



# MINNESOTA AGRICULTURAL CHEMICAL USE

## Corn and Potatoes, Fall 2014



The National Agricultural Statistics Service (NASS) Agricultural Chemical Use Program is the U.S. Department of Agriculture's official source of statistics about on-farm and post-harvest fertilizer and pesticide use and pest management practices.

In the fall of 2014, NASS collected data about chemical use and pest management practices used on corn and potatoes production. The data was collected as part of the Agricultural Resource Management Survey (ARMS) and the results are presented here. The results are based on 4,500 surveys sent to producers in the 19 program states in 2014; there were 321 responses from Minnesota producers. The 19 program states in the 2014 ARMS were Colorado, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, Pennsylvania, South Dakota, Texas, Washington, and Wisconsin.

### Uses of ARMS Data

Farm organizations, commodity groups, agribusiness, Congress, State Departments of Agriculture, and the USDA use information from ARMS to evaluate the production practices, resource use, and the financial performance of farm/ranch businesses and to make policy decisions affecting agriculture.

In general, farmers benefit from ARMS data indirectly. They see the information through contact with representatives from farm/commodity groups or extension advisors in reports issued by State colleges and universities, in farm magazines, newspapers, and on radio or TV broadcasts. Most respondents probably do not realize the data come from the ARMS but may be affected by the farm policy decisions that are made.

A few specific examples of how these data are used include:

- The National Corn Growers Association used data from past studies in their sustaining innovation media message, showing that farmers have increased corn production while reducing land, fertilizer, and chemical use.
- It will provide accurate real world information to update models that simulate the carbon footprint of corn and corn ethanol production.
- It will be used in the re-registration of existing pesticides and in the registration of new pesticides.

Markets cannot operate efficiently without accurate and timely information. As with all USDA reports everyone, from the smallest farmer to the largest agribusiness firm, has free and equal access to the results from this survey. This access to information allows farmers to stay on equal footing with agribusiness firms and others who market agricultural commodities.

<p><b>USDA-NASS</b>          MINNESOTA FIELD OFFICE          375 JACKSON ST, STE 610          ST. PAUL, MN 55101</p> <p>PHONE: 651-728-3113          FAX: 855-271-9802          E-MAIL: <a href="mailto:NASSRFOUMR@NASS.USDA.GOV">NASSRFOUMR@NASS.USDA.GOV</a></p> <p>Dan Lofthus, State Statistician</p>	<p><i>TO MINNESOTA PRODUCERS: This report contains results collected from the annual Agricultural Resource Management Survey. Your operation, large or small, represents Minnesota agriculture. We appreciate your assistance in providing timely and accurate data. Thank you for your support.</i></p> <p style="text-align: right;"><i>~Greg Thessen, Director, Upper Midwest Region</i></p>
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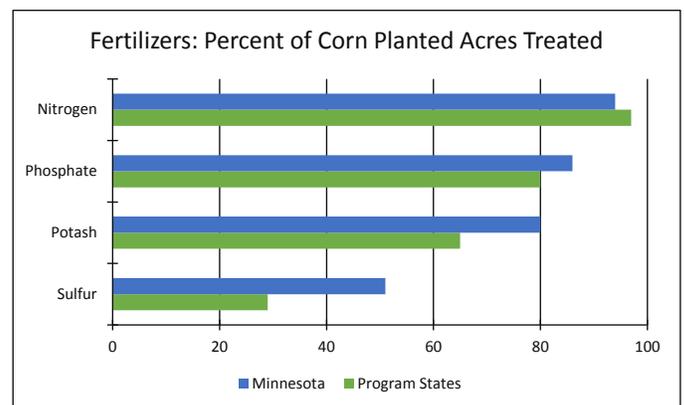
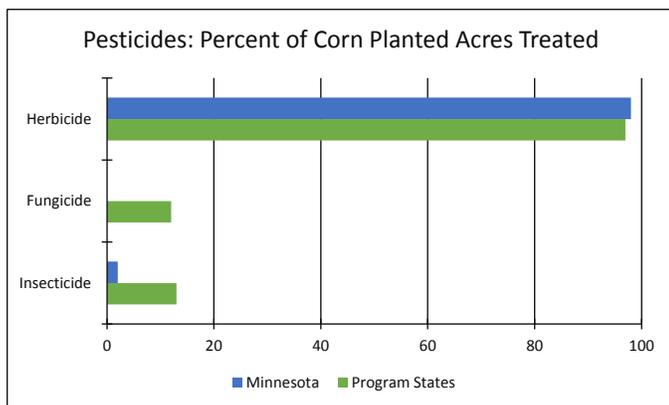
### OUR CONFIDENTIALITY PLEDGE

- **Names, addresses, and personal identifiers are fully protected by NASS with the force of law.** Title 7, U.S. Code, Section 2276 and the Confidential Information Protection and Statistical Efficiency Act **prohibit public disclosure** of individual information.
- **Only authorized** persons working for NASS as employees or sworn agents, who are subject to fines and imprisonment for unauthorized disclosure, can access individual record data and only for approved official purposes.
- **Data security** is a top priority during preparation of NASS reports.
- Published statistics from NASS surveys and censuses **will not** disclose reported data from an individual.

# CORN

**Pesticides:** Herbicide active ingredients were applied to 98 percent of the corn acres planted in Minnesota. Active ingredient Acetochlor was the most widely used pesticide overall, and was the active ingredient with the greatest total amount. Insecticide active ingredient was applied to 2 percent of corn acres planted, in Minnesota.

**Fertilizers:** Of the three primary macronutrients, nitrogen (N) was the most widely used on corn. Minnesota farmers applied nitrogen to 94 percent of planted acres at an average rate of 143 pounds per acre per year. Macronutrients phosphate (P) and potash (K) were applied to the majority of acres, at an average rate of 70 and 88 pounds per acre per year, respectively. The secondary macronutrient, sulfur (S), was applied to 51 percent of acres planted to corn.



Active Ingredient	Minnesota			Program States <sup>1</sup>		
	Planted Acres Treated (%)	Rate Applied per Year (lbs/acre)	Total Lbs Applied (1,000 lbs)	Planted Acres Treated (%)	Rate Applied per Year (lbs/acre)	Total Lbs Applied (1,000 lbs)
<b>Pesticide Use on Corn</b>						
<b>FUNGICIDE:</b>						
TOTAL FUNGICIDE	(D)		(D)	12		1,162
<b>HERBICIDE:</b>						
Acetochlor	53	0.994	4,227	29	1.256	28,685
Atrazine	23	0.604	1,120	55	1.018	45,231
Clopyralid	31	0.064	158	13	0.072	752
Dicamba, Sodaum Salt	6	0.080	40	6	0.092	472
Diflufenzopyr-sodium	6	0.031	15	6	0.036	177
Dimethenamid-P	5	0.609	233	4	0.630	2,130
Flumetsulam	31	0.027	66	13	0.030	315
Glyphosate	11	0.899	799	11	0.907	7,979
Glyphosate DIM. Salt	5	0.891	339	4	1.113	3,604
Glyphosate ISO. Salt	43	0.820	2,817	38	0.889	27,221
Glyphosate POT. Salt	24	1.032	1,970	24	1.159	22,560
Mesotrione	25	0.133	267	27	0.115	2,529
S-Metolachlor	13	1.153	1,241	27	1.106	23,600
Saflufenacil	5	0.060	23	4	0.060	178
Tembotrione	10	0.079	65	6	0.072	336
Topramezone	2	0.014	3	3	0.015	31
TOTAL HERBICIDE	98		13,596	97		176,291
<b>INSECTICIDE:</b>						
TOTAL INSECTICIDE	2		26	13		1,684
<b>Fertilizer Use on Corn</b>						
Nitrogen	94	143	1,091,800	97	144	11,244,700
Phosphate	86	70	491,400	80	64	4,072,000
Potash	80	88	570,200	65	82	4,285,800
Sulfur	51	18	72,500	29	15	345,400

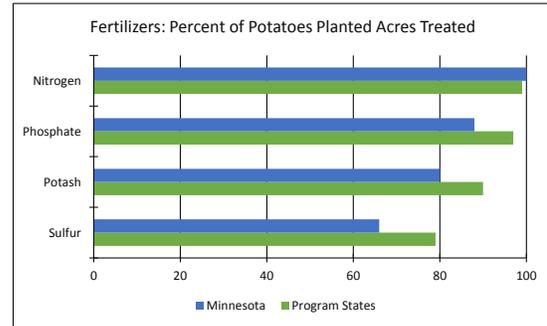
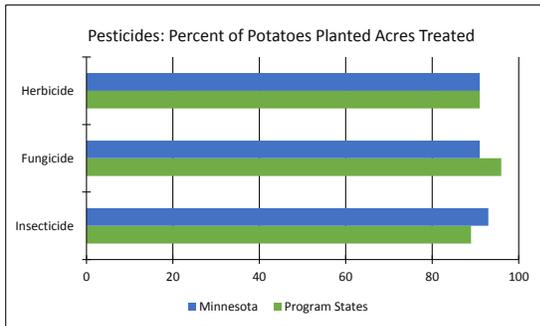
<sup>1</sup> The 15 program states surveyed about corn in the 2014 ARMS were Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, Pennsylvania, South Dakota, Texas, and Wisconsin.

(D) Withheld to avoid disclosing data for individual operations.

# POTATOES

**Pesticides:** Herbicide active ingredients were applied to 91 percent of the potatoes acres planted in Minnesota. Active ingredient Chlorothalonil was the most widely used pesticide overall, and Mancozeb was the active ingredient with the greatest total amount. Fungicide and insecticide active ingredients were applied to 91 percent and 93 percent of potatoes acres planted, respectively, in Minnesota.

**Fertilizers:** Of the three primary macronutrients, nitrogen (N) was the most widely used on potatoes. Minnesota farmers applied nitrogen to 100 percent of planted acres at an average rate of 144 pounds per acre per year. Macronutrients phosphate (P) and potash (K) were applied to the majority of acres, at an average rate of 73 and 171 pounds per acre per year, respectively. The secondary macronutrient, sulfur (S), was applied to 66 percent of acres planted to potatoes.



Active Ingredient	Minnesota			Program States <sup>1</sup>		
	Planted Acres Treated (%)	Rate Applied Per Year (lbs/acre)	Total Lbs Applied (1,000 lbs)	Planted Acres Treated (%)	Rate Applied Per Year (lbs/acre)	Total Lbs Applied (1,000 lbs)
<b>Pesticide Use on Potatoes</b>						
<b>FUNGICIDE:</b>						
Azoxystrobin	80	0.216	7	56	0.155	71
Chlorothalonil	88	4.523	172	70	3.538	2,018
Cyazofamid	53	0.135	3	13	0.153	17
Difenoconazole	65	0.216	6	31	0.158	40
Fluopyram	56	0.086	2	30	0.129	32
Mancozeb	81	7.513	261	61	3.559	1,790
Mandipropamide technical	65	0.216	6	28	0.166	38
Mefenoxam	75	0.519	17	44	0.256	93
Pyraclostrobin	49	0.137	3	23	0.157	30
Pyrimethanil	64	0.773	21	34	0.478	134
Triphenyltin hydrox.	45	0.191	4	20	0.256	43
<b>TOTAL FUNGICIDE</b>	<b>91</b>		<b>612</b>	<b>96</b>		<b>6,018</b>
<b>HERBICIDE:</b>						
Glyphosate ISO. Salt	11	0.475	2	11	0.852	81
Metribuzin	70	0.417	13	75	0.443	271
S-Metolachlor	24	1.379	14	18	1.386	201
<b>TOTAL HERBICIDE</b>	<b>91</b>		<b>34</b>	<b>91</b>		<b>1,683</b>
<b>INSECTICIDE:</b>						
Clothianidin	7	0.183	1	4	0.093	3
Dimethoate	24	0.452	5	4	0.528	15
Esfenvalerate	45	0.056	1	13	0.073	8
Thiamethoxam	74	0.179	6	27	0.097	22
<b>TOTAL INSECTICIDE</b>	<b>93</b>		<b>13</b>	<b>89</b>		<b>892</b>
<b>OTHER CHEMICALS:</b>						
Diquat dibromide	49	0.589	12	37	0.564	170
<b>TOTAL OTHER CHEMICALS</b>	<b>52</b>		<b>4,067</b>	<b>67</b>		<b>69,474</b>
<b>Fertilizer Use on Potatoes</b>						
Nitrogen	100	144	6,200	99	205	166,100
Phosphate	88	73	2,800	97	129	102,700
Potash	80	171	5,900	90	149	109,800
Sulfur	66	33	900	79	64	42,000

<sup>1</sup>The 8 program states surveyed about potatoes in the 2014 ARMS were Colorado, Idaho, Maine, Michigan, Minnesota, North Dakota, Washington, and Wisconsin.

**Pest Management Practices:** Scouting for weeds was the top pest management practice on **corn** acreage. Scouting for weeds, diseases, insects, and mites were the top pest management practices on **potatoes** acreage.

	Minnesota				Program States			
	Corn		Potatoes		Corn <sup>1</sup>		Potatoes <sup>2</sup>	
	% of Area Planted	% of Operations	% of Area Planted	% of Operations	% of Area Planted	% of Operations	% of Area Planted	% of Operations
<b>Avoidance</b>								
Crop or plant variety chosen for specific pest resistance	51	51	32	42	57	54	41	37
Planting locations planned to avoid cross infestation of pests	18	16	87	70	24	22	48	50
Planting or harvesting dates adjusted	13	14	54	46	21	20	43	45
Rotated crops during past 3 years	89	88	100	99	84	84	97	97
Row spacing, plant density, or row directions adjusted	13	14	63	43	19	16	42	42
<b>Monitoring</b>								
Diagnostic laboratory services used for pest detection via soil or plant tissue analysis	12	9	67	52	13	9	69	62
Field mapping data used to assist decisions	24	16	62	50	18	15	28	23
Scouted								
-established process used	27	19	87	72	23	19	60	58
-for pests due to a pest advisory warning	7	5	47	42	9	7	41	38
-for pests due to a pest development model	7	6	34	37	10	8	37	34
-for pests or beneficial organisms-not scouted	6	11	(Z)	3	7	13	1	1
-for pests or beneficial organism by conducting gen. observations while performing routine tasks	25	30	(Z)	1	26	29	11	15
-for pests or beneficial organism by deliberately going to the crop acres or growing areas	69	59	100	96	67	58	88	84
Scouted for diseases	74	64	100	96	80	69	99	98
-by employee	(Z)	(Z)	50	30	1	1	24	17
-by farm supply company or chemical dealer	16	20	7	7	14	15	11	10
-by independent crop consultant or commercial scout	21	20	14	7	16	13	28	26
-by operator, partner, or family member	63	60	30	56	68	71	38	47
Scouted for insects & mites	75	69	100	97	81	70	98	97
-by employee	(Z)	(Z)	57	35	1	1	24	18
-by farm supply company or chemical dealer	18	21	(Z)	1	15	15	11	11
-by independent crop consultant or commercial scout	20	17	14	7	17	14	28	26
-by operator, partner, or family member	62	61	30	57	67	70	37	46
Scouted for weeds	94	89	100	97	92	86	97	96
-by employee	(Z)	(Z)	57	35	1	1	25	18
-by farm supply company or chemical dealer	16	22	(Z)	1	13	14	10	9
-by independent crop consultant or commercial scout	17	15	14	7	15	11	24	23
-by operator, partner, employee, or family member	67	63	30	57	70	73	41	51
Weather data used to assist decisions	64	64	91	75	57	56	89	86
Written or electronic records kept to track pest activity	36	30	80	70	34	29	61	57
<b>Prevention</b>								
Beneficial insect or vertebrate habitat maintained	5	7	29	30	14	13	24	25
Crop residues removed or burned down	5	4	1	5	9	10	14	14
Equipment & implements cleaned after field work to reduce spread of pests	40	41	75	72	35	33	88	82
Field edges, ditches, or fence lines were chopped, sprayed, mowed, plowed, or burned	52	47	88	81	56	50	86	82
Field left fallow previous year to manage insects	0	0	(NA)	(NA)	1	1	(NA)	(NA)
Flamer used to kill weeds	0	0	(Z)	2	1	(Z)	7	7
No-till or minimum till used	38	39	20	20	67	67	29	26
Plowed down crop residue using conventional tillage	47	52	67	74	32	33	70	74
Seed treated for insect or disease control after purchase	16	15	52	46	23	19	77	73
Water management practices used	2	3	6	13	8	5	55	47
<b>Suppression</b>								
Beneficial organisms applied or released	1	(Z)	(Z)	1	1	1	3	4
Biological pesticides applied	8	6	2	7	10	10	15	12
Buffer strips or border rows maintained to isolate organic from non-organic crops	5	5	5	10	8	7	18	16
Floral lures, attractants, repellants, pheromone traps, or biological pest controls used	0	0	(Z)	(Z)	1	(Z)	8	10
Ground covers, mulches, or other physical barriers maintained	34	36	68	55	47	46	62	63
Pesticides with different mechanisms of actions to keep pest from becoming resistant to pesticides	28	20	84	64	32	32	82	76
Scouting data compared to published information to assist decisions	24	17	42	42	24	21	49	45
Trap crop grown to manage insects	1	1	4	8	2	2	1	3

<sup>1</sup> The 15 program states surveyed about corn in the 2014 ARMS were Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, Pennsylvania, South Dakota, Texas, and Wisconsin.

<sup>2</sup> The 8 program states surveyed about potatoes in the 2014 ARMS were Colorado, Idaho, Maine, Michigan, Minnesota, North Dakota, Washington, and Wisconsin.

(Z) Less than half the rounding unit. (NA) Not available.

Complete data from the 2014 agricultural chemical use survey for corn are available on the NASS website at [http://www.nass.usda.gov/Surveys/Guide\\_to\\_NASS\\_Surveys/Chemical\\_Use/](http://www.nass.usda.gov/Surveys/Guide_to_NASS_Surveys/Chemical_Use/)

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