



Minnesota Ag News – Chemical Use

Corn and Soybeans: Fall 2018

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Cooperating with the Minnesota Department of Agriculture

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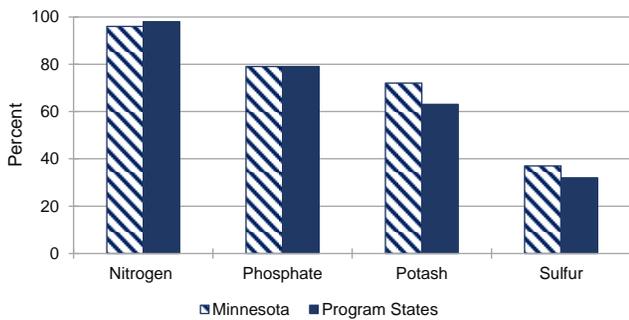
The National Agricultural Statistics Service (NASS) Agricultural Chemical Use Program is the U.S. Department of Agriculture’s official source of statistics about on-farm and post-harvest fertilizer and pesticide use and pest management practices.

In the fall of 2018, NASS collected data for the 2018 crop year, the one-year period beginning after the 2017 harvest and ending after the 2018 harvest, about chemical use and pest management practices used on corn and soybean production. The data was collected as part of the Agricultural Resource Management Survey (ARMS) and the results are presented here.

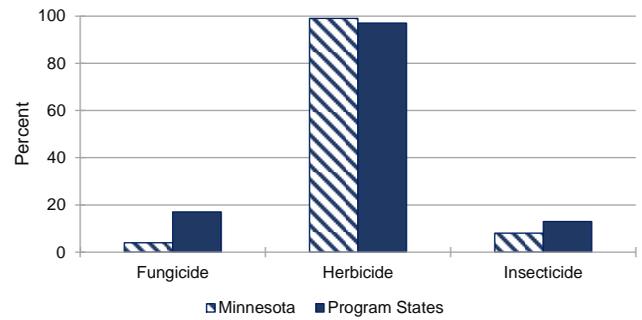
Fertilizer Use: Of the three primary macronutrients, nitrogen (N) was the most widely used on corn. Minnesota farmers applied nitrogen to 96 percent of planted acres at an average rate of 137 pounds per acre per year. Macronutrients phosphate (P) and potash (K) were applied to the majority of acres, at an average rate of 74 and 91 pounds per acre per year, respectively. The secondary macronutrient, sulfur (S), was applied to 37 percent of acres planted to corn.

Pesticide Use: Herbicide active ingredients were applied to 99 percent of the corn acres planted in Minnesota. Acetochlor was the most widely used pesticide overall applied to 63 percent of the planted acres. Acetochlor was also the active ingredient with the greatest total amount applied in Minnesota. Fungicide and insecticide active ingredients were applied to 4 percent and 8 percent of corn acres planted, respectively.

**Fertilizers, Corn Planted Acres Treated
Minnesota and Program States: 2018**



**Pesticides, Corn Planted Acres Treated
Minnesota and Program States: 2018**



Fertilizer Use On Corn – Minnesota and Program States: 2018

Active ingredient	Minnesota			Program states ¹		
	Planted acres treated (percent)	Yearly rate (lbs per acre)	Total applied (1,000 lbs)	Planted acres treated (percent)	Yearly rate (lbs per acre)	Total applied (1,000 lbs)
Nitrogen	96	137	1,041,900	98	149	12,007,300
Phosphate	79	74	462,600	79	69	4,510,500
Potash	72	91	517,200	63	87	4,525,900
Sulfur	37	19	56,100	32	18	468,400

Pesticide Use On Corn – Minnesota and Program States: 2018

Active ingredient	Minnesota			Program states ¹		
	Planted acres treated (percent)	Yearly rate (lbs per acre)	Total applied (1,000 lbs)	Planted acres treated (percent)	Yearly rate (lbs per acre)	Total applied (1,000 lbs)
Fungicide:						
Total ²	4		63	17		3,775
Herbicide³:						
Acetochlor	63	1.254	6,202	33	1.433	38,757
Atrazine	40	0.534	1,668	65	1.037	55,899
Clopyralid	38	0.077	228	13	0.082	859
Clopyralid mono salt	10	0.086	66	4	0.082	301
Dimethenamid-P	10	0.659	519	6	0.676	3,410
Flumetsulam	28	0.030	67	10	0.031	267
Glyphosate iso. salt	31	0.836	2,068	34	0.993	27,691
Glyphosate pot. salt	26	1.046	2,122	26	1.187	25,306
Mesotrione	52	0.106	433	42	0.121	4,177
S-Metolachlor	14	0.959	1,074	29	1.198	28,259
Tembotrione.....	13	0.071	74	7	0.084	472
Total ²	99		15,885	97		214,721
Insecticide:						
Bifenthrin	5	0.063	23	5	0.089	402
Total ²	8		50	13		2,087

¹The 18 program states surveyed about corn in the 2018 ARMS were Colorado, Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, New York, North Carolina, North Dakota, Ohio, Pennsylvania, South Dakota, Texas, and Wisconsin.

²Total Fungicide, Herbicide, and Insecticide includes pesticides that are not listed in this table.

³Given the large number of herbicides applied to row crops, active ingredients that were applied to less than 10 percent of planted acres in Minnesota are not included in this table, but can be found at www.nass.usda.gov.

The 2018 Agricultural Chemical Use Survey of soybean producers collected data about fertilizer and pesticide use as well as pest management practices in growing soybeans.

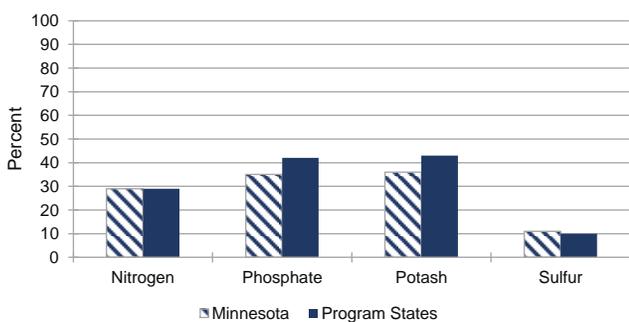
Fertilizer Use

Fertilizer refers to a soil-enriching input that contains one or more plant nutrients, primarily nitrogen (N), phosphate (P₂O₅), and potash (K₂O). Of the three primary macronutrients, potash was the most widely used on soybean acres planted in Minnesota. Farmers applied potash to 36 percent of planted acres at an average rate of 68 pounds per acre per year. Macronutrients nitrogen and phosphate were applied at an average rate of 14 and 46 pounds per acre per year, respectively. The secondary macronutrient, sulfur, was applied to 11 percent of acres planted to soybeans.

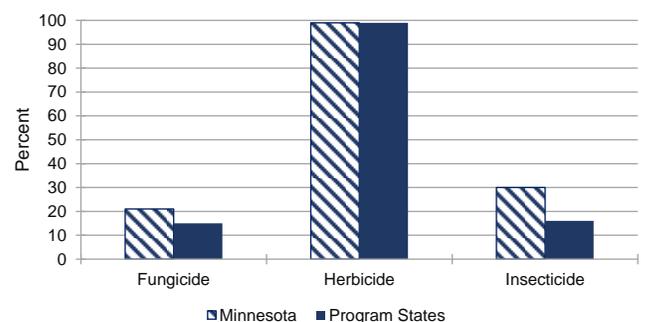
Pesticide Use

The pesticide active ingredients used on soybeans are classified in this report as herbicides (targeting weeds), insecticides (targeting insects), and fungicides (targeting fungal disease). Herbicide active ingredients were applied to 99 percent of the soybean acres planted. Fomesafen sodium and Glyphosate isopropylamine salt were the most widely used pesticides on soybean acres, but glyphosate potassium salt was the active ingredient with the greatest total amount applied. Fungicides and insecticides were applied to 21 and 30 percent of soybean acres planted in Minnesota.

**Fertilizers, Percent of Soybean Planted Acres Treated
Minnesota and Program States: 2018**



**Pesticides, Percent of Soybean Planted Acres Treated
Minnesota and Program States: 2018**



Fertilizer Use On Soybeans – Minnesota and Program States: 2018

Active ingredient	Minnesota			Program states ¹		
	Planted acres treated (percent)	Yearly rate (lbs per acre)	Total applied (1,000 lbs)	Planted acres treated (percent)	Yearly rate (lbs per acre)	Total applied (1,000 lbs)
Nitrogen	29	14	32,800	29	17	416,400
Phosphate	35	46	124,900	42	55	1,974,300
Potash	36	68	191,400	43	87	3,221,400
Sulfur	11	13	11,500	10	13	111,500

Pesticide Use On Soybeans – Minnesota and Program States: 2018

Active ingredient	Minnesota			Program states ¹		
	Planted acres treated (percent)	Yearly rate (lbs per acre)	Total applied (1,000 lbs)	Planted acres treated (percent)	Yearly rate (lbs per acre)	Total applied (1,000 lbs)
Fungicide:						
Azoxystrobin	6	0.095	42	6	0.139	676
Fluxapyroxad	7	0.048	26	4	0.065	208
Propiconazole	6	0.098	49	4	0.108	383
Pyraclostrobin	11	0.120	99	5	0.133	574
Tetraconazole	6	0.066	31	3	0.097	250
Total ²	21		299	15		3,709
Herbicide³:						
Clethodim	17	0.066	85	15	0.109	1,398
Cloransulam-methyl	11	0.020	17	6	0.026	133
Fluazifop-p-butyl	12	0.073	66	4	0.083	269
Fomesafen sodium	33	0.207	541	18	0.234	3,643
Glufosinate-ammonium	12	0.647	599	18	0.623	9,759
Glyphosate	21	0.899	1,456	7	1.105	7,098
Glyphosate iso. salt	33	0.922	2,405	47	1.202	48,256
Glyphosate pot. salt	26	1.392	2,841	28	1.527	36,651
Imazethapyr	10	0.038	28	12	0.047	464
S-Metolachlor	11	1.402	1,174	18	1.283	19,439
Sulfentrazone	28	0.171	373	20	0.195	3,339
Total ²	99		12,060	99		184,060
Insecticide:						
Bifenthrin	4	0.078	25	4	0.076	257
Chlorpyrifos	11	0.654	562	2	0.532	869
Lambda-cyhalothrin	16	0.028	35	6	0.030	150
Thiamethoxam	4	0.032	10	1	0.035	26
Total ²	30		637	16		2,304

¹ The 19 program states surveyed about soybeans in the 2018 ARMS were Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, Ohio, South Dakota, Tennessee, Virginia, and Wisconsin.

² Total Fungicide, Herbicide, and Insecticide includes pesticides that are not listed in this table.

³ Given the large number of herbicides applied to row crops, active ingredients that were applied to less than 10 percent of planted acres in Minnesota are not included in this table, but can be found at www.nass.usda.gov.

Scouting for weeds was the top **pest management practice** on **corn** acreage. Scouting for insects and mites was the top pest management practice on **soybean** acreage.

Pest Management Practices – Minnesota and Program States: 2018

	Minnesota				Program states			
	Corn		Soybeans		Corn ¹		Soybeans ²	
	% of area planted	% of operations	% of area planted	% of operations	% of area planted	% of operations	% of area planted	% of operations
Avoidance								
Crop or plant variety chosen for specific pest resistance	57	52	54	55	58	54	53	50
Planting locations planned to avoid cross infestation of pests	13	11	17	18	20	19	15	13
Planting or harvesting dates adjusted	16	15	13	13	21	19	17	17
Rotated crops during past 3 years	91	90	83	76	84	85	77	74
Row spacing, plant density, or row directions adjusted	10	8	18	16	18	15	21	19
Monitoring								
Diagnostic laboratory services used for pest detection via soil or plant tissue analysis	7	6	7	7	9	9	5	4
Field mapping data used to assist decisions	26	20	21	14	19	18	12	10
Scouted-								
established process used	32	21	31	29	23	20	22	19
for pests due to a pest advisory warning	14	9	19	14	11	9	13	11
for pests due to a pest development model	22	17	21	16	11	9	9	8
for pests or beneficial organisms-not scouted	5	8	3	6	4	8	4	6
for pests or beneficial organism by conducting general observations while performing routine tasks	17	24	10	13	30	32	26	31
for pests or beneficial organism by deliberately going to the crop acres or growing areas	78	69	87	82	66	60	71	63
Scouted for diseases-								
by employee	83	81	84	76	84	76	85	80
(Z)	(Z)	(Z)	0	0	2	2	1	1
by farm supply company or chemical dealer	18	21	19	22	12	14	12	13
by independent crop consultant or commercial scout	17	14	16	13	15	13	17	13
by operator, partner, or family member	65	66	65	65	71	71	69	74
Scouted for insects & mites-								
by employee	82	80	97	90	84	76	88	84
(Z)	(Z)	(Z)	0	0	2	2	1	1
by farm supply company or chemical dealer	16	20	16	18	12	14	12	13
by independent crop consultant or commercial scout	17	14	14	11	15	13	17	12
by operator, partner, or family member	67	66	70	71	71	71	70	74
Scouted for weeds-								
by employee	94	92	94	91	94	90	94	92
(Z)	(Z)	(Z)	0	0	2	2	1	1
by farm supply company or chemical dealer	12	15	13	15	11	12	11	12
by independent crop consultant or commercial scout	15	12	14	11	14	12	15	11
by operator, partner, or family member	73	73	72	74	73	75	72	76
Weather data used to assist decisions	83	80	74	71	66	66	66	65
Written or electronic records kept to track pest activity	51	41	49	41	43	38	36	31
Prevention								
Beneficial insect or vertebrate habitat maintained	4	3	3	2	11	9	5	5
Crop residues removed or burned down	3	4	3	2	8	11	11	14
Equipment & implements cleaned after field work to reduce spread of pests	55	54	46	41	43	40	40	39
Field edges, ditches, or fence lines were chopped, sprayed, mowed, plowed, or burned	58	48	53	39	56	50	52	49
Field left fallow previous year to manage insects	0	0	0	0	1	1	(Z)	(Z)
Flamer used to kill weeds	1	1	0	0	(Z)	1	(Z)	(Z)
No-till or minimum-till used	44	40	38	37	65	65	64	67
Plowed down crop residue using conventional tillage	44	43	36	35	27	29	20	19
Seed treated for insect or disease control after purchase	12	8	33	28	24	22	33	28
Water management practices used	1	1	3	1	6	4	4	2
Suppression								
Beneficial organisms applied or released	(Z)	(Z)	(Z)	1	1	1	1	1
Biological pesticides applied	3	3	(Z)	1	11	9	3	3
Buffer strips or border rows maintained to isolate organic from non-organic crops	7	6	4	5	8	10	5	5
Floral lures, attractants, repellants, pheromone traps, or biological pest controls used	(Z)	(Z)	0	0	1	(Z)	(Z)	(Z)
Ground covers, mulches, or other physical barriers maintained	33	27	29	27	45	44	34	32
Pesticides with different mechanisms of action to keep pest from becoming resistant to pesticides	39	32	31	27	44	41	40	38
Scouting data compared to published information to assist decisions	33	26	45	39	28	26	28	23
Trap crop grown to manage insects	(Z)	(Z)	1	1	1	1	(Z)	(Z)

¹ The 18 program states surveyed about corn in the 2018 ARMS were Colorado, Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, New York, North Carolina, North Dakota, Ohio, Pennsylvania, South Dakota, Texas, and Wisconsin.

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(Z) Less than half the rounding unit.