East Central	Yes	6
5 – East Central	No	94
6 – West Central	Yes	5
6 – West Central	No	95
7 – Southwest	Yes	42
7 – Southwest	No	58
8 – South Central	Yes	36
8 – South Central	No	64
9 – Southeast	Yes	21
9 – Southeast	No	79
10 – Metro	Yes	22
10 – Metro	No	78
Statewide	Yes	25
Statewide	No	75

*Area or state totals may not add due to rounding

Table 9. "Was Atrazine split applied on any of your corn acres in 2010, premixes included?" (Q.12)

Pesticide Monitoring Area	Was Atrazine Split Applied	Percent of Respondents
1 – Northwest Red River	Yes	33
1 – Northwest Red River	No	67
4 – Central Sands	Yes	13
4 – Central Sands	No	87
5 – East Central	Yes	0
5 – East Central	No	100
6 – West Central	Yes	5
6 – West Central	No	95
7 – Southwest	Yes	13
7 – Southwest	No	88
8 – South Central	Yes	7
8 – South Central	No	93
9 – Southeast	Yes	11
9 – Southeast	No	89
10 – Metro	Yes	11
10 – Metro	No	89
Statewide	Yes	10
Statewide	No	90

*Area or state totals may not add due to rounding

Table 10. "Was Acetochlor applied on any of your corn acres in 2010, premixes included?" (Q.13)

Pesticide Monitoring Area	Acetochlor Applied	Percent of All Respondents	Percent of Respondents That Reported Yes or No[§]
1 – Northwest Red River	Yes	6	7
1 – Northwest Red River	No	91	93
1 – Northwest Red River	Don't Know	3	0
4 – Central Sands	Yes	9	11
4 – Central Sands	No	79	89
4 – Central Sands	Don't Know	12	0
5 – East Central	Yes	7	11
5 – East Central	No	84	89
5 – East Central	Don't Know	8	0
6 – West Central	Yes	15	18
6 – West Central	No	80	82
6 – West Central	Don't Know	15	0
7 – Southwest	Yes	15	19
7 – Southwest	No	78	81
7 – Southwest	Don't Know	6	0
8 – South Central	Yes	18	21
8 – South Central	No	73	79
8 – South Central	Don't Know	9	0
9 – Southeast	Yes	14	18
9 – Southeast	No	71	82
9 – Southeast	Don't Know	16	0
10 – Metro	Yes	12	15
10 – Metro	No	77	85
10 – Metro	Don't Know	11	0
Statewide	Yes	14	17
Statewide	No	76	83
Statewide	Don't Know	10	0

[§] Percent was calculated using only those respondents who answered yes or no to the question.
*Area or state totals may not add due to rounding

Editor's Note. Ten percent (or 248 farmers) of the producers were not aware if their herbicide package included acetochlor. Of this subgroup, 64% (or 159 farmers) identified the product name. Of the farmers that knew the product, 32% (or 51 farmers) did apply acetochlor. This was determined by providing the AIs in the products stated to have been applied by the farmers.

Tables 11-12 pertain to the farmers applying acetochlor. Included are those farmers who answered, "Yes", to the question: "Was acetochlor applied on any of your corn acres?" Farmers, who answered, "I don't know", were included when they were determined to have applied acetochlor through identification of the product name. These farmers were classified through Q.13, Q.14, and Q.15.

Due to the straight-forward nature of the remaining tables, only a minimal amount of supporting information was provided under the "Editor's Notes".

Table 11. "Was Acetochlor incorporated on any of your corn acres in 2010, premixes included?" (Q.16)

Pesticide Monitoring Area	Was Acetochlor Incorporated?	Percent of Respondents
1 – Northwest Red River	Yes	50
1 – Northwest Red River	No	50
4 – Central Sands	Yes	28
4 – Central Sands	No	72
5 – East Central	Yes	29
5 – East Central	No	71
6 – West Central	Yes	60
6 – West Central	No	40
7 – Southwest	Yes	38
7 – Southwest	No	62
8 – South Central	Yes	60
8 – South Central	No	40
9 – Southeast	Yes	36
9 – Southeast	No	64
10 – Metro	Yes	67
10 – Metro	No	33
Statewide	Yes	49
Statewide	No	51

*Area or state totals may not add due to rounding

Table 12. "Was Acetochlor split applied on any of your corn acres in 2010, premixes included?" (Q.17)

Pesticide Monitoring Area	Was Acetochlor Split Applied	Percent of Respondents
1 – Northwest Red River	Yes	13
1 – Northwest Red River	No	88
4 – Central Sands	Yes	5
4 – Central Sands	No	95
5 – East Central	Yes	0
5 – East Central	No	100
6 – West Central	Yes	10
6 – West Central	No	90
7 – Southwest	Yes	0
7 – Southwest	No	100
8 – South Central	Yes	5
8 – South Central	No	95
9 – Southeast	Yes	6
9 – Southeast	No	94
10 – Metro	Yes	8
10 – Metro	No	92
Statewide	Yes	5
Statewide	No	95

*Area or state totals may not add due to rounding

Herbicide Program Decisions

Questions 18-21 were related to herbicide decisions. Only farmers who applied atrazine or acetochlor answered these questions. Of the 2,673 farmers surveyed, 561 (21 percent) applied either atrazine or acetochlor. The following questions were answered by those 561 farmers who applied atrazine or acetochlor.

Table 13. "Who decides what products to apply?" (Q.18)

Pesticide Monitoring Area	Who Decides What Product to Apply?	Percent of All Respondents
1 – Northwest Red River	Farmer	10
1 – Northwest Red River	Dealer/Consultant	20
1 – Northwest Red River	Both	70
4 – Central Sands	Farmer	20
4 – Central Sands	Dealer/Consultant	28
4 – Central Sands	Both	52
5 – East Central	Farmer	33
5 – East Central	Dealer/Consultant	19
5 – East Central	Both	48
6 – West Central	Farmer	39
6 – West Central	Dealer/Consultant	9
6 – West Central	Both	52
7 – Southwest	Farmer	46
7 – Southwest	Dealer/Consultant	19
7 – Southwest	Both	35
8 – South Central	Farmer	36
8 – South Central	Dealer/Consultant	8
8 – South Central	Both	56
9 – Southeast	Farmer	27
9 – Southeast	Dealer/Consultant	21
9 – Southeast	Both	51
10 – Metro	Farmer	54
10 – Metro	Dealer/Consultant	46
10 - Metro	Both	0
Statewide	Farmer	31
Statewide	Dealer/Consultant	17
Statewide	Both	52

*Area or state totals may not add due to rounding

Table 14. "Who decides when to apply the herbicides?" (Q.19)

Pesticide Monitoring Area	Who Decides When to Apply Herbicides?	Percent of All Respondents
1 – Northwest Red River	Farmer	20
1 – Northwest Red River	Dealer/Consultant	10
1 – Northwest Red River	Both	70
4 – Central Sands	Farmer	54
4 – Central Sands	Dealer/Consultant	20
4 – Central Sands	Both	26
5 – East Central	Farmer	52
5 – East Central	Dealer/Consultant	19
5 – East Central	Both	29
6 – West Central	Farmer	55
6 – West Central	Dealer/Consultant	7
6 – West Central	Both	39
7 – Southwest	Farmer	59
7 – Southwest	Dealer/Consultant	15
7 – Southwest	Both	26
8 – South Central	Farmer	61
8 – South Central	Dealer/Consultant	7
8 – South Central	Both	33
9 – Southeast	Farmer	51
9 – Southeast	Dealer/Consultant	14
9 – Southeast	Both	35
10 – Metro	Farmer	43
10 – Metro	Dealer/Consultant	25
10 – Metro	Both	32
Statewide	Farmer	55
Statewide	Dealer/Consultant	13
Statewide	Both	32

*Area or state totals may not add due to rounding

Table 15. "Who scouts your fields?" (Q.20)

Pesticide Monitoring Area	Who Scouts Your Fields?	Percent of All Respondents
1 – Northwest Red River	Farmer	20
1 – Northwest Red River	Dealer/Consultant	40
1 – Northwest Red River	Both	40
1 – Northwest Red River	Field Not Scouted	0
4 – Central Sands	Farmer	45
4 – Central Sands	Dealer/Consultant	32
4 – Central Sands	Both	22
4 – Central Sands	Field Not Scouted	1
5 – East Central	Farmer	62
5 – East Central	Dealer/Consultant	24
5 – East Central	Both	14
5 – East Central	Field Not Scouted	0
6 – West Central	Farmer	45
6 – West Central	Dealer/Consultant	23
6 – West Central	Both	27
6 – West Central	Field Not Scouted	5
7 – Southwest	Farmer	50
7 – Southwest	Dealer/Consultant	24
7 – Southwest	Both	26
7 – Southwest	Field Not Scouted	0
8 – South Central	Farmer	58
8 – South Central	Dealer/Consultant	15
8 – South Central	Both	26
8 – South Central	Field Not Scouted	1
9 – Southeast	Farmer	47
9 – Southeast	Dealer/Consultant	23
9 – Southeast	Both	27
9 – Southeast	Field Not Scouted	3
10 – Metro	Farmer	43
10 – Metro	Dealer/Consultant	36
10 – Metro	Both	18
10 - Metro	Field Not Scouted	4
Statewide	Farmer	51
Statewide	Dealer/Consultant	23
Statewide	Both	25
Statewide	Field Not Scouted	2

*Area or state totals may not add due to rounding

Table 16. "Who determines if application setbacks or restrictions are appropriate on your farm?" (Q.21)

Pesticide Monitoring Area	Who Determines Setbacks?	Percent of All Respondents
1 – Northwest Red River	Farmer	30
1 – Northwest Red River	Dealer/Consultant	60
1 – Northwest Red River	Both	10
1 – Northwest Red River	Neither	0
4 – Central Sands	Farmer	37
4 – Central Sands	Dealer/Consultant	32
4 – Central Sands	Both	30
4 – Central Sands	Neither	1
5 – East Central	Farmer	38
5 – East Central	Dealer/Consultant	29
5 – East Central	Both	33
5 – East Central	Neither	0
6 – West Central	Farmer	43
6 – West Central	Dealer/Consultant	20
6 – West Central	Both	36
6 – West Central	Neither	0
7 – Southwest	Farmer	39
7 – Southwest	Dealer/Consultant	35
7 – Southwest	Both	26
7 – Southwest	Neither	0
8 – South Central	Farmer	43
8 – South Central	Dealer/Consultant	21
8 – South Central	Both	34
8 – South Central	Neither	2
9 – Southeast	Farmer	39
9 – Southeast	Dealer/Consultant	25
9 – Southeast	Both	32
9 – Southeast	Neither	4
10 – Metro	Farmer	43
10 – Metro	Dealer/Consultant	29
10 – Metro	Both	21
10 - Metro	Neither	7
Statewide	Farmer	40
Statewide	Dealer/Consultant	26
Statewide	Both	31
Statewide	Neither	2

*Area or state totals may not add due to rounding

Scouting for Weeds and Related Practices

Table 17. "Has someone mapped weed infestations in any of your fields in the last three years?" (Q.23)

Pesticide Monitoring Area	Weed Infestations Mapped Last 3 Years	Percent of Respondents
1 – Northwest Red River	Yes	40
1 – Northwest Red River	No	60
4 – Central Sands	Yes	22
4 – Central Sands	No	78
5 – East Central	Yes	0
5 – East Central	No	100
6 – West Central	Yes	16
6 – West Central	No	84
7 – Southwest	Yes	15
7 – Southwest	No	85
8 – South Central	Yes	22
8 – South Central	No	78
9 – Southeast	Yes	17
9 – Southeast	No	83
10 – Metro	Yes	14
10 - Metro	No	86
Statewide	Yes	19
Statewide	No	81

*Area or state totals may not add due to rounding

Table 18. “Do you choose herbicides based on type of weeds and/or density of weeds?” (Q.24)

Pesticide Monitoring Area	Herbicide Choice Based on Weeds	Percent of Respondents
1 – Northwest Red River	Yes	90
1 – Northwest Red River	No	10
4 – Central Sands	Yes	95
4 – Central Sands	No	5
5 – East Central	Yes	95
5 – East Central	No	5
6 – West Central	Yes	98
6 – West Central	No	2
7 – Southwest	Yes	94
7 – Southwest	No	6
8 – South Central	Yes	96
8 – South Central	No	4
9 – Southeast	Yes	91
9 – Southeast	No	9
10 – Metro	Yes	100
10 - Metro	No	2
Statewide	Yes	95
Statewide	No	5

*Area or state totals may not add due to rounding

Water Resources and Soil Resources

Table 19. "Do you know the soil texture of your farm?" (Q.25)

Pesticide Monitoring Area	Soil Texture Known of Farm Soils	Percent of Respondents
1 – Northwest Red River	Yes	90
1 – Northwest Red River	No	10
4 – Central Sands	Yes	92
4 – Central Sands	No	8
5 – East Central	Yes	95
5 – East Central	No	5
6 – West Central	Yes	93
6 – West Central	No	7
7 – Southwest	Yes	80
7 – Southwest	No	20
8 – South Central	Yes	87
8 – South Central	No	13
9 – Southeast	Yes	82
9 – Southeast	No	18
10 – Metro	Yes	82
10 - Metro	No	18
Statewide	Yes	87
Statewide	No	13

*Area or state totals may not add due to rounding

Table 20. "Do you know the organic matter level of your farm soils?" (Q.26)

Pesticide Monitoring Area	Organic Matter Known of Farm Soils	Percent of Respondents
1 – Northwest Red River	Yes	80
1 – Northwest Red River	No	20
4 – Central Sands	Yes	63
4 – Central Sands	No	37
5 – East Central	Yes	67
5 – East Central	No	33
6 – West Central	Yes	82
6 – West Central	No	18
7 – Southwest	Yes	56
7 – Southwest	No	44
8 – South Central	Yes	76
8 – South Central	No	24
9 – Southeast	Yes	64
9 – Southeast	No	36
10 – Metro	Yes	54
10 - Metro	No	46
Statewide	Yes	69
Statewide	No	31

*Area or state totals may not add due to rounding

Table 21. "Do you know the depth to the water table in your field?" (Q.27)

Pesticide Monitoring Area	Knowledge of Depth to the Water Table	Percent of Respondents
1 – Northwest Red River	Yes	40
1 – Northwest Red River	No	60
4 – Central Sands	Yes	42
4 – Central Sands	No	58
5 – East Central	Yes	42
5 – East Central	No	58
6 – West Central	Yes	30
6 – West Central	No	70
7 – Southwest	Yes	26
7 – Southwest	No	74
8 – South Central	Yes	35
8 – South Central	No	65
9 – Southeast	Yes	34
9 – Southeast	No	66
10 – Metro	Yes	29
10 – Metro	No	71
Statewide	Yes	36
Statewide	No	65

*Area or state totals may not add due to rounding

Editor's Note: Respondents that answered, "No" were then asked whether they believed that the depth to groundwater exceeded 30 feet. Table 22 details those responses.

Table 22. "Is the water table at a depth greater than 30 feet?" (Q.28)

Pesticide Monitoring Area	"Yes" Response Percent of Respondents	"No" Response Percent of Respondents	Don't Know Response Percent of Respondents
1 – Northwest Red River	100	0	0
4 – Central Sands	88	5	7
5 – East Central	100	0	0
6 – West Central	86	7	7
7 – Southwest	89	11	0
8 – South Central	94	2	4
9 – Southeast	76	0	24
10 – Metro	100	0	0
Statewide	87	3	10

*Area or state totals may not add due to rounding

Editor's Note: Respondents who answered, "Yes", to question 28 were then asked, "How was the depth primarily determined?" Figure 1 details their responses.

Figure 1. Information sources used to determine water table depth (Q.28)

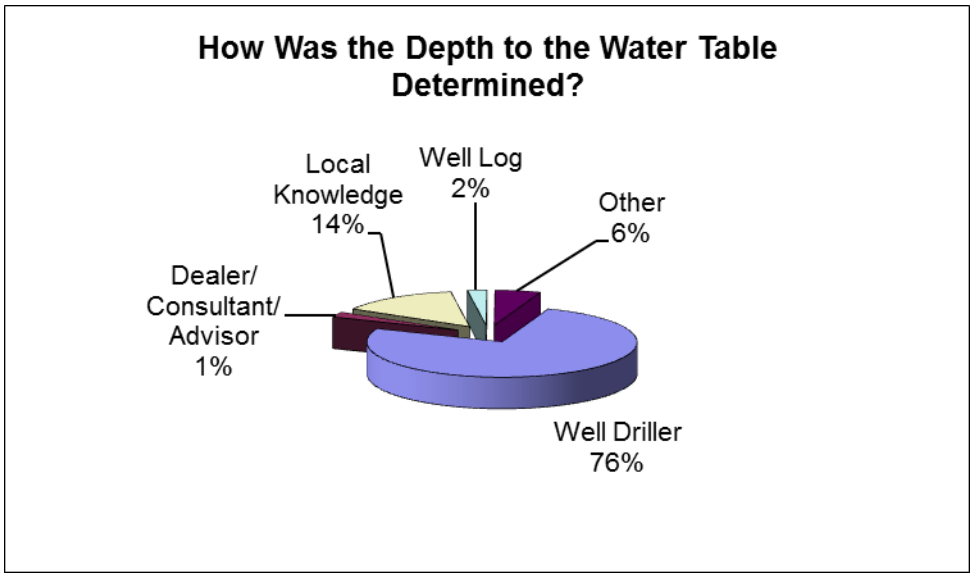


Table 23. "Are any streams, lakes, or other surface waters immediately adjacent to or in your corn fields?" (Q.29)

Pesticide Monitoring Area	Surface Water Adjacent to or in Field	Percent of Respondents
1 – Northwest Red River	Yes	40
1 – Northwest Red River	No	60
4 – Central Sands	Yes	30
4 – Central Sands	No	70
5 – East Central	Yes	35
5 – East Central	No	65
6 – West Central	Yes	39
6 – West Central	No	61
7 – Southwest	Yes	35
7 – Southwest	No	65
8 – South Central	Yes	48
8 – South Central	No	52
9 – Southeast	Yes	25
9 – Southeast	No	75
10 – Metro	Yes	43
10 - Metro	No	57
Statewide	Yes	37
Statewide	No	63

*Area or state totals may not add due to rounding

Editor's Note: Respondents who answered, "Yes" to question 29 were then asked, "Are there filter strips or vegetative buffers on any of these acres?" Table 24 details their responses.

Table 24. "Are there filter strips or vegetative buffers on any of these acres?" (Q.29.a)

Pesticide Monitoring Area	Filter Strips or Buffers	Percent of Respondents
1 – Northwest Red River	Yes	0
1 – Northwest Red River	No	100
4 – Central Sands	Yes	97
4 – Central Sands	No	3
5 – East Central	Yes	100
5 – East Central	No	0
6 – West Central	Yes	82
6 – West Central	No	18
7 – Southwest	Yes	95
7 – Southwest	No	5
8 – South Central	Yes	85
8 – South Central	No	15
9 – Southeast	Yes	91
9 – Southeast	No	9
10 – Metro	Yes	75
10 - Metro	No	25
Statewide	Yes	78
Statewide	No	10

*Area or state totals may not add due to rounding

Editor's Note: Respondents who answered "Yes" to question 29a in regards to having filter strips or vegetative buffers were then asked, "Were they required as part of a conservation program?" Table 25 details their responses.

Table 25. "Were they required as part of a conservation program?"(Q.29.a.i)

Pesticide Monitoring Area	Response	Percent of Respondents
1 – Northwest Red River	Yes	25
1 – Northwest Red River	No	75
4 – Central Sands	Yes	27
4 – Central Sands	No	73
5 – East Central	Yes	100
5 – East Central	No	0
6 – West Central	Yes	15
6 – West Central	No	85
7 – Southwest	Yes	33
7 – Southwest	No	67
8 – South Central	Yes	23
8 – South Central	No	77
9 – Southeast	Yes	45
9 – Southeast	No	55
10 – Metro	Yes	33
10 - Metro	No	67
Statewide	Yes	28
Statewide	No	72

*Area or state totals may not add due to rounding

Table 26. "Do you irrigate corn?" (Q.30)

Pesticide Monitoring Area	Irrigation	Percent of Respondents
1 – Northwest Red River	Yes	0
1 – Northwest Red River	No	100
4 – Central Sands	Yes	18
4 – Central Sands	No	82
5 – East Central	Yes	0
5 – East Central	No	100
6 – West Central	Yes	5
6 – West Central	No	95
7 – Southwest	Yes	0
7 – Southwest	No	100
8 – South Central	Yes	1
8 – South Central	No	99
9 – Southeast	Yes	0
9 – Southeast	No	100
10 – Metro	Yes	18
10 - Metro	No	82
Statewide	Yes	5
Statewide	No	95

*Area or state totals may not add due to rounding

Table 27. "Do you have an irrigation water management plan?" (Q.31)

Pesticide Monitoring Area	Irrigation Water Management Plan	Percent of Respondents
Statewide	Yes	69
Statewide	No	31

*Area or state totals may not add due to rounding

Editor's Note. Only eight percent (or 40) of the farmers used irrigation on corn acres. Due to the small numbers of farmers irrigating, only statewide data is reported.

Figure 2. "What type of tillage did you use before planting on the majority of your corn aces?" (Q.32)

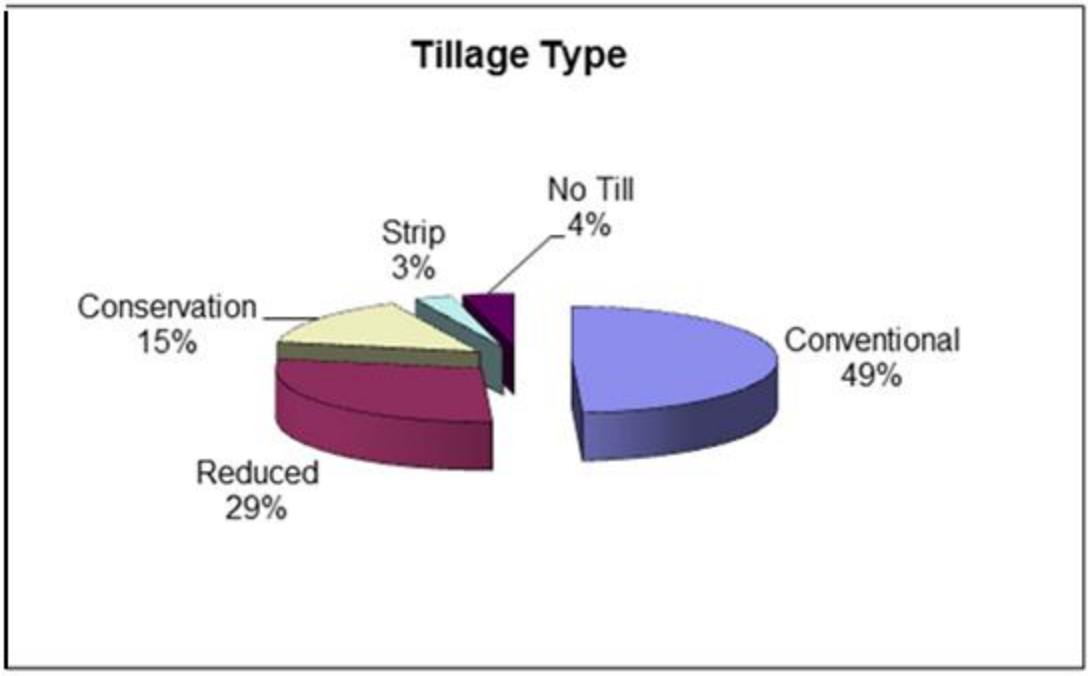


Table 28. "Do you use precision applications for herbicides (variable rate applications)?" (Q.33)

Pesticide Monitoring Area	Variable Rate Applications	Percent of Respondents
1 – Northwest Red River	Yes	50
1 – Northwest Red River	No	50
4 – Central Sands	Yes	37
4 – Central Sands	No	63
5 – East Central	Yes	30
5 – East Central	No	70
6 – West Central	Yes	30
6 – West Central	No	70
7 – Southwest	Yes	28
7 – Southwest	No	72
8 – South Central	Yes	37
8 – South Central	No	63
9 – Southeast	Yes	42
9 – Southeast	No	58
10 – Metro	Yes	48
10 - Metro	No	52

Pesticide Monitoring Area	Variable Rate Applications	Percent of Respondents
Statewide	Yes	37
Statewide	No	63

Table 29. "In general, do you alternate use of herbicide products to keep weeds from becoming resistant to herbicides?" (Q.34)

Pesticide Monitoring Area	Response to Using Alternative Herbicide	Percent of Respondents
1 – Northwest Red River	Yes	100
1 – Northwest Red River	No	0
4 – Central Sands	Yes	85
4 – Central Sands	No	15
5 – East Central	Yes	100
5 – East Central	No	0
6 – West Central	Yes	95
6 – West Central	No	5
7 – Southwest	Yes	91
7 – Southwest	No	9
8 – South Central	Yes	90
8 – South Central	No	10
9 – Southeast	Yes	88
9 – Southeast	No	12
10 – Metro	Yes	82
10 - Metro	No	18
Statewide	Yes	89
Statewide	No	11

*Area or state totals may not add due to rounding

Table 30. "Did you reduce from previous applications, the rate per acre of any corn herbicide?" (Q.35)

Pesticide Monitoring Area	Reduced Rate from Previous Applications	Percent of Respondents
1 – Northwest Red River	Yes	50
1 – Northwest Red River	No	50
4 – Central Sands	Yes	51
4 – Central Sands	No	49
5 – East Central	Yes	70
5 – East Central	No	30
6 – West Central	Yes	25
6 – West Central	No	75
7 – Southwest	Yes	38
7 – Southwest	No	62
8 – South Central	Yes	38
8 – South Central	No	62
9 – Southeast	Yes	48
9 – Southeast	No	52
10 – Metro	Yes	41
10 - Metro	No	59
Statewide	Yes	43
Statewide	No	57

*Area or state totals may not add due to rounding

Table 31. "Did you select an herbicide with a different mode of action to reduce weed resistance to herbicides?" (Q.36)

Pesticide Monitoring Area	Selected Herbicide with Different Mode of Action to Reduce Weed Resistance	Percent of Respondents
1 – Northwest Red River	Yes	80
1 – Northwest Red River	No	20
4 – Central Sands	Yes	65
4 – Central Sands	No	35
5 – East Central	Yes	80
5 – East Central	No	20
6 – West Central	Yes	84
6 – West Central	No	16
7 – Southwest	Yes	75
7 – Southwest	No	25
8 – South Central	Yes	81
8 – South Central	No	19
9 – Southeast	Yes	72
9 – Southeast	No	28
10 – Metro	Yes	64
10 - Metro	No	36
Statewide	Yes	75
Statewide	No	25

*Area or state totals may not add due to rounding

Table 32. "Did you choose a particular herbicide to reduce impacts to surface water or groundwater?" (Q.37)

Pesticide Monitoring Area	Chose Herbicide to Reduce Impact to Surface or Ground Water	Percent of Respondents
1 – Northwest Red River	Yes	40
1 – Northwest Red River	No	60
4 – Central Sands	Yes	46
4 – Central Sands	No	54
5 – East Central	Yes	35
5 – East Central	No	65
6 – West Central	Yes	47
6 – West Central	No	53
7 – Southwest	Yes	47
7 – Southwest	No	53
8 – South Central	Yes	37
8 – South Central	No	63
9 – Southeast	Yes	51
9 – Southeast	No	49
10 – Metro	Yes	41
10 - Metro	No	59
Statewide	Yes	43
Statewide	No	57

*Area or state totals may not add due to rounding

Table 33. "Did you band herbicide applications to reduce use?" (Q.38)

Pesticide Monitoring Area	Banded Herbicide Applications to Reduce Use	Percent of Respondents
1 – Northwest Red River	Yes	10
1 – Northwest Red River	No	90
4 – Central Sands	Yes	7
4 – Central Sands	No	93
5 – East Central	Yes	10
5 – East Central	No	90
6 – West Central	Yes	2
6 – West Central	No	98
7 – Southwest	Yes	4
7 – Southwest	No	96
8 – South Central	Yes	7
8 – South Central	No	93
9 – Southeast	Yes	4
9 – Southeast	No	96
10 – Metro	Yes	7
10 - Metro	No	93
Statewide	Yes	6
Statewide	No	94

*Area or state totals may not add due to rounding

Appendix 1. Survey Form

P.O. Box 7068
St. Paul, MN 55107-7068
Telephone: 651-296-2230 or 1-800-453-7502
FAX: 651-296-3185 or 1-800-839-2186

MINNESOTA AGRICULTURAL STATISTICS SERVICE

Annual Pesticide Survey: Herbicide Applications and Practices on Corn in Planning for or During the 2010 Growing Season

Please make necessary corrections in name and address on the label.

Pesticide Use Questions 2010 Crop Season FIELDS MP102_Part 1

Corn Did you grow corn on your operation in 2010?

CornAcre How many corn acres were planted for field corn (for all purposes)

AnyApp On your 2010 corn acres, did you:" :

Self (1) "Apply herbicides yourself?",

Custom (2) "Have herbicides custom applied?",

Both (3) "Applied herbicides yourself and had herbicides custom applied?",

None (4) "Did not use herbicides.")

Active Do you know the active ingredients of the herbicides you used

on your corn acres in 2010?" **: Yes-1 No-3 Some-5**

Records Do you keep herbicide application records on your farm?" : Yes No Some

ReadLabel Do you usually read the label for pesticide products applied on your farm?" : Yes No

Atrazine Was Atrazine applied on any of your corn acres in 2010, premixes included? Yes No

Products1 Do you know the products applied to your corn acres in 2010?" :Yes No

ProductList1 Were any of the following products applied on your corn acres in 2010? : Yes No

Aatrex 4L·····Expert·····Harness Xtra·····Steadfast ATZ

Breakfree ATZ·····Fieldmaster·····Keystone

Callisto Xtra·····FulTime·····Liberty ATZ

Confidence Xtra·····G-Max Lite·····Lumax

Degree Xtra·····Guardsman Max·····Marksman"

Incorporate1 Was Atrazine incorporated on any of your corn acres in 2010, premixes included?"

: Yes No

Split1 Was Atrazine split-applied on any of your corn acres in 2010, premixes included?" : Yes No

Acetochlor Was Acetochlor applied on any of your corn acres in 2010, premixes included?"

: Yes No

Products2 Do you know the products applied to your corn acres in 2010?" : Yes No

ProductList2 Were any of the following products applied on your corn acres in 2010? :Yes No

Breakfree…… FulTime …… Surpass EC

Confidence……Harness …… Top Notch

Degree……Keystone…… Volley

Fieldmaster……SureStart……Warrant

Incorporate2 Was Acetochlor incorporated on any of your corn acres in 2010, premixes included?"

: Yes No

Split2 Was Acetochlor split-applied on any of your corn acres in 2010, premixes included?"

: Yes No

What The following questions ask about how decisions are made regarding your HERBICIDE program. Who decides what products to apply?"

: (1)Farmer,

Dealer (2) "Dealer/Crop Consultant",

Both (3)"Farmer & Dealer/Consultant"

When Who decides when to apply herbicides?"

: (1)Farmer,

Dealer (2) "Dealer/Crop Consultant",

Both (3) "Farmer & Dealer/Consultant"

Scouts Who scouts your fields?"

: (1)Farmer,

Dealer(2) "Dealer/Crop Consultant",

Both (3) "Farmer & Dealer/Consultant",

Neither (4) "Fields are not scouted")

Setbacks Setbacks or restrictions are part of many pesticide labels.

Who decides if application setbacks or restrictions are appropriate for your farm?"

: (1)Farmer,

Dealer(2) "Dealer/Crop Consultant",

Both (3) "Farmer & Dealer/Consultant",

(4)Neither

Mapped Has someone mapped weed infestations in any of your corn fields in the last three years?" : Yes No

Choose Do you choose herbicides based on type of weeds and/or density of weeds?" : Yes No

Soil The next set of questions are about soil and water resources on your operation.

Do you know the soil texture on your farm? : Yes No

Organic Do you know the organic matter level of your farm's soils?" :Yes No

WaterTable Do you know the depth to the water table in your fields?" : Yes No

WaterTableD Is the water table at a depth greater than 30 feet?" : Yes No

DepthDet How was the depth primarily determined?" :

WellDrill (1) "Well Driller for Drinking Water",

Local (2) "Local Knowledge",

Advisor (3) "A dealer, consultant or crop advisor",

WellLog (4) "Well Log",

None (5) "None of the Above"

Streams Are any streams, lakes or other surface waters immediately adjacent to or in your corn fields?" : Yes No

Buffers Are there filter strips or vegetative buffers on any of these acres?" : Yes No

ConPlan Were they required as part of a conservation program?" : Yes No

Irrigate Do you irrigate corn?" : Yes No

Plan Do you have an irrigation water management plan?" : Yes No

Tillage What type of tillage did you use before planting on the majority of your corn acres?

Conventional(1) "Conventional < 15% residue",

Reduced(2) "Reduced tillage 15% - 30% residue",

Conservation (3) "Conservation tillage > 30% residue",

Strip (4)"Strip Tillage",

NoTill (5) "No tillage")

Precision Now I am going to ask about GENERAL PRACTICES for corn acres only.

Do you use precision applications (variable rate applications) for herbicides?" : Yes No

Alternate In general, do you alternate use of herbicide products to keep weeds from becoming resistant to herbicides?" : Yes No

Reduce Did you reduce from previous applications, the rate per acre of any corn herbicide?" : Yes No

Select Did you select an herbicide with a different mode of action to reduce weed resistance to herbicides?" : Yes No

Particular Did you choose a particular herbicide to reduce impacts to surface water or groundwater?" : Yes No

Band Did you band herbicide applications to reduce use?" : Yes No