

E1841



2016 DRY BEAN Grower Survey

*of Production, Pest Problems
and Pesticide Use*

in Minnesota and North Dakota

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*In cooperation with the
Northarvest Bean Growers Association*

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Introduction

The 2016 dry bean grower survey is the 27th annual survey of varieties grown, pest problems, pesticide use and grower practices of the Northharvest Bean Growers Association, an association of dry edible bean growers in Minnesota and North Dakota. Research and Extension faculty at North Dakota State University and the directors of the Northharvest Bean Growers Association developed the survey form (Appendix I). The survey was mailed to all Northharvest bean growers. All participants in the survey were anonymous.

Results of previous surveys dated 1987-1992, 1994-2000, 2002 and 2004-2015 have been published (see References). No surveys were conducted in 1993 and 2001. In 2003, the survey was completed by dry bean producers who attended the Northharvest Bean Day in Fargo during the winter. However, the lack of responses made processing and analyses of results unreliable, so no report was compiled.

Data reported in the figures represent totals for the entire Northharvest survey unless otherwise noted. Data reported in the tables are broken down by state and also are totaled for the entire Northharvest survey. Percent values in tables and figures are rounded to one decimal for clear presentation. Consequently, percent values in some tables and figures may not total exactly 100 (e.g. 99.9 or 100.1) when the presented values are added. Other instances in which percent values do not total 100 are explained in footnotes to the tables.

Throughout this report, trade names of chemicals often are presented as an aid for clearer communication. Mention of trade names does not constitute endorsement or recommendation by North Dakota State University or the Northharvest Bean Growers Association.

Acknowledgments

A grant from the Northharvest Bean Growers Association funded the survey.

Production

Table 1. Number of Northharvest dry bean growers responding, acres planted by respondents and total state acres in 2016.

Growers	No. of respondents	Respondents' acres	Total acres ^a	Acres surveyed (% of total)
Minnesota	48	26,357	155,000	17
North Dakota	92	59,755	625,000	9.6
Northharvest	140	86,112	780,000	11

^aTotal of dry bean acres planted for Minnesota and North Dakota (source: USDA National Agricultural Statistics Service).

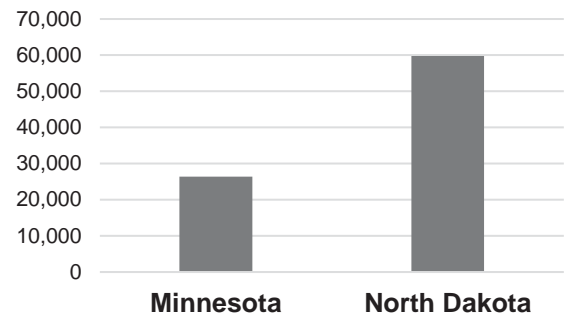


Figure 1. Northharvest dry bean acres planted by state in 2016 (respondents' acres only).

Table 2. Dry bean production by county in 2016.

Minnesota		North Dakota			
No. of respondents ^a	Acres ^b	No. of respondents ^a	Acres ^b		
Polk	8	4,235	Grand Forks	19	11,701
Wadena	5	2,655	Pembina	13	7,702
Hubbard	2	2,613	Benson	8	6,880
Norman	3	1,842	Wells	8	5,827
Swift	5	1,774	Steele	10	3,996
Otter Tail	3	1,694	Traill	7	3,708
Stevens	3	1,503	Nelson	3	3,315
Mahnomen	4	1,383	Ramsey	5	3,073
Becker	1	1,000	Walsh	12	2,762
Stearns	1	900	Cass	3	1,659
Pope	1	750	Griggs	4	1,543
Renville	4	711	LaMoure	1	1,000
Grant	3	705	Barnes	2	800
Kandiyohi	2	630	Richland	1	800
Benton	2	606	McLean	2	759
Marshall	2	540	Dickey	1	750
Douglas	1	530	Pierce	2	720
Clay	2	452	Cavalier	3	650
Morrison	4	446	Foster	1	500
Big Stone	2	365	Ransom	2	500
Traverse	1	300	Stutsman	2	450
Beltrami	1	293	Eddy	2	340
Sherburne	1	200	Sheridan	1	150
Chippewa	1	120	Rolette	1	95
Todd	1	60	Towner	1	75
Brown	1	50			
Total	26,357	Total	59,755		

^aSome respondents had dry bean acreage in more than one county.

^bRespondents' acres only.

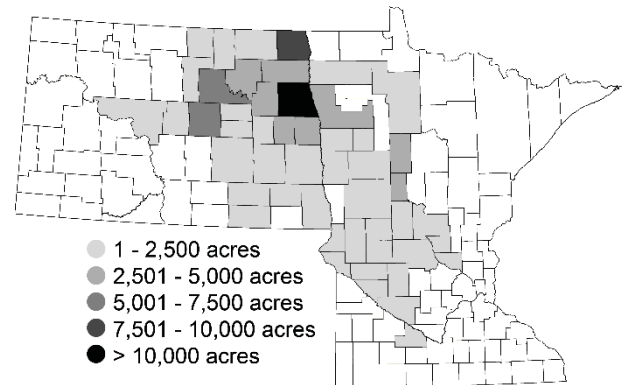


Figure 2. Northharvest dry bean production by county in 2016 (respondents' acres only).

Table 3. Dry bean acres planted, harvested, irrigated, on tile-drained ground and damaged by water in 2016.

	Acres reported (no.) ^a	Acres reported (%) ^a
Minnesota		
Planted	26,357	100
Harvested	25,128	95.3
Irrigated	12,130	46.0
Tile-drained	5,516	20.9
Water damage (beans harvested)	1,676	6.4
Water damage (beans not harvested)	1,230	4.7
North Dakota		
Planted	59,755	100
Harvested	54,916	91.9
Irrigated	1,206	2.0
Tile-drained	2,465	4.1
Water damage (beans harvested)	11,869	19.9
Water damage (beans not harvested)	4,833	8.1
Northarvest		
Planted	86,112	100
Harvested	80,044	93.0
Irrigated	13,336	15.5
Tile-drained	7,981	9.3
Water damage (beans harvested)	13,545	15.7
Water damage (beans not harvested)	6,063	7.0

^aRespondents' acres only.

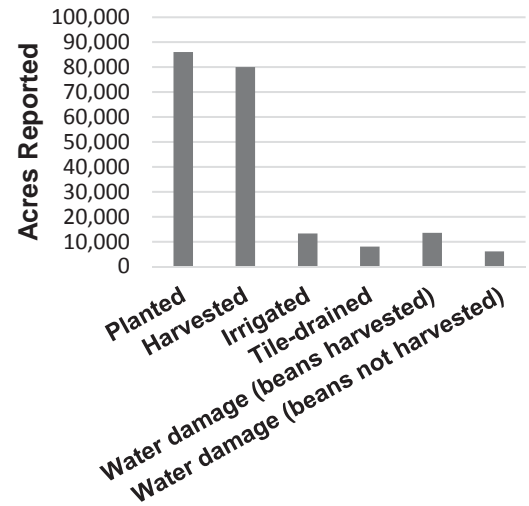


Figure 3. Northarvest respondents' reported acres from Table 3.

Table 4. Dry bean market classes grown in 2016.

Market class	Acres reported (no.) ^a	Acres reported (%) ^a
Minnesota		
Kidney	14,553	55.2
Navy	6,648	25.2
Black	3,303	12.5
Pinto	1,163	4.4
Pink	535	2.0
Small Red	155	0.6
Great Northern	0	0
Total	26,357	100
North Dakota		
Pinto	44,527	74.5
Navy	8,040	13.5
Black	5,808	9.7
Great Northern	600	1.0
Kidney	433	0.7
Pink	267	0.4
Small Red	80	0.1
Total	59,755	100
Northarvest		
Pinto	45,690	53.1
Kidney	14,986	17.4
Navy	14,688	17.1
Black	9,111	10.6
Pink	802	0.9
Great Northern	600	0.7
Small Red	235	0.3
Total	86,112	100

^aRespondents' acres only.

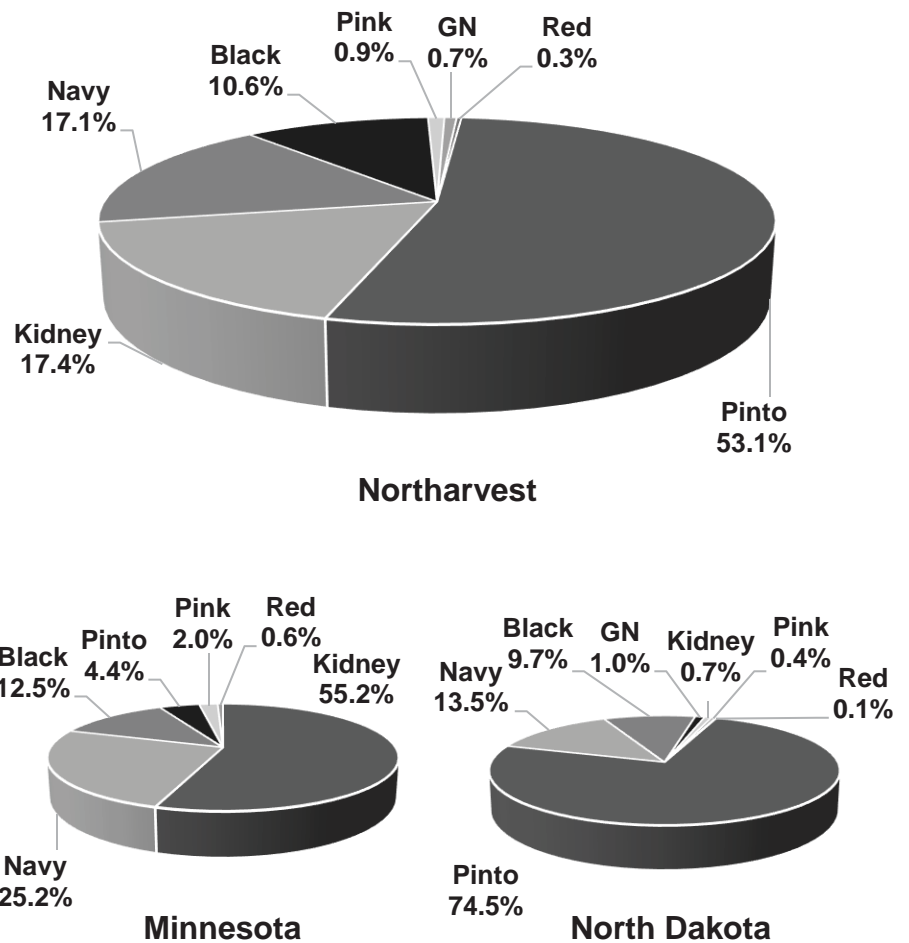


Figure 4. Northarvest dry bean market classes grown in 2016.

Table 5. Dry bean varieties grown in 2016.

Variety	Class	Acres planted ^a					
		Minnesota	% ^b	North Dakota	% ^b	Northharvest	% ^b
Eclipse	Black	1,727	6.6	4,515	7.6	6,242	7.2
Zorro	Black	1,576	6.0	880	1.5	2,456	2.9
Black Cat	Black	0	0	300	0.5	300	0.3
Not specified	Black	0	0	113	0.2	113	0.1
Total Black	Black	3,303	12.5	5,808	9.7	9,111	10.6
Orion	GN	0	0	300	0.5	300	0.3
Taurus	GN	0	0	300	0.5	300	0.3
Total GN	GN	0	0	600	1.0	600	0.7
Montcalm	Kidney	3,134	11.9	133	0.2	3,267	3.8
Red Hawk	Kidney	1,888	7.2	250	0.4	2,138	2.5
Pink Panther	Kidney	1,617	6.1	0	0	1,617	1.9
Drake	Kidney	1,510	5.7	0	0	1,510	1.8
Chapparral	Kidney	1,435	5.4	0	0	1,435	1.7
Cabernet	Kidney	1,232	4.7	0	0	1,232	1.4
Beluga	Kidney	1,216	4.6	0	0	1,216	1.4
Clouseau	Kidney	1,085	4.1	0	0	1,085	1.3
Red Rover	Kidney	1,046	4.0	0	0	1,046	1.2
Foxfire	Kidney	300	1.1	0	0	300	0.3
Talon	Kidney	45	0.2	50	0.1	95	0.1
Dynasty	Kidney	25	0.1	0	0	25	0
Big Red	Kidney	20	0.1	0	0	20	0
Total Kidney	Kidney	14,553	55.2	433	0.7	14,986	17.4
HMS Medalist	Navy	2,109	8.0	4,329	7.2	6,438	7.5
T9905	Navy	3,574	13.6	2,318	3.9	5,892	6.8
Ensign	Navy	300	1.1	552	0.9	852	1.0
Blizzard	Navy	0	0	381	0.6	381	0.4
Vigilant	Navy	330	1.3	0	0	330	0.4
COOP 06063	Navy	90	0.3	140	0.2	230	0.3
Not specified	Navy	80	0.3	210	0.4	290	0.3
Vista	Navy	90	0.3	0	0	90	0.1
Blizzard	Navy	0	0	80	0.1	80	0.1
Navigator	Navy	60	0.2	0	0	60	0.1
Indi	Navy	15	0.1	30	0.1	45	0.1
Total Navy	Navy	6,648	25.2	8,040	13.5	14,688	17.1
Floyd	Pink	288	1.1	267	0.4	555	0.6
ISB 473	Pink	90	0.3	0	0	90	0.1
Rogers 922	Pink	85	0.3	0	0	85	0.1
Not specified	Pink	72	0.3	0	0	72	0.1
Total Pink	Pink	535	2.0	267	0.4	802	0.9
Windbreaker	Pinto	748	2.8	13,592	22.7	14,340	16.7
La Paz	Pinto	75	0.3	13,910	23.3	13,985	16.2
Monterrey	Pinto	0	0	5,405	9.0	5,405	6.3
Lariat	Pinto	0	0	3,119	5.2	3,119	3.6
Santa Cruz	Pinto	290	1.1	2,491	4.2	2,781	3.2
Vibrant	Pinto	0	0	2,034	3.4	2,034	2.4
Torreon	Pinto	0	0	1,180	2.0	1,180	1.4
Sinaloa	Pinto	0	0	1,105	1.8	1,105	1.3
ND 307	Pinto	0	0	1,000	1.7	1,000	1.2
Buster	Pinto	0	0	200	0.3	200	0.2
El Dorado	Pinto	0	0	200	0.3	200	0.2
Stampede	Pinto	0	0	150	0.3	150	0.2
ND Palomino	Pinto	50	0.2	51	0.1	101	0.1
Maverick	Pinto	0	0	90	0.2	90	0.1
Total Pinto	Pinto	1,163	4.4	44,527	74.5	45,690	53.1
Ruby	Small Red	155	0.6	0	0	155	0.2
Merlot	Small Red	0	0	80	0.1	80	0.1
Total Red	Small Red	155	0.6	80	0.1	235	0.3
Grand Total	All Classes	26,357	100	59,755	100	86,112	100

^aRespondents' acres only.

^bPercent of respondents' total dry bean acreage.

^cGN = Great Northern.

Table 6. Dry bean production problems reported in 2016.

Production problem	Respondents (no.)	Respondents (%)	Acres reported (no.) ^a	Acres reported (%) ^a
Minnesota				
Hail	22	45.8	7,614	28.9
Diseases	11	22.9	3,090	11.7
Wind	3	6.3	2,545	9.7
None reported	3	6.3	2,534	9.6
Weeds	16	33.3	2,510	9.5
Harvest	7	14.6	1,872	7.1
Water damage (beans harvested)	17	35.4	1,676	6.4
Water damage (beans not harvested)	19	39.6	1,230	4.7
Drought	4	8.3	443	1.7
Emergence/stand	2	4.2	330	1.3
Delayed planting	2	4.2	256	1.0
Applied herbicide injury	4	8.3	230	0.9
Frost	1	2.1	226	0.9
Soil salinity	1	2.1	145	0.6
Herbicide drift injury	1	2.1	5	0
North Dakota				
Hail	41	44.6	15,128	25.3
Water damage (beans harvested)	52	56.5	11,869	19.9
Weeds	32	34.8	11,247	18.8
Harvest	19	20.7	8,067	13.5
Diseases	15	16.3	6,577	11.0
Water damage (beans not harvested)	55	59.8	4,833	8.1
Emergence/stand	17	18.5	3,945	6.6
Delayed planting	12	13.0	3,913	6.5
Wind	14	15.2	3,579	6.0
Drought	2	2.2	2,050	3.4
Soil salinity	24	26.1	1,072	1.8
None reported	2	2.2	915	1.5
Applied herbicide injury	2	2.2	530	0.9
Herbicide drift injury	2	2.2	154	0.3
Micronutrient deficiency	1	1.1	50	0.1
Frost	1	1.1	15	0
Northarvest				
Hail	63	45.0	22,742	26.4
Weeds	48	34.3	13,757	16.0
Water damage (beans harvested)	69	49.3	13,545	15.7
Harvest	26	18.6	9,939	11.5
Diseases	26	18.6	9,667	11.2
Wind	17	12.1	6,124	7.1
Water damage (beans not harvested)	74	52.9	6,063	7.0
Emergence/stand	19	13.6	4,275	5.0
Delayed planting	14	10	4,169	4.8
None reported	5	3.6	3,449	4.0
Drought	6	4.3	2,493	2.9
Soil salinity	25	17.9	1,217	1.4
Applied herbicide injury	6	4.3	760	0.9
Frost	2	1.4	241	0.3
Herbicide drift injury	3	2.1	159	0.2
Micronutrient deficiency	1	0.7	50	0.1

^aRespondents' acres only.

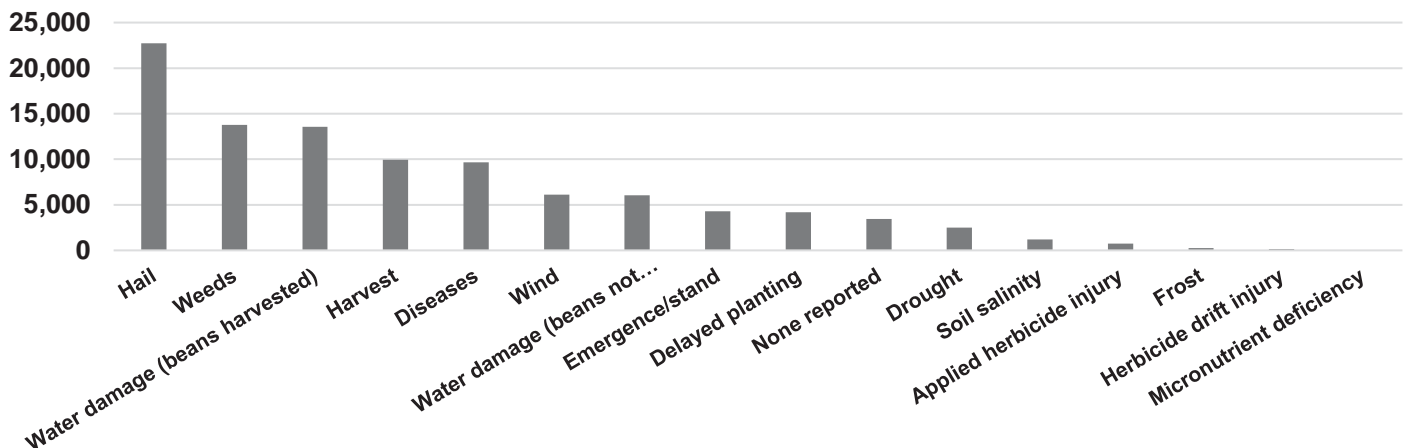


Figure 5. Northarvest respondents' reported acres for dry bean production problems in 2016.

Table 7. Purchased seed size problems that affected acreage planting intentions in 2016.

Variety	Class	Respondents (no.)	Acres reported ^a	Not enough seed			Too much seed		
				Respondents (no.)	Acres affected ^a	%	Respondents (no.)	Acres affected ^a	%
Minnesota									
Eclipse	Black	7	1,727	0	0	0	0	0	0
Beluga	Kidney	5	1,216	1	20	1.6	0	0	0
Clouseau	Kidney	3	1,085	0	0	0	1	150	13.8
HMS									
Medalist	Navy	13	2,109	1	10	0.5	0	0	0
T 9905	Navy	11	3,574	1	20	0.6	0	0	0
Windbreaker	Pinto	3	748	0	0	0	0	0	0
North Dakota									
Eclipse	Black	11	4,515	1	20	0.4	0	0	0
Beluga	Kidney	0	0	0	0	0	0	0	0
Clouseau	Kidney	0	0	0	0	0	0	0	0
HMS									
Medalist	Navy	13	4,329	0	0	0	1	5	0.1
T 9905	Navy	6	2,318	0	0	0	0	0	0
Windbreaker	Pinto	26	13,592	1	50	0.4	0	0	0
La Paz	Pinto	43	13,910	0	0	0	1	5	0
Northarvest									
Eclipse	Black	18	6,242	1	20	0.3	0	0	0
Beluga	Kidney	5	1,216	1	20	1.6	0	0	0
Clouseau	Kidney	3	1,085	0	0	0	1	150	13.8
HMS									
Medalist	Navy	26	6,438	1	10	0.2	1	5	0.1
T 9905	Navy	17	5,892	1	20	0.3	0	0	0
Windbreaker	Pinto	29	14,340	1	50	0.3	0	0	0
La Paz	Pinto	44	13,985	0	0	0	1	5	0

^aRespondents' acres only.

Table 8. Row spacing by dry bean market class in 2016.

Row spacing	Black ^a		GN ^b		Kidney		Navy ^a		Pink		Pinto ^a		Red	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Minnesota														
< 11 inches	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 to 15 inches	1	8.3	0	0	0	0	2	9.1	0	0	1	25.0	0	0
16 to 20 inches	0	0	0	0	0	0	2	9.1	0	0	0	0	0	0
21 to 25 inches	9	75.0	0	0	8	47.1	14	63.6	1	33.3	2	50	1	100
26 to 30 inches	2	16.7	0	0	9	52.9	4	18.2	2	66.7	1	25.0	0	0
> 30 inches	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	12	100	0	0	17	100	22	100	3	100	4	100	1	100
North Dakota														
< 11 inches	0	0	0	0	0	0	0	0	0	0	1	1.3	0	0
11 to 15 inches	2	15.4	0	0	0	0	0	0	0	0	5	6.5	0	0
16 to 20 inches	0	0	0	0	0	0	1	5.9	0	0	5	6.5	0	0
21 to 25 inches	6	46.2	1	100	1	33.3	8	47.1	1	100	24	31.2	0	0
26 to 30 inches	5	38.5	0	0	2	66.7	8	47.1	0	0	41	53.2	1	100
> 30 inches	0	0	0	0	0	0	0	0	0	0	1	1.3	0	0
Total	13	100	1	100	3	100	17	100	1	100	77	100	1	100
Northarvest														
< 11 inches	0	0	0	0	0	0	0	0	0	0	1	1.2	0	0
11 to 15 inches	3	12.0	0	0	0	0	2	5.1	0	0	6	7.4	0	0
16 to 20 inches	0	0	0	0	0	0	3	7.7	0	0	5	6.2	0	0
21 to 25 inches	15	60	1	100	9	45.0	22	56.4	2	50	26	32.1	1	50
26 to 30 inches	7	28.0	0	0	11	55.0	12	30.8	2	50	42	51.9	1	50
> 30 inches	0	0	0	0	0	0	0	0	0	0	1	1.2	0	0
Total	25	100	1	100	20	100	39	100	4	100	81	100	2	100

^aBlack, navy and pinto varieties are typically Type II (upright) varieties.

^bGN = Great Northern.

Table 9. Seeding rate by dry bean market class in 2016.

Seeding rate ^a	Black ^b		GN ^c		Kidney		Navy ^b		Pink		Pinto ^b		Red	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Minnesota														
< 70,000	0	0	0	0	1	5.9	0	0	0	0	0	0	0	0
70 to 79,000	0	0	0	0	7	41.2	0	0	1	25.0	2	50	0	0
80 to 89,000	0	0	0	0	6	35.3	0	0	3	75.0	1	25.0	1	100
90 to 99,000	1	10	0	0	3	17.6	1	4.8	0	0	1	25.0	0	0
100 to 109,000	3	30	0	0	0	0	3	14.3	0	0	0	0	0	0
110 to 119,000	2	20	0	0	0	0	9	42.9	0	0	0	0	0	0
120 to 129,000	4	40	0	0	0	0	7	33.3	0	0	0	0	0	0
> 129,000	0	0	0	0	0	0	1	4.8	0	0	0	0	0	0
Total	10	100	0	0	17	100	21	100	4	100	4	100	1	100
North Dakota														
< 70,000	0	0	0	0	0	0	0	0	0	0	12	16.4	0	0
70 to 79,000	0	0	1	100	3	100	0	0	0	0	33	45.2	0	0
80 to 89,000	1	9.1	0	0	0	0	0	0	1	100	25	34.2	1	100
90 to 99,000	2	18.2	0	0	0	0	2	15.4	0	0	2	2.7	0	0
100 to 109,000	4	36.4	0	0	0	0	2	15.4	0	0	0	0	0	0
110 to 119,000	4	36.4	0	0	0	0	8	61.5	0	0	1	1.4	0	0
120 to 129,000	0	0	0	0	0	0	1	7.7	0	0	0	0	0	0
> 129,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	11	100	1	100	3	100	13	100	1	100	73	100	1	100
Northarvest														
< 70,000	0	0	0	0	1	5.0	0	0	0	0	12	15.6	0	0
70 to 79,000	0	0	1	100	10	50	0	0	1	20	35	45.5	0	0
80 to 89,000	1	4.8	0	0	6	30	0	0	4	80	26	33.8	2	100
90 to 99,000	3	14.3	0	0	3	15.0	3	8.8	0	0	3	3.9	0	0
100 to 109,000	7	33.3	0	0	0	0	5	14.7	0	0	0	0	0	0
110 to 119,000	6	28.6	0	0	0	0	17	50	0	0	1	1.3	0	0
120 to 129,000	4	19.0	0	0	0	0	8	23.5	0	0	0	0	0	0
> 129,000	0	0	0	0	0	0	1	2.9	0	0	0	0	0	0
Total	21	100	1	100	20	100	34	100	5	100	77	100	2	100

^aLive seeds per acre.

^bBlack, navy and pinto varieties are typically Type II (upright) varieties.

^cGN = Great Northern

Table 10. Difference between seeding rate and established plant stand for dry bean market classes grown in 2016.

Difference ^a	Black ^b		GN ^c		Kidney		Navy ^b		Pink		Pinto ^b		Red	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Minnesota														
< 10,000	2	20	0	0	3	21.4	5	26.3	1	50	1	25.0	0	0
10 to 19,000	7	70	0	0	9	64.3	12	63.2	1	50	3	75.0	1	100
20 to 29,000	0	0	0	0	1	7.1	1	5.3	0	0	0	0	0	0
30 to 39,000	1	10	0	0	1	7.1	1	5.3	0	0	0	0	0	0
Total	10	100	0	0	14	100	19	100	2	100	4	100	1	100
North Dakota														
< 10,000	0	0	1	100	2	66.7	0	0	1	100	33	58.9	1	100
10 to 19,000	5	71.4	0	0	1	33.3	7	100	0	0	21	37.5	0	0
20 to 29,000	2	28.6	0	0	0	0	0	0	0	0	1	1.8	0	0
30 to 39,000	0	0	0	0	0	0	0	0	0	0	1	1.8	0	0
Total	7	100	1	100	3	100	7	100	1	100	56	100	1	100
Northarvest														
< 10,000	2	11.8	1	100	5	29.4	5	19.2	2	66.7	34	56.7	1	50
10 to 19,000	12	70.6	0	0	10	58.8	19	73.1	1	33.3	24	40	1	50
20 to 29,000	2	11.8	0	0	1	5.9	1	3.8	0	0	1	1.7	0	0
30 to 39,000	1	5.9	0	0	1	5.9	1	3.8	0	0	1	1.7	0	0
Total	17	100	1	100	17	100	26	100	3	100	60	100	2	100

^aPlants per acre.

^bBlack, navy and pinto varieties are typically Type II (upright) varieties.

^cGN = Great Northern

Table 11. Percent of total dry bean acres harvested by direct combining in 2016.

Percent direct combined	Respondents (no.)	Respondents (%)	Acres reported ^a	Acres reported ^a (%)
Minnesota				
1 to 25%	3	6.5	3,430	13.6
26 to 50%	0	0	0	0
51 to 75%	2	4.3	459	1.8
76 to 99%	1	2.2	320	1.3
100%	23	50	5,956	23.6
No direct harvest	17	37.0	15,037	59.7
Total	46	100	25,202	100
North Dakota				
1 to 25%	13	14.4	10,757	18.4
26 to 50%	7	7.8	5,687	9.7
51 to 75%	4	4.4	1,310	2.2
76 to 99%	5	5.6	3,940	6.7
100%	51	56.7	28,675	49.0
No direct harvest	10	11.1	8,184	14.0
Total	90	100	58,553	100
Northharvest				
1 to 25%	16	11.8	14,187	16.9
26 to 50%	7	5.1	5,687	6.8
51 to 75%	6	4.4	1,769	2.1
76 to 99%	6	4.4	4,260	5.1
100%	74	54.4	34,631	41.3
No direct harvest	27	19.9	23,221	27.7
Total	136	100	83,755	100

^aRespondents' harvested acres only.

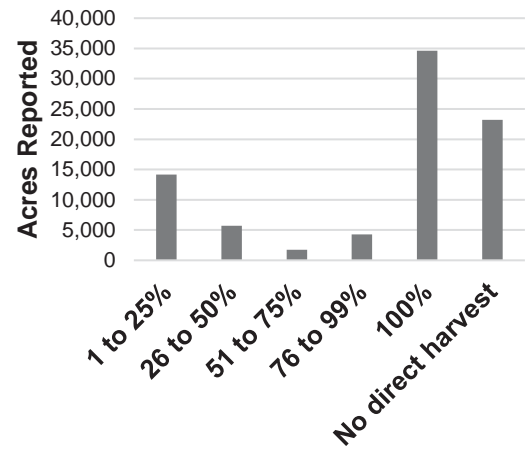


Figure 6. Northharvest percent of dry bean acres harvested by direct combining in 2016.

Table 12. Estimated yield loss in harvested dry beans in 2016.

Estimated yield loss	Direct Harvest		Conventional Harvest	
	Respondents (no.)	Respondents (%)	Respondents (no.)	Respondents (%)
Minnesota				
0%	0	0	1	4.3
1-5%	12	41.4	17	73.9
6-10%	12	41.4	5	21.7
11-15%	3	10.3	0	0
16-20%	2	6.9	0	0
Total	29	100	23	100
North Dakota				
0%	0	0	0	0
1-5%	24	30	25	64.1
6-10%	33	41.3	14	35.9
11-15%	15	18.8	0	0
16-20%	8	10	0	0
Total	80	100	39	100
Northharvest				
0%	0	0	1	1.6
1-5%	36	33.0	42	67.7
6-10%	45	41.3	19	30.6
11-15%	18	16.5	0	0
16-20%	10	9.2	0	0
Total	109	100	62	100

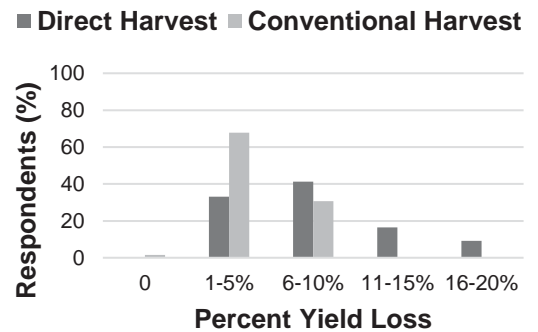


Figure 7. Northharvest estimated yield loss in harvested dry beans in 2016.

Table 13. Dry bean field tillage practices in 2016.

Tillage practice	Acres reported (no.) ^a	Acres reported (%) ^a
Minnesota		
Conventional	22,922	87
Minimum	3,435	13
Strip-tillage	0	0
No-till	0	0
Total	26,357	100
North Dakota		
Conventional	45,146	76
Minimum	8,568	14
No-till	3,871	6
Strip-tillage	2,170	4
Total	59,755	100
Northarvest		
Conventional	68,068	79
Minimum	12,003	14
No-till	3,871	4
Strip-tillage	2,170	3
Total	86,112	100

^aRespondents' acres only.

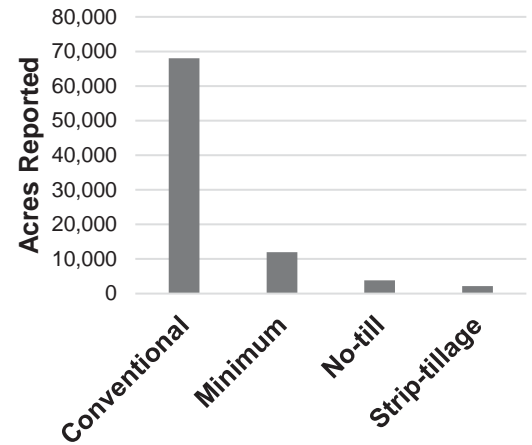


Figure 8. Northharvest dry bean field tillage practices in 2016.

Agronomy

Table 14. Ground rolling on dry bean fields in 2016.

Timing	Respondents (no.)	Respondents (%) ^a	Acres reported (no.) ^b	Acres reported (%) ^b
Minnesota				
Pre-plant	8	17.8	3,852	14.8
Pre-emerge	16	35.6	3,783	14.6
Post-emerge	3	6.7	1,666	6.4
Did not roll	25	55.6	16,671	64.2
Total			25,972	100
North Dakota				
Pre-plant	9	9.9	3,549	6.1
Pre-emerge	49	53.8	26,583	45.4
Post-emerge	8	8.8	4,930	8.4
Did not roll	38	41.8	23,510	40.1
Total			58,572	100
Northarvest				
Pre-plant	17	12.5	7,401	8.8
Pre-emerge	65	47.8	30,366	35.9
Post-emerge	11	8.1	6,596	7.8
Did not roll	63	46.3	40,181	47.5
Total			84,544	100

^aPercentages do not total 100 percent because some respondents practiced more than one timing.

^bRespondents' acres only.

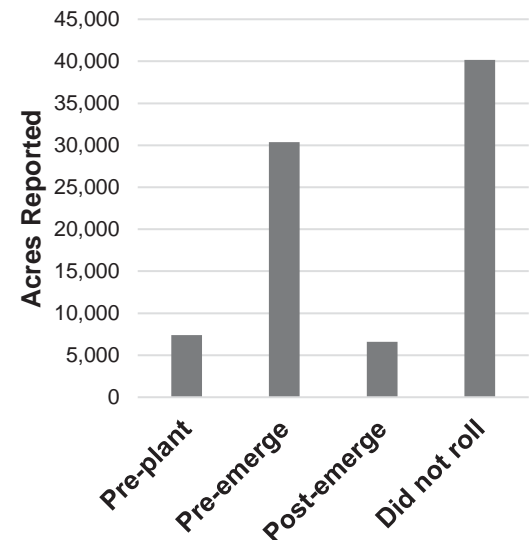


Figure 9. Northharvest ground rolling on dry bean fields in 2016.

Table 15. Ground rolling and direct harvest on dry bean fields in 2016.

Percent Direct Combined	Ground Rolling			
	Yes		No	
Minnesota	Respondents (no.)	Respondents (%)	Respondents (no.)	Respondents (%)
0%	2	9.5	15	65.2
1 to 25%	1	4.8	2	8.7
26 to 50%	0	0	0	0
51 to 75%	0	0	1	4.3
76 to 100%	0	0	1	4.3
100%	18	85.7	4	17.4
Total	21	100	23	100
North Dakota				
0%	2	3.1	8	30.8
1 to 25%	4	6.3	9	34.6
26 to 50%	4	6.3	3	11.5
51 to 75%	4	6.3	0	0
76 to 100%	3	4.7	2	7.7
100%	47	73.4	4	15.4
Total	64	100	26	100
Northarvest				
0%	4	4.7	23	46.9
1 to 25%	5	5.9	11	22.4
26 to 50%	4	4.7	3	6.1
51 to 75%	4	4.7	1	2.0
76 to 100%	3	3.5	3	6.1
100%	65	76.5	8	16.3
Total	85	100	49	100

Table 16. Use of fertilizers on dry bean fields in 2016.

Fertilizer	Respondents (no.)	Respondents (%)
Minnesota		
Nitrogen	40	97.6
Phosphorus	36	87.8
Potash	33	80.5
Zinc	28	68.3
Sulfur	27	65.9
North Dakota		
Nitrogen	70	92.1
Phosphorus	61	80.3
Potash	30	39.5
Zinc	53	69.7
Sulfur	26	34.2
Northarvest		
Nitrogen	110	94.0
Phosphorus	97	82.9
Potash	63	53.8
Zinc	81	69.2
Sulfur	53	45.3

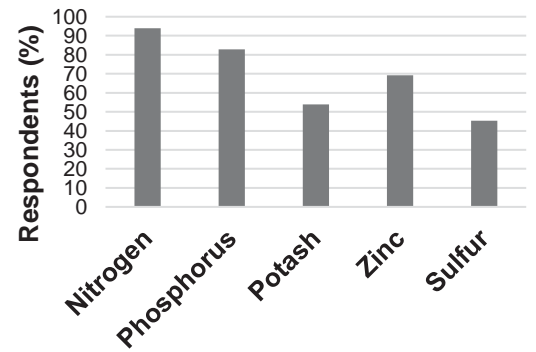


Figure 10. Northarvest use of fertilizers on dry bean fields in 2016.

Table 17. Fertilizer application methods on dry bean fields in 2016.

Fertilizer	Respondents (no.)	Respondents (%)
Minnesota		
Broadcast	44	95.7
In-furrow	17	37.0
Banded	12	26.1
Foliar	8	17.4
North Dakota		
Broadcast	64	79.0
In-furrow	32	39.5
Banded	21	25.9
Foliar	4	4.9
Northarvest		
Broadcast	108	85.0
In-furrow	49	38.6
Banded	33	26.0
Foliar	12	9.4

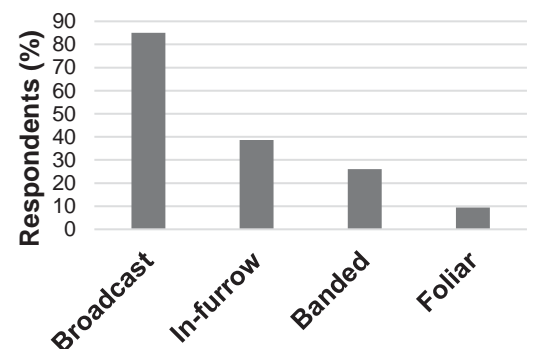


Figure 11. Northarvest fertilizer application methods on dry bean fields in 2016.

Table 18. Use of soil test prior to fertilization of dry bean fields in 2016.

Soil test	Respondents (no.)	Respondents (%)
Minnesota		
Soil test used	40	85.1
Soil test not used	7	14.9
Total	47	100
North Dakota		
Soil test used	70	78.7
Soil test not used	19	21.3
Total	89	100
Northarvest		
Soil test used	110	80.9
Soil test not used	26	19.1
Total	136	100

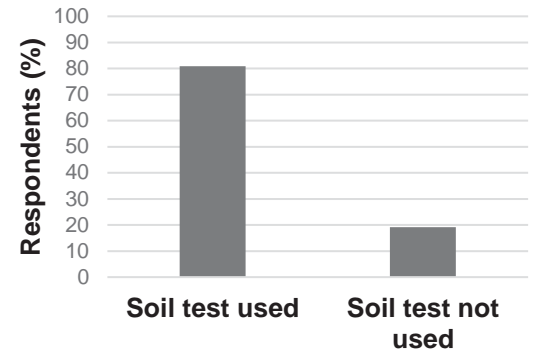


Figure 12. Northarvest use of soil test in 2016.

Table 19. Use of *Rhizobium* inoculants on dry bean fields in 2016.

<i>Rhizobium</i> use	Respondents (no.)	Respondents (%)
Minnesota		
Inoculant used	7	15.9
Inoculant not used	37	84.1
Total	44	100
North Dakota		
Inoculant used	12	14.3
Inoculant not used	72	85.7
Total	84	100
Northarvest		
Inoculant used	19	14.8
Inoculant not used	109	85.2
Total	128	100

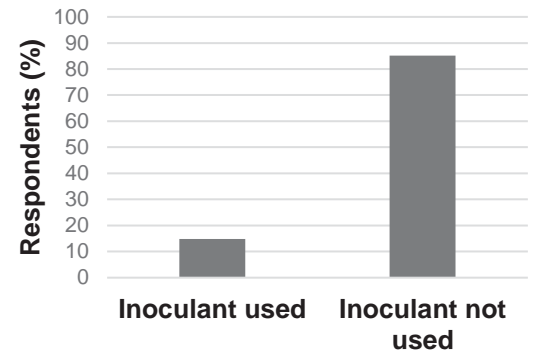


Figure 13. Northarvest use of inoculant in 2016.

Table 20. Use of site-specific nutrient management (SSNM) on dry bean fields in 2016.

Soil test	Respondents (no.)	Respondents (%)
Minnesota		
SSNM used	13	28.3
SSNM not used	33	71.7
Total	46	100
North Dakota		
SSNM used	28	32.2
SSNM not used	59	67.8
Total	87	100
Northarvest		
SSNM used	41	30.8
SSNM not used	92	69.2
Total	133	100

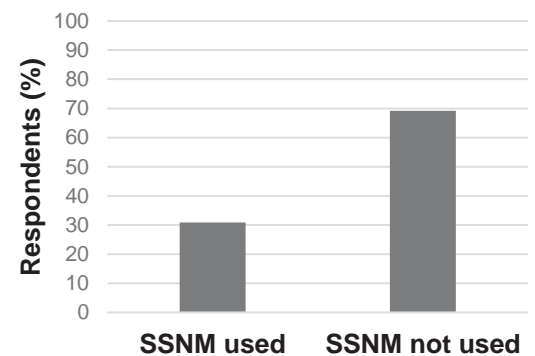


Figure 14. Northarvest use of site-specific nutrient management in 2016.

Table 21. Desiccants used on dry beans in 2016.

Desiccant	Respondents (no.)	Respondents (%)	Acres reported (no.) ^a	Acres reported (%) ^a
Minnesota				
Sharpen	25	54.3	8,847	35.0
No desiccant used	11	23.9	5,634	22.3
Valor	10	21.7	5,392	21.3
Paraquat	6	13.0	2,351	9.3
Sodium chlorate	5	10.9	2,136	8.5
Glyphosate	3	6.5	580	2.3
Desiccant Total			19,306	
North Dakota				
Sharpen	91			
Sharpen	58	63.7	35,099	58.9
Glyphosate	47	51.6	29,201	49.0
Valor	21	23.1	9,453	15.9
Paraquat	15	16.5	8,748	14.7
No desiccant used	11	12.1	3,405	5.7
Sodium chlorate	0	0	0	0
Desiccant Total			82,501	
Northarvest				
Sharpen	137			
Sharpen	83	60.6	43,946	51.8
Glyphosate	50	36.5	29,781	35.1
Valor	31	22.6	14,845	17.5
Paraquat	21	15.3	11,099	13.1
No desiccant used	22	16.1	9,039	10.7
Sodium chlorate	5	3.6	2,136	2.5
Desiccant Total			101,807	

^aRespondents' acres only.

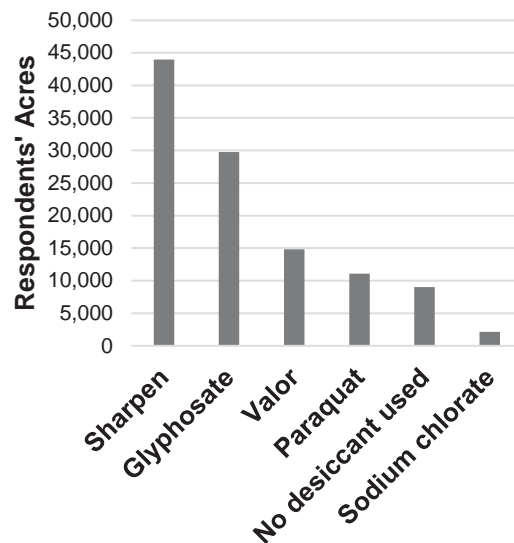


Figure 15. Northarvest desiccants used on dry beans in 2016.

Table 22. Desiccant tank-mixes used on dry beans in 2016.

Desiccant Combination	Respondents (no.)	Acres reported (no.)
Minnesota		
Paraquat + Sharpen	3	636
Glyphosate + Sharpen	3	580
Paraquat + Sodium chlorate	1	515
Sharpen + Sodium chlorate	1	65
North Dakota		
Glyphosate + Sharpen	25	14,913
Glyphosate + Paraquat + Sharpen	3	2,761
Paraquat + Sharpen	3	2,525
Glyphosate + Valor	5	1,709
Paraquat + Valor	4	1,037
Glyphosate + Sharpen + Valor	1	559
Sharpen + Valor	1	122
Northarvest		
Glyphosate + Sharpen	28	15,493
Paraquat + Sharpen	6	3,161
Glyphosate + Paraquat + Sharpen	3	2,761
Glyphosate + Valor	5	1,709
Paraquat + Valor	4	1,037
Glyphosate + Sharpen + Valor	1	559
Paraquat + Sodium chlorate	1	515
Sharpen + Valor	1	122
Sharpen + Sodium chlorate	1	65

Table 23. Frequency of crops in dry bean crop rotation program, 2012-2015.

Crop	2015	2014	2013	2012	4-year average
	Respondents (%)	Respondents (%)	Respondents (%)	Respondents (%)	Respondents (%)
Minnesota					
Barley	2.1	2.2	0	0	1.1
Corn	68.1	21.7	44.4	40.5	43.7
Dry bean	0	4.3	28.9	28.6	15.5
No crop	0	2.2	0	0	0.5
Oats	0	4.3	0	2.4	1.7
Pea	0	0	0	2.4	0.6
Potato	4.3	8.7	6.7	0	4.9
Soybean	0	47.8	11.1	28.6	21.9
Sugarbeet	14.9	13.0	0	9.5	9.4
Wheat	23.4	10.9	13.3	2.4	12.5
North Dakota					
Barley	6.7	0	2.4	0	2.3
Canola	0	2.3	0	1.3	0.9
Corn	39.3	13.6	42.2	15.4	27.6
Dry bean	4.5	43.2	19.3	60.3	31.8
No crop	1.1	0	2.4	1.3	1.2
Potato	1.1	0	2.4	2.6	1.5
Soybean	2.2	34.1	18.1	21.8	19.1
Sugarbeet	12.4	8.0	0	2.6	5.7
Sunflower	1.1	1.1	0	0	0.6
Wheat	68.5	27.3	49.4	24.4	42.4
Northarvest					
Barley	5.1	0.7	1.6	0	1.9
Canola	0	1.5	0	0.8	0.6
Corn	49.3	16.4	43.0	24.2	33.2
Dry bean	2.9	29.9	22.7	49.2	26.2
No crop	0.7	0.7	1.6	0.8	1.0
Oats	0	1.5	0	0.8	0.6
Pea	0	0	0	0.8	0.2
Potato	2.2	3.0	3.9	1.7	2.7
Soybean	1.5	38.8	15.6	24.2	20
Sugarbeet	13.2	9.7	0	5.0	7.0
Sunflower	0.7	0.7	0	0	0.4
Wheat	52.9	21.6	36.7	16.7	32.0

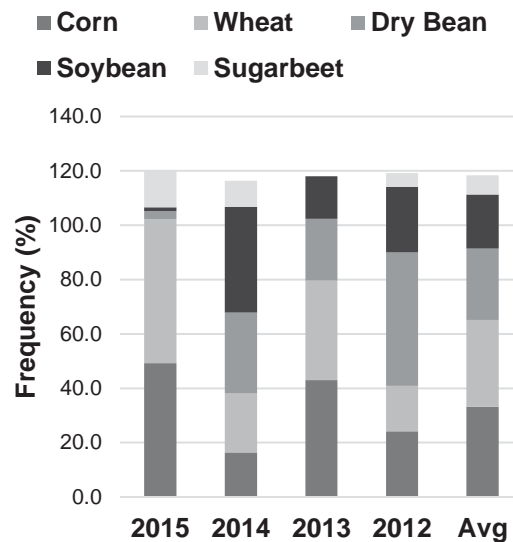


Figure 16. Northarvest frequency of major crops in dry bean crop rotation program, 2012-2015.

Table 24. Number of years dry beans are grown in dry bean crop rotation program.

Number of years	Respondents	Respondents
	(no.)	(%)
Minnesota		
1 of past 5 years	23	47.9
2 of past 5 years	23	47.9
3 of past 5 years	2	4.2
4 of past 5 years	0	0
5 of past 5 years	0	0
Total	48	100
North Dakota		
1 of past 5 years	26	28.3
2 of past 5 years	32	34.8
3 of past 5 years	31	33.7
4 of past 5 years	1	1.1
5 of past 5 years	2	2.2
Total	92	100
Northarvest		
1 of past 5 years	49	35.0
2 of past 5 years	55	39.3
3 of past 5 years	33	23.6
4 of past 5 years	1	0.7
5 of past 5 years	2	1.4
Total	140	100

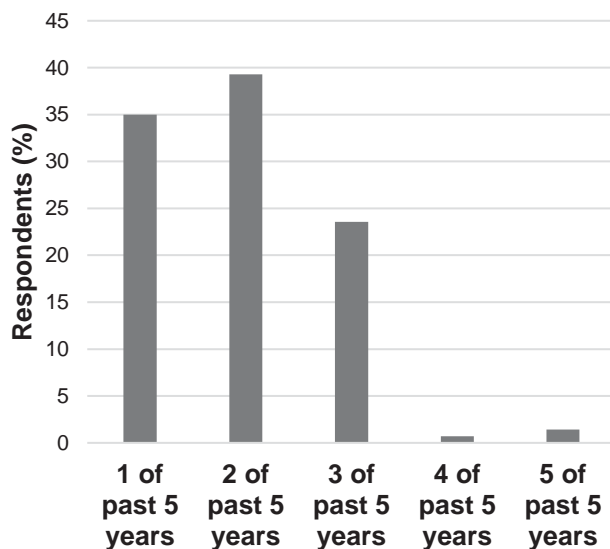


Figure 17. Northarvest number of years dry beans are grown in dry bean crop rotation program.

Insect Pests and Insecticide Use

Table 25. Worst insect problem in dry beans in 2016.

Insect ^a	Respondents (no.)	Respondents (%)	Acres reported (no.) ^{b,c}	Acres reported (%) ^{b,c}
Minnesota				
None	34	73.9	15,952	63.3
Leafhoppers	9	19.6	7,748	30.7
Seed corn maggot	2	4.3	1,400	5.6
Spider mites	1	2.2	102	0.4
Total	46	100	25,202	100
North Dakota				
None	59	66.3	37,560	65.8
Cutworms	9	10.1	6,398	11.2
Wireworms	10	11.2	5,635	9.9
Grasshoppers	6	6.7	4,145	7.3
Aphids	2	2.2	1,630	2.9
Leafhoppers	1	1.1	1,100	1.9
Amyworms	1	1.1	365	0.6
Bean leaf beetle	1	1.1	262	0.5
Total	89	100	57,095	100
Northarvest				
None	93	68.9	53,512	65.0
Leafhoppers	10	7.4	8,848	10.8
Cutworms	9	6.7	6,398	7.8
Wireworms	10	7.4	5,635	6.8
Grasshoppers	6	4.4	4,145	5.0
Aphids	2	1.5	1,630	2.0
Seed corn maggot	2	1.5	1,400	1.7
Amyworms	1	0.7	365	0.4
Bean leaf beetle	1	0.7	262	0.3
Spider mites	1	0.7	102	0.1
Total	135	100	82,297	100

^aRanked as No. 1 insect problem by respondents.

^bRespondents' acres only.

^cInsect problem may not have been present across all reported acres.

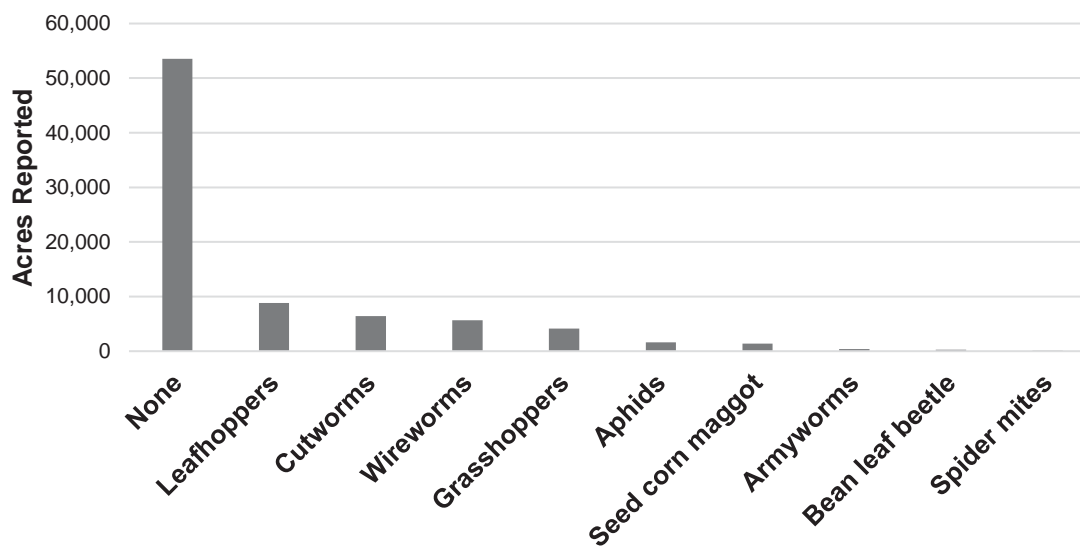


Figure 18. Northarvest worst insect problem in dry beans in 2016.

Table 26. Insects ranked as one of the three worst in dry beans in 2016.

Insect ^a	Respondents (no.)	Respondents (%)	Acres reported (no.) ^{b,c}	Acres reported (%) ^{b,c}
Minnesota				
None	34	73.9	15,952	63.3
Leafhoppers	12	26.1	9,250	36.7
Cutworms	3	6.5	2,061	8.2
Aphids	2	4.3	1,980	7.9
Seed corn maggot	2	4.3	1,400	5.6
Bean leaf beetle	1	2.2	940	3.7
Spider mites	3	6.5	752	3.0
North Dakota				
None	59	66.3	37,560	65.8
Wireworms	19	21.3	12,383	21.7
Cutworms	20	22.5	11,828	20.7
Grasshoppers	14	15.7	7,777	13.6
Seed corn maggot	3	3.4	3,008	5.3
Aphids	5	5.6	2,707	4.7
Leafhoppers	4	4.5	2,232	3.9
Bean leaf beetle	2	2.2	1,292	2.3
Armyworms	2	2.2	1,265	2.2
Spider mites	2	2.2	1,245	2.2
Northarvest				
None	93	68.9	53,512	65.0
Cutworms	23	17.0	13,889	16.9
Wireworms	19	14.1	12,383	15.0
Leafhoppers	16	11.9	11,482	14.0
Grasshoppers	14	10.4	7,777	9.4
Aphids	7	5.2	4,687	5.7
Seed corn maggot	5	3.7	4,408	5.4
Bean leaf beetle	3	2.2	2,232	2.7
Spider mites	5	3.7	1,997	2.4
Armyworms	2	1.5	1,265	1.5

^aRanked as No. 1, 2 or 3 insect problem by respondents.

^bRespondents' acres only.

^cInsect problem may not have been present across all reported acres.

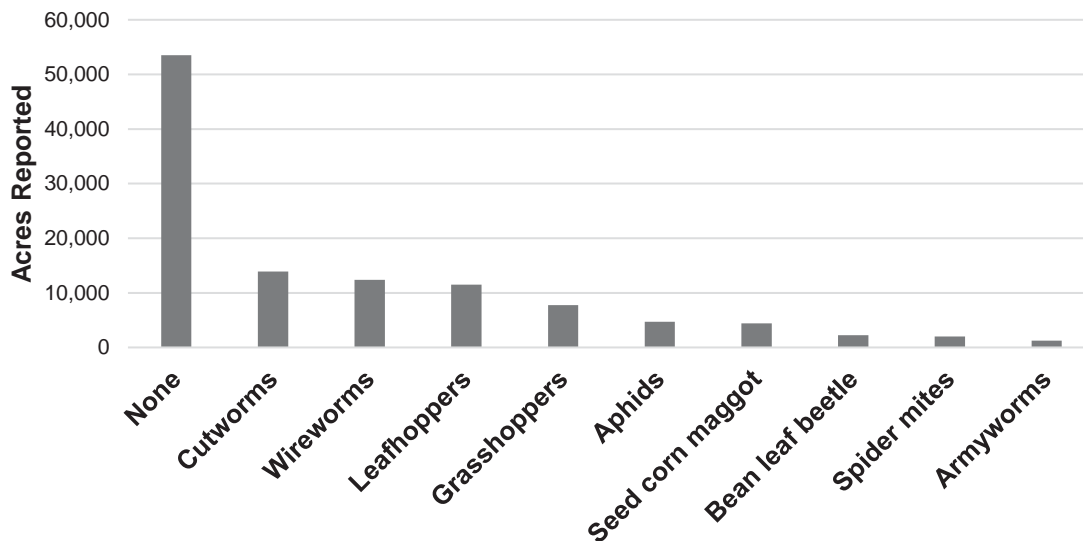


Figure 19. Northarvest insects ranked as one of the three worst in dry beans in 2016.

Table 27. Foliar insecticide use in dry beans in 2016.

Insecticide	Respondents (no.)	Respondents (%)	Acres reported (no.)^{a,b}	Acres reported (%)^{a,b}
Minnesota				
None	37	77.1	19,171	72.7
Asana XL	4	8.3	2,831	10.7
Hero	1	2.1	2,239	8.5
Baythroid XL	1	2.1	2,180	8.3
Dimethoate	2	4.2	1,445	5.5
Warrior II/generics	4	8.3	1,134	4.3
Brigade/generics	1	2.1	133	0.5
Insecticide Total			9,962	37.8
North Dakota				
None	86	94.5	56,307	94.6
Asana XL	2	2.2	1,598	2.7
Brigade/generics	2	2.2	860	1.4
Warrior II/generics	1	1.1	600	1.0
Insecticide Total			3,058	5.1
Northarvest				
None	123	88.5	75,478	87.9
Asana XL	6	4.3	4,429	5.2
Hero	1	0.7	2,239	2.6
Baythroid XL	1	0.7	2,180	2.5
Warrior II/generics	5	3.6	1,734	2.0
Dimethoate	2	1.4	1,445	1.7
Brigade/generics	3	2.2	993	1.2
Insecticide Total			13,020	15.2

^aRespondents' acres only. Multiple applications count as multiple acres.

^bPercentages do not total 100 percent because some respondents treated more than once with the same product and/or treated the same acreage with more than one product.

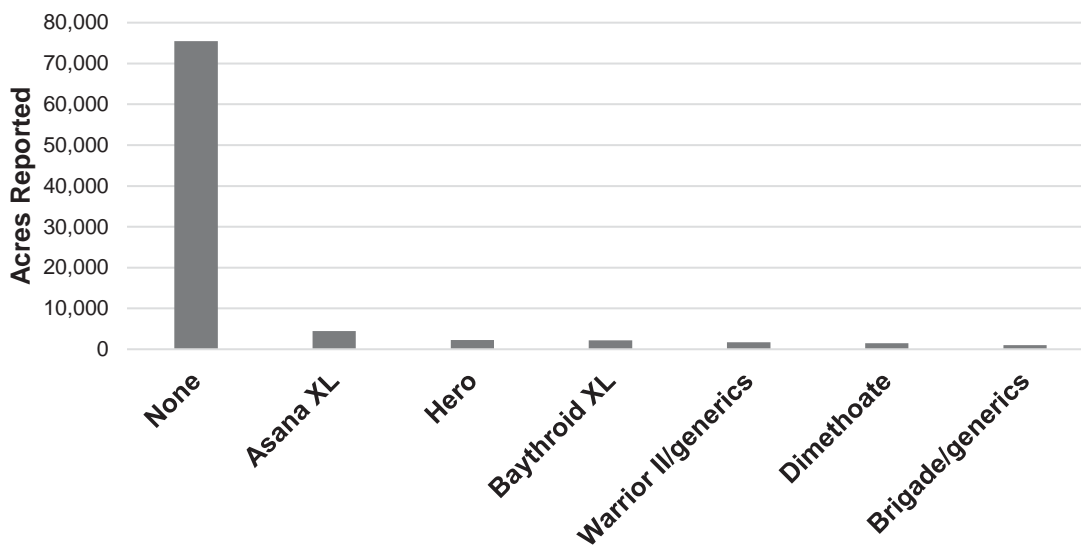


Figure 20. Northarvest foliar insecticide use in dry beans in 2016.

Table 28. Soil insecticide and seed treatment use in dry beans in 2016.

Seed Treatment	Respondents (no.)	Respondents (%)	Acres reported (no.) ^{a,b}	Acres reported (%) ^{a,b}
Minnesota				
Cruiser Maxx	24	52.2	15,597	61.7
None	13	28.3	4,801	19.0
Don't know	5	10.9	3,008	11.9
Dyna-Shield Imidacloprid	2	4.3	2,733	10.8
Lorsban	5	10.9	2,337	9.3
Enhance AW	1	2.2	494	2.0
Capture LFR	1	2.2	400	1.6
Cruiser 5FS	1	2.2	281	1.1
Insecticide Total			24,850	98.4
North Dakota				
Cruiser Maxx	31	35.2	19,972	35.6
Don't know	24	27.3	14,766	26.3
None	23	26.1	11,671	20.8
Capture LFR	5	5.7	5,500	9.8
Lorsban	10	11.4	5,433	9.7
Cruiser 5FS	4	4.5	1,683	3.0
Gaucho 600	1	1.1	1,040	1.9
Dyna-Shield Imidacloprid	1	1.1	267	0.5
Insecticide Total			48,661	86.6
Northarvest				
Cruiser Maxx	55	41.0	35,569	43.7
Don't know	29	21.6	17,774	21.8
None	36	26.9	16,472	20.2
Lorsban	15	11.2	7,770	9.5
Capture LFR	6	4.5	5,900	7.2
Dyna-Shield Imidacloprid	3	2.2	3,000	3.7
Cruiser 5FS	5	3.7	1,964	2.4
Gaucho 600	1	0.7	1,040	1.3
Enhance AW	1	0.7	494	0.6
Insecticide Total			73,511	90.3

^aRespondents' acres only.

^bPercentages do not total 100 percent because some respondents treated more than once with the same product and/or treated the same acreage with more than one product.

*Soil-applied insecticide.

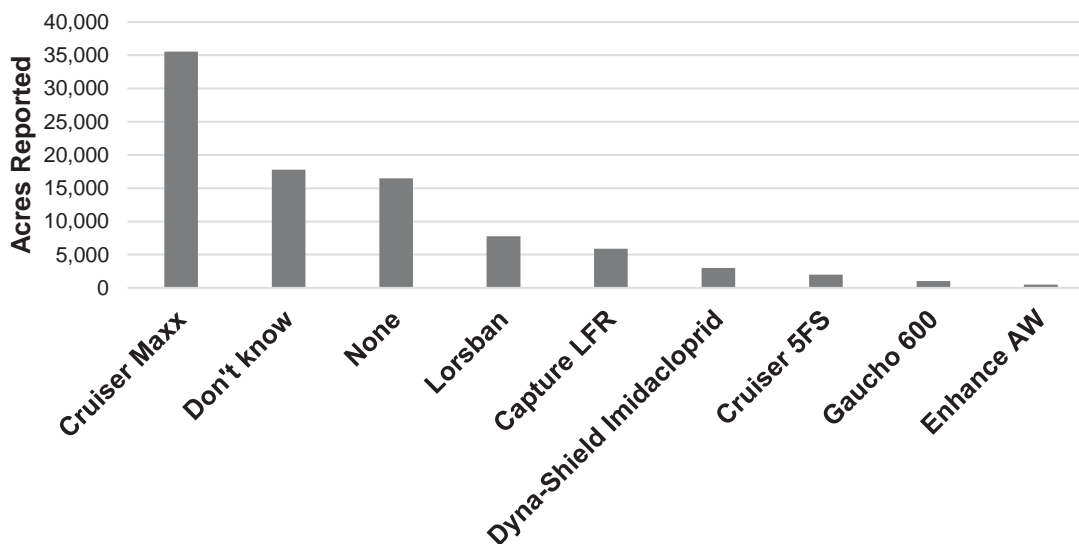


Figure 21. Northarvest insecticide seed treatment and soil insecticide use in dry beans in 2016.

Plant Diseases and Fungicide Use

Table 29. Worst disease problem in dry beans in 2016.

Disease ^a	Respondents (no.)	Respondents (%)	Acres reported (no.) ^{b,c}	Acres reported (%) ^{b,c}
Minnesota				
White mold	27	60	13,422	52.5
Common bacterial blight	8	17.8	7,050	27.6
Root rot	5	11.1	3,999	15.6
None	3	6.7	815	3.2
Bacterial wilt	1	2.2	236	0.9
Anthraxnose	1	2.2	50	0.2
Total	45	100	25,572	100
North Dakota				
White mold	44	50.6	30,810	54.3
Common bacterial blight	15	17.2	9,759	17.2
Root rot	11	12.6	6,845	12.1
None	7	8.0	4,108	7.2
Rust	7	8.0	3,435	6.1
Bacterial wilt	1	1.1	1,200	2.1
Bacterial brown spot	1	1.1	400	0.7
Viruses (general)	1	1.1	207	0.4
Total	87	100	56,764	100
Northarvest				
White mold	71	53.8	44,232	53.7
Common bacterial blight	23	17.4	16,809	20.4
Root rot	16	12.1	10,844	13.2
None	10	7.6	4,923	6.0
Rust	7	5.3	3,435	4.2
Bacterial wilt	2	1.5	1,436	1.7
Bacterial brown spot	1	0.8	400	0.5
Viruses (general)	1	0.8	207	0.3
Anthraxnose	1	0.8	50	0.1
Total	132	100	82,336	100

^aRanked as No. 1 disease problem by respondents.

^bRespondents' acres only.

^cDisease problem may not have been present across all reported acres.

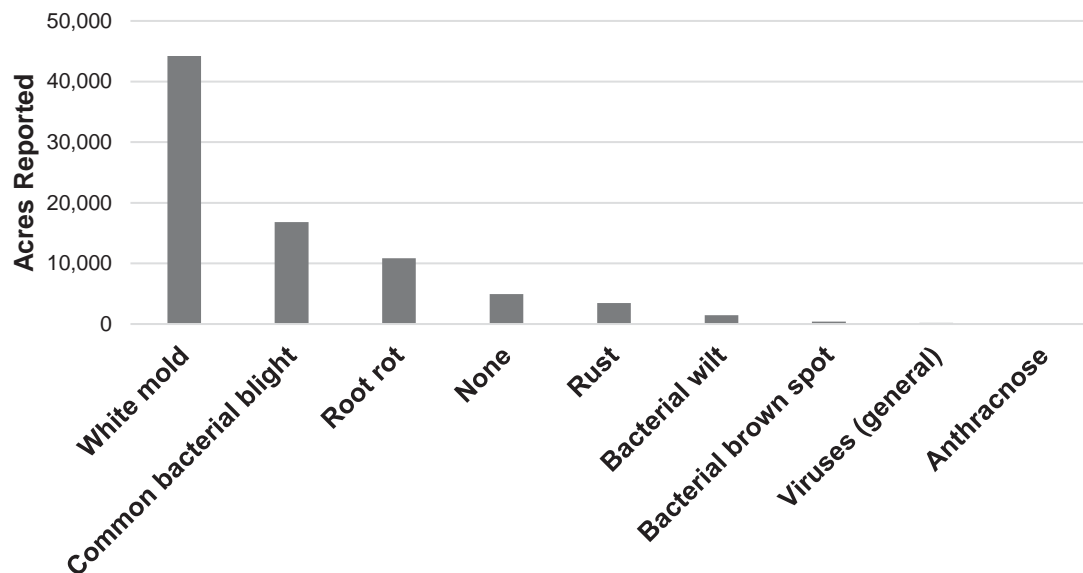


Figure 22. Northarvest worst disease problem in dry beans in 2016.

Table 30. Diseases ranked as one of the three worst in dry beans in 2016.

Disease ^a	Respondents (no.)	Respondents (%)	Acres reported (no.) ^{b,c}	Acres reported (%) ^{b,c}
Minnesota				
White mold	38	84.4	22,182	86.7
Root rot	22	48.9	15,148	59.2
Common bacterial blight	21	46.7	14,299	55.9
Bacterial brown spot	3	6.7	4,018	15.7
Viruses	3	6.7	3,430	13.4
Rust	2	4.4	2,118	8.3
Anthracnose	5	11.1	1,812	7.1
Halo blight	3	6.7	1,325	5.2
Bacterial wilt	4	8.9	1,120	4.4
Bean common mosaic virus	1	2.2	940	3.7
None	3	6.7	815	3.2
North Dakota				
White mold	70	80.5	45,642	80.4
Rust	36	41.4	23,114	40.7
Common bacterial blight	35	40.2	22,831	40.2
Root rot	28	32.2	15,974	28.1
Bacterial brown spot	10	11.5	6,831	12.0
Anthracnose	6	6.9	5,462	9.6
None	7	8.0	4,108	7.2
Bacterial wilt	5	5.7	3,860	6.8
Halo blight	5	5.7	3,413	6.0
Viruses	6	6.9	1,931	3.4
Northarvest				
White mold	108	81.8	67,824	82.4
Common bacterial blight	56	42.4	37,130	45.1
Root rot	50	37.9	31,122	37.8
Rust	38	28.8	25,232	30.6
Bacterial brown spot	13	9.8	10,849	13.2
Anthracnose	11	8.3	7,274	8.8
Viruses	9	6.8	5,361	6.5
Bacterial wilt	9	6.8	4,980	6.0
None	10	7.6	4,923	6.0
Halo blight	8	6.1	4,738	5.8
Bean common mosaic virus	1	0.8	940	1.1

^aRanked as No. 1, 2 or 3 disease problem by respondents.

^bRespondents' acres only.

^cDisease problem may not have been present across all reported acres.

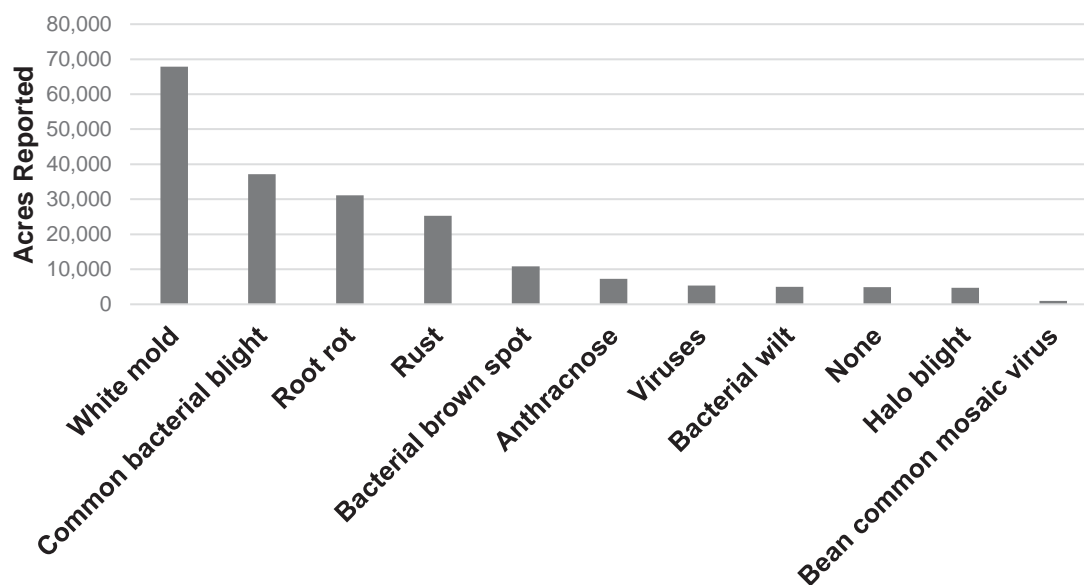


Figure 23. Northarvest diseases ranked as one of the three worst in dry beans in 2016.

Table 31. Foliar and banded fungicide use in dry beans in 2016.

Fungicide	Resp. (no.)	Resp. (%) ^b	Total acres treated (no.) ^a	Total acres treated (%) ^{a,b}	Acres treated by ground (no.) ^a	Acres treated by ground (%) ^a	Acres treated by air (no.) ^a	Acres treated by air (%) ^a
Minnesota								
Endura	20	42.6	15,692	59.9	9,001	17.9	6,691	13.3
Topsin broadcast	26	55.3	15,195	58.0	10,187	20.3	5,008	10
Proline broadcast	8	17.0	5,634	21.5	4,250	8.5	1,384	2.8
Omega	1	2.1	3,623	13.8	3,623	7.2	0	0
ProPulse	1	2.1	2,239	8.5	2,239	4.5	0	0
Priaxor	2	4.3	2,178	8.3	1,878	3.7	300	0.6
Calcium	1	2.1	1,750	6.7	1,750	3.5	0	0
Incognito	2	4.3	940	3.6	940	1.9	0	0
Aproach	1	2.1	900	3.4	900	1.8	0	0
Headline	1	2.1	800	3.1	800	1.6	0	0
Copper	2	4.3	656	2.5	0	0	656	1.3
Champion	1	2.1	409	1.6	0	0	409	0.8
Contans	1	2.1	200	0.8	200	0.4	0	0
None	9	19.1	3,185	12.2				
Fungicide Total			50,216		35,768	71.2	14,448	28.8
North Dakota								
Topsin broadcast	38	43.2	32,177	56.3	28,785	39.5	3,392	4.7
Endura	23	26.1	14,852	26.0	12,219	16.8	2,633	3.6
Incognito	6	6.8	7,115	12.4	6,615	9.1	500	0.7
Tebuconazole	7	8.0	6,000	10.5	6,000	8.2	0	0
Priaxor	9	10.2	5,828	10.2	5,258	7.2	570	0.8
Topsin banded	4	4.5	3,824	6.7	3,824	5.2	0	0
Omega	3	3.4	1,400	2.4	1,200	1.6	200	0.3
Headline	4	4.5	770	1.3	723	1.0	47	0.1
Quadris Opti	1	1.1	400	0.7	400	0.5	0	0
Proline banded	1	1.1	320	0.6	320	0.4	0	0
Aproach	1	1.1	260	0.5	0	0	260	0.4
None	19	21.6	6,009	10.5				
Fungicide Total			72,946		65,344	89.6	7,602	10.4
Northarvest								
Topsin broadcast	64	47.4	47,372	56.8	38,972	31.6	8,400	6.8
Endura	43	31.9	30,544	36.6	21,220	17.2	9,324	7.6
Incognito	8	5.9	8,055	9.7	7,555	6.1	500	0.4
Priaxor	11	8.1	8,006	9.6	7,136	5.8	870	0.7
Tebuconazole	7	5.2	6,000	7.2	6,000	4.9	0	0
Proline broadcast	8	5.9	5,634	6.8	4,250	3.5	1,384	1.1
Omega	4	3.0	5,023	6.0	4,823	3.9	200	0.2
Topsin banded	4	3.0	3,824	4.6	3,824	3.1	0	0
ProPulse	1	0.7	2,239	2.7	2,239	1.8	0	0
Calcium	1	0.7	1,750	2.1	1,750	1.4	0	0
Headline	5	3.7	1,570	1.9	1,523	1.2	47	0
Aproach	2	1.5	1,160	1.4	900	0.7	260	0.2
Copper	2	1.5	656	0.8	0	0	656	0.5
Champion	1	0.7	409	0.5	0	0	409	0.3
Quadris Opti	1	0.7	400	0.5	400	0.3	0	0
Proline banded	1	0.7	320	0.4	320	0.3	0	0
Contans	1	0.7	200	0.2	200	0.2	0	0
None	28	20.7	9,194	11.0		0		0
Fungicide Total			123,162		101,112	82.1	22,050	17.9

^aRespondents' acres only. Includes acreage treated more than once with the same product.

^bPercentages do not total 100 percent because some respondents treated more than once with the same product and/or treated the same acreage with more than one product.

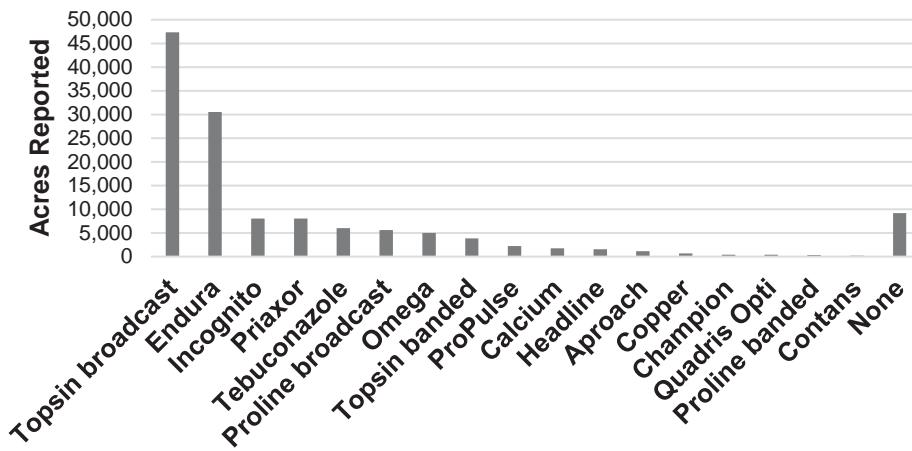


Figure 24. Northharvest foliar and banded fungicide use in dry beans in 2016.

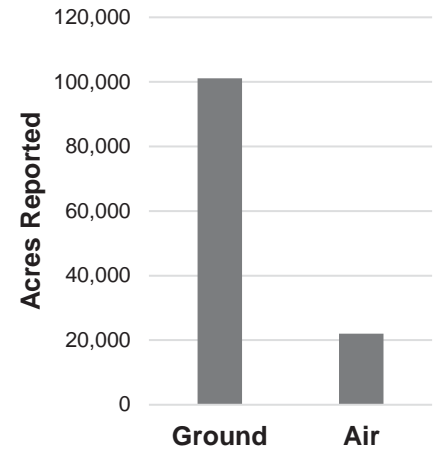


Figure 25. Northharvest fungicide application method in dry beans in 2016.

Table 32. In-furrow fungicide use in dry beans in 2016.

Seed treatment	Respondents (no.)	Respondents (%)	Total acres treated (no.) ^a	Total acres treated (%) ^a
Minnesota				
Headline	4	8.7	3,145	12.5
Endura	1	2.2	800	3.2
None	41	89.1	21,316	84.4
Fungicide Total	46	100	3,945	15.6
North Dakota				
Endura	1	1.1	1,200	2.1
Headline	1	1.1	30	0.1
None	88	97.8	55,854	96.7
Fungicide Total	90	100	1,230	2.1
Northharvest				
Headline	5	3.7	3,175	3.8
Endura	2	1.5	2,000	2.4
None	129	94.9	77,170	93.0
Fungicide Total	136	100	5,175	6.2

^aRespondents' acres only.

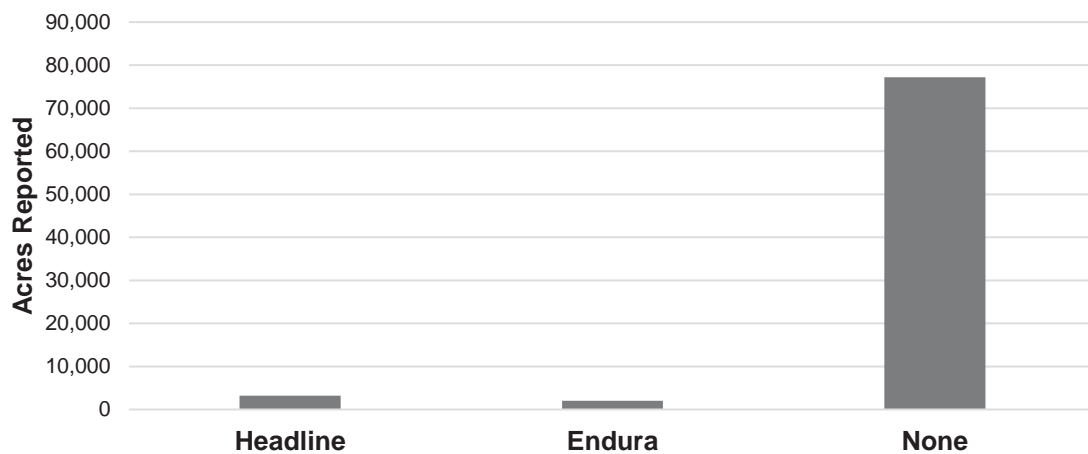


Figure 26. Northharvest in-furrow fungicide use in dry beans in 2016.

Table 33. Fungicide seed treatment use in dry beans in 2016.

Seed treatment	Respondents (no.)	Respondents (%) ^b	Total acres treated (no.) ^a	Total acres treated (%) ^{a,b}
Minnesota				
ApronMaxx	29	63.0	16,148	63.9
Rancona	10	21.7	7,907	31.3
Vibrance	7	15.2	3,511	13.9
Apron, Apron XL	5	10.9	3,020	12.0
Maxim	5	10.9	2,951	11.7
Dynasty	9	19.6	2,744	10.9
Don't know	4	8.7	2,466	9.8
Stamina	2	4.3	1,209	4.8
Headline	1	2.2	800	3.2
Thiram	1	2.2	350	1.4
Rancona Summit	1	2.2	281	1.1
None	7	15.2	3,237	12.8
Seed Treatment Total			41,387	
North Dakota				
ApronMaxx	40	44.9	25,514	44.6
Don't know	19	21.3	11,551	20.2
Maxim	12	13.5	8,801	15.4
Dynasty	12	13.5	8,204	14.3
Rancona	10	11.2	7,394	12.9
Apron, Apron XL	10	11.2	6,936	12.1
Captan	4	4.5	3,120	5.5
Vibrance	6	6.7	3,054	5.3
Metalaxyl	2	2.2	2,700	4.7
Stamina	3	3.4	2,215	3.9
Streptomycin	1	1.1	860	1.5
None	19	21.3	9,707	17.0
Seed Treatment Total			80,349	
Northarvest				
ApronMaxx	69	51.1	41,662	50.5
Rancona	20	14.8	15,301	18.6
Don't know	23	17.0	14,017	17.0
Maxim	17	12.6	11,752	14.3
Dynasty	21	15.6	10,948	13.3
Apron, Apron XL	15	11.1	9,956	12.1
Vibrance	13	9.6	6,565	8.0
Stamina	5	3.7	3,424	4.2
Captan	4	3.0	3,120	3.8
Metalaxyl	2	1.5	2,700	3.3
Streptomycin	1	0.7	860	1.0
Headline	1	0.7	800	1.0
Thiram	1	0.7	350	0.4
Rancona Summit	1	0.7	281	0.3
None	26	19.3	12,944	15.7
Seed Treatment Total			121,736	

^aRespondents' acres only. Includes acreage treated with more than one product.

^bPercentages do not total 100 percent because some respondents treated the same acreage with more than one product.

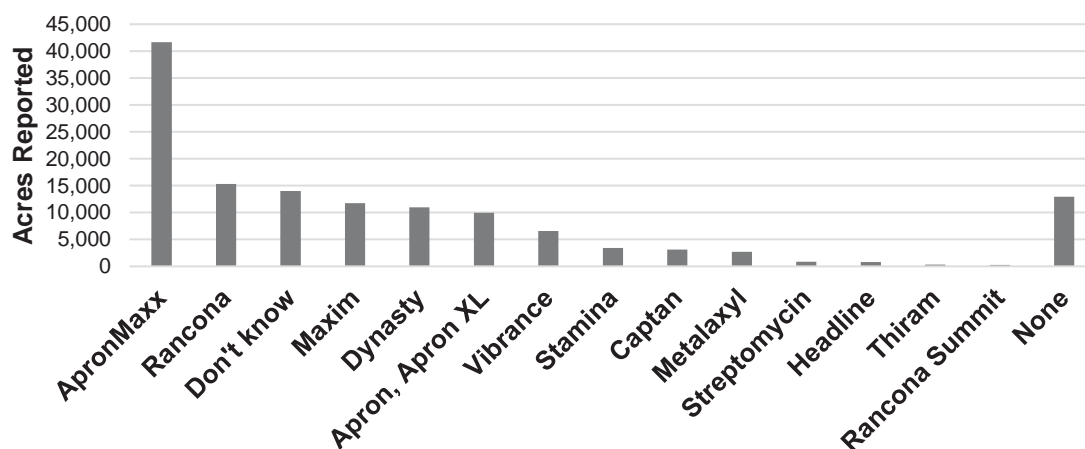


Figure 27. Northarvest fungicide seed treatment use in dry beans in 2016.

Weeds and Herbicide Use

Table 34. Worst weed problem in dry beans in 2016.

Weed ^a	Respon- dents (no.)	Respon- dents (%)	Acres reported (no.) ^{b,c}	Acres reported (%) ^{b,c}
Minnesota				
Lambsquarters	15	32.6	10,000	40.6
Ragweed	11	23.9	6,697	27.2
Nightshade	4	8.7	3,239	13.1
Waterhemp	8	17.4	1,653	6.7
Biennial wormwood	2	4.3	1,080	4.4
Smartweed	1	2.2	885	3.6
Redroot pigweed	3	6.5	710	2.9
Clover	1	2.2	293	1.2
None	1	2.2	102	0.4
Total	46	100	24,659	100
North Dakota				
Kochia	24	26.4	16,452	27.6
Ragweed	6	6.6	7,301	12.3
Nightshade	10	11.0	6,768	11.4
Biennial wormwood	12	13.2	6,298	10.6
Lambsquarters	9	9.9	4,755	8.0
Volunteer grain	6	6.6	3,795	6.4
Wild mustard	7	7.7	2,967	5.0
Cocklebur	3	3.3	2,887	4.8
Wild buckwheat	4	4.4	2,520	4.2
Foxtail	2	2.2	2,264	3.8
Redroot pigweed	5	5.5	2,098	3.5
Waterhemp	1	1.1	800	1.3
Wild oat	1	1.1	400	0.7
Canada thistle	1	1.1	250	0.4
Total	91	100	59,555	100
Northharvest				
Kochia	24	17.5	16,452	19.5
Lambsquarters	24	17.5	14,755	17.5
Ragweed	17	12.4	13,998	16.6
Nightshade	14	10.2	10,007	11.9
Biennial wormwood	14	10.2	7,378	8.8
Volunteer grain	6	4.4	3,795	4.5
Wild mustard	7	5.1	2,967	3.5
Cocklebur	3	2.2	2,887	3.4
Redroot pigweed	8	5.8	2,808	3.3
Wild buckwheat	4	2.9	2,520	3.0
Waterhemp	9	6.6	2,453	2.9
Foxtail	2	1.5	2,264	2.7
Smartweed	1	0.7	885	1.1
Wild oat	1	0.7	400	0.5
Clover	1	0.7	293	0.3
Canada thistle	1	0.7	250	0.3
None	1	0.7	102	0.1
Total	137	100	84,214	100

^aRanked as No. 1 weed problem by respondents.

^bRespondents' acres only.

^cWeed problem may not have been present across all reported acres.

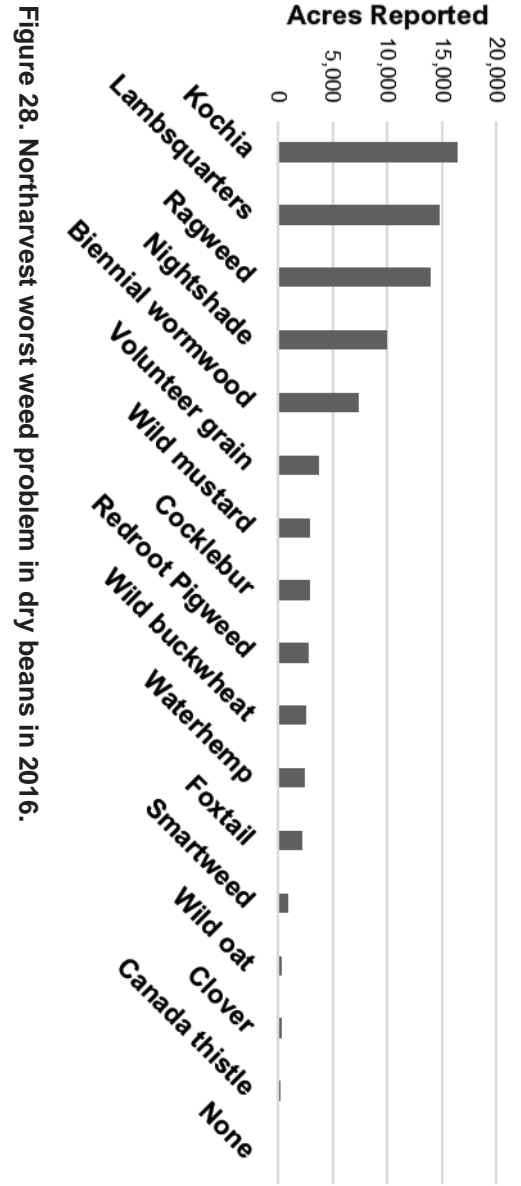


Figure 28. Northharvest worst weed problem in dry beans in 2016.

Table 35. Weeds ranked as one of the three worst in dry beans in 2016.

Weed ^a	Respon- dents (no.)	Respon- dents (%)	Acres reported (no.) ^b	Acres reported (%) ^b	Weed ^a	Respon- dents (no.)	Respon- dents (%)	Acres reported (no.) ^b	Acres reported (%) ^b
Minnesota					Northharvest				
Lambsquarters	37	80.4	19,507	79.1	Lambsquarters	67	48.9	37,646	44.7
Ragweed	23	50	13,274	53.8	Ragweed	49	35.8	34,247	40.7
Redroot pigweed	15	32.6	9,084	36.8	Kochia	44	32.1	31,506	37.4
Nightshade	9	19.6	7,395	30	Nightshade	34	24.8	24,013	28.5
Waterhemp	13	28.3	5,689	23.1	Biennial wormwood	36	26.3	23,767	28.2
Wild buckwheat	6	13.0	3,813	15.5	Redroot pigweed	34	24.8	20,479	24.3
Biennial wormwood	5	10.9	2,292	9.3	Volunteer grain	26	19.0	14,822	17.6
Foxtail	3	6.5	1,565	6.3	Wild buckwheat	20	14.6	12,425	14.8
Sunflower	3	6.5	1,530	6.2	Wild mustard	19	13.9	8,596	10.2
Smartweed	4	8.7	1,501	6.1	Cocklebur	13	9.5	8,365	9.9
Wild mustard	2	4.3	1,110	4.5	Waterhemp	19	13.9	8,193	9.7
Kochia	2	4.3	1,080	4.4	Foxtail	8	5.8	7,256	8.6
Canada thistle	4	8.7	691	2.8	Canada thistle	12	8.8	5,357	6.4
Volunteer grain	2	4.3	506	2.1	Lanceleaf sage	2	1.5	1,824	2.2
Clover	1	2.2	293	1.2	Black medic	2	1.5	1,600	1.9
None	1	2.2	102	0.4	Sunflower	3	2.2	1,530	1.8
Venice mallow	1	2.2	83	0.3	Smartweed	4	2.9	1,501	1.8
Cocklebur	1	2.2	65	0.3	Venice mallow	3	2.2	1,363	1.6
North Dakota					Dandelion	1	0.7	700	0.8
Kochia	42	46.2	30,426	51.1	Wild oat	2	1.5	660	0.8
Biennial wormwood	31	34.1	21,475	36.1	Clover	1	0.7	293	0.3
Ragweed	26	28.6	20,973	35.2	None	1	0.7	102	0.1
Lambsquarters	30	33.0	18,139	30.5	^a Ranked as No. 1, 2 or 3 weed by respondents. ^b Respondents' acres only. ^c Weed problem may not have been present across all reported acres.				
Nightshade	25	27.5	16,618	27.9					
Volunteer grain	24	26.4	14,316	24.0					
Redroot pigweed	19	20.9	11,395	19.1					
Wild buckwheat	14	15.4	8,612	14.5					
Cocklebur	12	13.2	8,300	13.9					
Wild mustard	17	18.7	7,486	12.6					
Foxtail	5	5.5	5,691	9.6					
Canada thistle	8	8.8	4,666	7.8					
Waterhemp	6	6.6	2,504	4.2					
Lanceleaf sage	2	2.2	1,824	3.1					
Black medic	2	2.2	1,600	2.7					
Venice mallow	2	2.2	1,280	2.1					
Dandelion	1	1.1	700	1.2					
Wild oat	2	2.2	660	1.1					

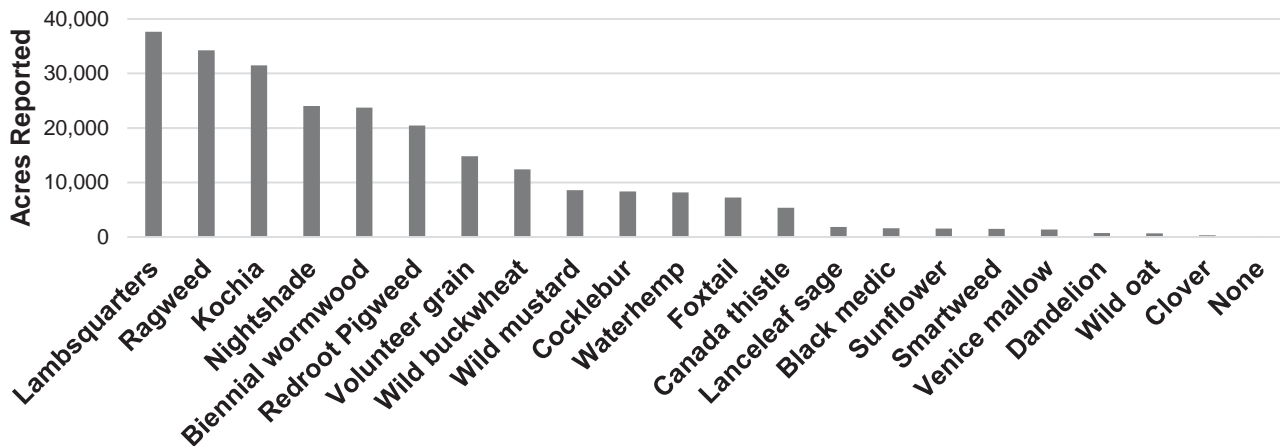


Figure 29. Northharvest weeds ranked as one of the three worst in dry beans in 2016.

Table 36. Weed control practices used in dry beans in 2016.

Herbicide or other practice	Acres reported (no.) ^a	Acres reported (%) ^b	Herbicide or other practice	Acres reported (no.) ^a	Acres reported (%) ^b
Minnesota			Northharvest		
Raptor	24,545	93.1	Raptor	79,677	92.8
Basagran/generics	21,421	81.3	Basagran/generics	75,465	87.9
Reflex	12,636	47.9	Reflex	52,832	61.5
Sonalan	9,149	34.7	Select/generics	37,667	43.9
Select/generics	6,853	26.0	Sonalan	21,360	24.9
Prowl	6,298	23.9	Rezult	16,221	18.9
Outlook	5,599	21.2	Trifluralin	16,161	18.8
Dual	4,318	16.4	Prowl	16,090	18.7
Rezult	4,115	15.6	Spartan Charge	12,257	14.3
Poast	3,907	14.8	Glyphosate (preplant)	11,572	13.5
Trifluralin	3,750	14.2	Assure	9,677	11.3
Permit	3,700	14.0	Spartan Elite	8,422	9.8
Eptam	3,256	12.4	Permit	7,545	8.8
Assure	1,870	7.1	Pursuit	6,984	8.1
Glyphosate (preplant)	1,760	6.7	Outlook	6,919	8.1
BroadAxe	592	2.2	Dual	6,142	7.2
Pursuit	509	1.9	Poast	5,954	6.9
Varisto	226	0.9	Eptam	3,816	4.4
Fusilade DX	205	0.8	BroadAxe	2,024	2.4
Cultivation	13,285	50.4	Fusilade DX	925	1.1
Manual labor	2,746	10.4	Varisto	406	0.5
Rotary hoe	345	1.3	Cultivation	33,835	39.4
Herbicide Total	114,709		Rotary hoe	3,230	3.8
North Dakota			Manual labor	3,200	3.7
Raptor	55,132	92.7	Cover crop	927	1.1
Basagran/generics	54,044	90.8	None	400	0.5
Reflex	40,196	67.6	Herbicide Total	398,116	
Select/generics	30,814	51.8	^a Respondents' acres only. Includes acreage treated more than once with the same product. ^b Percentages do not total 100 percent because some respondents treated more than once with the same product and/or treated the same acreage with more than one product. ^c Herbicide total does not include cultivation, rotary hoe or manual labor acres.		
Trifluralin	12,411	20.9			
Spartan Charge	12,257	20.6			
Sonalan	12,211	20.5			
Rezult	12,106	20.3			
Glyphosate (preplant)	9,812	16.5			
Prowl	9,792	16.5			
Spartan Elite	8,422	14.2			
Assure	7,807	13.1			
Pursuit	6,475	10.9			
Permit	3,845	6.5			
Poast	2,047	3.4			
Dual	1,824	3.1			
BroadAxe	1,432	2.4			
Outlook	1,320	2.2			
Fusilade DX	720	1.2			
Eptam	560	0.9			
Varisto	180	0.3			
Cultivation	20,550	34.5			
Rotary hoe	2,885	4.8			
Cover crop	927	1.6			
Manual labor	454	0.8			
None	400	0.7			
Herbicide Total	283,407				

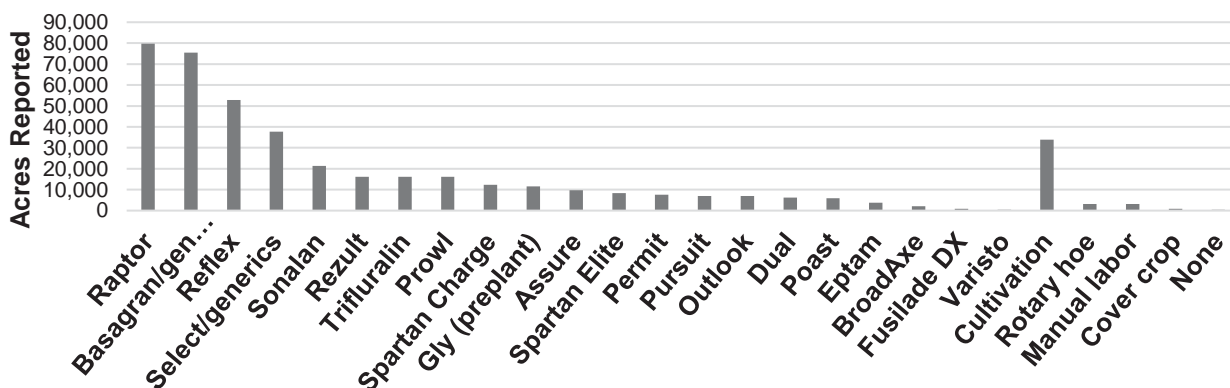


Figure 30. Northharvest weed control practices used in dry beans in 2016.

Table 37. Weed control practices used by dry bean market class in 2016.

Herbicide or other practice	Great						
	Black	Northern	Kidney	Navy	Pink	Pinto	Red
	% Acres Treated ^{a,b}						
Minnesota							
Assure	3.4	0	0	3.7	0	0	0
Basagran/generics	10.4	0	47.8	16.1	2.1	4.2	0.6
BroadAxe	2.1	0	0	0.2	0	0	0
Dual	5.1	0	8.7	2.2	0.3	0	0
Eptam	1.1	0	6.7	4.5	0	0	0
Fusilade DX	0.6	0	0	0.2	0	0	0
Glyphosate (preplant)	0	0	6.3	0.4	0	0	0
Outlook	1.6	0	16.4	2.9	0.3	0	0
Permit	2.9	0	7.7	2.8	0.6	0	0
Poast	0	0	11.6	0	0.6	2.0	0.6
Prowl	2.2	0	15.8	3.6	1.1	1.1	0
Pursuit	0.5	0	0	0.3	1.1	0	0
Raptor	11.8	0	53.7	22.0	1.8	3.3	0.6
Reflex	7.5	0	18.3	17.1	0.3	4.2	0.6
Rezult	0	0	7.2	5.9	1.4	1.1	0
Select/generics	5.2	0	8.6	11.0	0	1.1	0
Sonalan	3.3	0	11.7	15.8	0.3	3.1	0.6
Trifluralin	0	0	11.4	2.8	0	0	0
Varisto	0	0	0	0.9	0	0	0
Cultivation	1.9	0	25.3	14.9	0.9	6.2	1.2
Rotary hoe	0.8	0	0.3	0	0	0.2	0
Manual labor	1.9	0	7.7	0.9	0	0	0
North Dakota							
Assure	3.4	1.0	0	0.5	0	8.1	0
Basagran/generics	9.6	0	0.6	13.6	0.4	66.5	0
BroadAxe	0	0	0	0.5	0	1.9	0
Dual	0	0	0	1.8	0	1.3	0
Eptam	0	0	0	0	0	0.9	0
Fusilade DX	0.4	0	0	0	0	0.8	0
Glyphosate (preplant)	3.7	0	0	0.3	0	12.5	0
Outlook	0	0	0.2	0.3	0	1.7	0
Permit	0	1.0	0.2	0.7	0	4.5	0
Poast	0	0	0	0	0	3.4	0
Prowl	2.4	0	0.7	1.0	0	12.4	0
Pursuit	2.0	0	0	1.0	0	7.9	0
Raptor	9.1	0	0.6	13.4	0	69.5	0
Reflex	6.0	1.0	0.7	13.3	0	46.4	0.1
Rezult	1.2	0	0	3.5	0	15.6	0
Select/generics	3.6	0	0	9.0	0	39.2	0
Sonalan	2.1	0	0	4.7	0	13.7	0
Spartan Charge	2.1	1.0	0	0.3	0	17.0	0.1
Spartan Elite	0.2	0	0	0	0	14.0	0
Trifluralin	1.1	0	0	5.0	0	14.8	0
Varisto	0	0	0.1	0	0	0.1	0.1
Cultivation	3.0	0.4	0	8.3	0.4	22.4	0
Rotary hoe	2.0	0	0	0.8	0	2.1	0
Manual labor	0.4	0	0.2	0	0	0.2	0
Cover crop	0	0	0	0	0	1.6	0
None	0	0	0	0	0	0.7	0
Northarvest							
Assure	3.4	0.7	0	1.5	0	5.6	0
Basagran/generics	9.9	0	15.1	14.4	0.9	47.4	0.2
BroadAxe	0.6	0	0	0.4	0	1.3	0
Dual	1.6	0	2.7	1.9	0.1	0.9	0
Eptam	0.3	0	2.1	1.4	0	0.7	0
Fusilade DX	0.4	0	0	0.1	0	0.6	0
Glyphosate (preplant)	2.5	0	1.9	0.4	0	8.7	0
Outlook	0.5	0	5.2	1.1	0.1	1.1	0
Permit	0.9	0.7	2.5	1.4	0.2	3.1	0
Poast	0	0	3.6	0	0.2	3.0	0.2
Prowl	2.3	0	5.4	1.8	0.3	8.9	0
Pursuit	1.5	0	0	0.8	0.3	5.5	0
Raptor	9.9	0	16.9	16.0	0.5	49.2	0.2
Reflex	6.5	0.7	6.1	14.5	0.1	33.4	0.3
Rezult	0.9	0	2.2	4.2	0.4	11.2	0
Select/generics	4.1	0	2.6	9.6	0	27.5	0
Sonalan	2.5	0	3.6	8.1	0.1	10.5	0.2
Spartan Charge	1.5	0.7	0	0.2	0	11.8	0.1
Spartan Elite	0.1	0	0	0	0	9.7	0
Trifluralin	0.8	0	3.5	4.3	0	10.2	0
Varisto	0	0	0.1	0.3	0	0.1	0.1

^aRespondents' acres only. Includes acreage treated more than once with the same product.

^bPercentages do not total 100 percent because some respondents treated more than once with the same product and/or treated the same acreage with more than one product.

Herbicide or other practice	Great						
	Black	Northern	Kidney	Navy	Pink	Pinto	Red
Cultivation	2.7	0.3	7.8	10.3	0.6	17.4	0.4
Rotary hoe	1.6	0	0.1	0.5	0	1.5	0
Manual labor	0.8	0	2.5	0.3	0	0.1	0
Cover crop	0	0	0	0	0	1.1	0
None	0	0	0	0	0	0.5	0

^aRespondents' acres only. Includes acreage treated more than once with the same product.

^bPercentages do not total 100 percent because some respondents treated more than once with the same product and/or treated the same acreage with more than one product.

Scouting and Threshold Practices

Table 38. Scouting practices in dry beans in 2016.

	Insects		Diseases		Weeds	
	Respon- dents (no.)	Respon- dents (%)	Respon- dents (no.)	Respon- dents (%)	Respon- dents (no.)	Respon- dents (%)
Minnesota						
Grower	27	57.4	25	53.2	27	57.4
Crop consultant	18	38.3	18	38.3	17	36.2
Both	2	4.3	3	6.4	3	6.4
Don't scout	0	0	1	2.1	0	0
Total	47	100	47	100	47	100
North Dakota						
Grower	38	42.7	43	49.4	43	48.3
Crop consultant	40	44.9	41	47.1	40	44.9
Both	5	5.6	3	3.5	6	6.7
Don't scout	6	6.7	0	0	0	0
Total	89	100	87	100	89	100
Northharvest						
Grower	65	47.8	68	50	70	51.5
Crop consultant	58	42.6	59	43.4	57	41.9
Both	7	5.1	8	5.9	9	6.6
Don't scout	6	4.4	1	0.7	0	0
Total	136	100	136	100	136	100

Table 39. Use of economic thresholds for insects in dry beans in 2016.

	Respondents (no.)	Respondents (%)
Minnesota		
Economic thresholds used	43	95.6
Economic thresholds not used	2	4.4
Total	45	100
North Dakota		
Economic thresholds used	91	98.9
Economic thresholds not used	1	1.1
Total	92	100
Northharvest		
Economic thresholds used	134	97.8
Economic thresholds not used	3	2.2
Total	137	100

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APPENDIX I.

Please complete all requested information on practices, pest problems and pesticide use for your 2016 dry bean crop.

State	County	Acres
Minnesota	1.	
	2.	
	3.	
North Dakota	1.	
	2.	
	3.	

Dry Bean Production in 2016	Acres
Total dry bean acres planted	
Total dry bean acres harvested	
Total irrigated acres	
Total dry bean acres on tile-drained ground	
Dry bean acres with hail damage	
Dry bean acres with frost damage	

Dry Bean Production Problems in 2016 (please complete the table)		
Problem	Acres Affected	Bean Class
1. Applied herbicide injury		
*List herbicide in No. 1		
2. Herbicide drift injury		
*List herbicide if known		
3. Delayed planting		
4. Emergence/stand		
5. Harvest		
6. Disease		
7. Insects		
8. Weeds		
9. Micronutrient deficiency		
10. Water damage (beans drowned/not harvested)		
11. Water damage (beans still harvested)		
12. Hail damage		
13. Frost damage		
14. Wind damage		
15. Drought		
16. Soil salinity		
17. Other (specify)		

Dry Beans Grown in 2016		
Bean Class	Variety	Acres
Black	Black Cat	
	Eclipse	
	Zorro	
	Other (specify)	
Great Northern	Aries	
	Matterhorn	
	Orion	
	Powderhorn	
	Taurus	
Kidney	Beluga	
	Big Red	
	Cabernet	
	Cal Early LRK	
	Clouseau	
	Foxfire	
	Majesty	
	Montcalm	
	Pink Panther	
	Red Hawk	
	Red Rover	
	Other (specify)	
Navy	Avalanche	
	Ensign	
	HMS Medalist	
	Indi	
	Merlin	
	Navigator	
	Norstar	
	T 9905	
	Teton	
	Vigilant	
	Vista	
Other (specify)		
Pink	Floyd	
	ISB 473	
	Sedona	
	Other (specify)	
Pinto	Buster	
	La Paz	
	Lariat	
	Maverick	
	Monterrey	
	ND 307	
	Santa Cruz	
	Sequoia	
	Sinaloa	
	Sonora	
	Stampede	
	Vibrant	
	Windbreaker	
Other (specify)		
Small Red	Merlot	
	Rio Rojo	
	Ruby	
	Other (specify)	
Other Class	Other variety (specify)	

Agronomy

Please list row spacing and plants per acre for each bean class that you planted in 2016.			
Class	Row Spacing (inches)	Live Seeds Planted Per Acre OR Pounds Per Acre	Established Stand (Plants Per Acre)

Did the size of your purchased seed affect your ability to plant your intended acreage in 2016?		
Problem	Variety(ies)	Number of Acres (short or long)
Not enough seed		
Too much seed		
No problem		

Please list the crops in your dry bean crop rotation program for all fields you planted to dry bean in 2016.	
Year	List of Crops
2015	
2014	
2013	
2012	

Please list acreage for each tillage type listed below for your dry bean fields in 2016.	
Tillage Type	Acreage
Conventional	
Minimum	
Strip-till	
No-till	

Did you use a ground roller on your dry bean ground in 2016?			
Timing	Bean class	Acres rolled	What percent of rolled acres did you direct combine?
Preplant			
Pre-emerge			
Post-			
Didn't roll			

Fertilizer program for dry beans in 2016. Please indicate pounds per acre for fertilizer components and answer the questions.

Nitrogen	Phosphate	Potash	Zinc	Sulfur
Did you inoculate with Rhizobium?			Yes	No
Did you soil test prior to fertilizer application?			Yes	No
Did you use site-specific nutrient management for any fertilizers?			Yes	No

What fertilizer application methods did you use for dry beans in 2016? Please circle all methods you used.

Broadcast Banded In-furrow Foliar

Harvest. Please circle one answer for each question.

What percentage of your dry bean crop was harvested using direct combining in 2016?

0% 1-25% 26-50% 51-75% 76-100%

Your estimated yield loss using direct combining?

0% 1-5% 6-10% 11-15% 16-20% N/A

Your estimated yield loss using conventional combining?

0% 1-5% 6-10% 11-15% 16-20% N/A

Insecticides and Insect Pests

Foliar Insecticides Used on Dry Beans in 2016. If you did not use a foliar insecticide, please write "0" for acres treated.

Foliar Insecticide (write in name or number from the list below)	Acres Treated	No. of Applications	Application Method (circle one for each application)	
			air	ground

Foliar Insecticide Products

1. Asana XL	6. Mustang Maxx
2. Baythroid XL	7. Tombstone
3. Brigade/generics	8. Warrior / generics
4. Dimethoate	9. None used
5. Hero	10. Other (specify)

Seed Treatment Insecticides Used on Dry Beans in 2016. If you did not use a seed treatment insecticide, please write "0" for acres treated.

Seed Treatment Insecticide (write in name or number from the list below)	Acres Treated
Seed Treatment Insecticide Products	
1. Attendant 600 FS / 600	7. Gaucho 600
2. Capture LFR	8. Lorsban
3. Cruiser 5FS	9. None used
4. Cruiser Maxx	10. Other (please specify)
5. Dyna-Shield Imidacloprid 5	11. Don't know
6. Enhance AW	

Seed Treatment Fungicide (write in name or number from the list below)	Acres Treated
Seed Treatment Fungicide Products	
1. Apron	11. Rancona
2. ApronMaxx	12. Rancona Summit
3. Captan	13. Stamina
4. Dynasty	14. Spirato
5. EverGol Energy	15. Thiram
6. Headline	16. Trilex 2000
7. Maxim	17. Trilex Summit
8. Metalaxyl	18. Vibrance
9. Obvius	19. None used
10. Prevail	20. Other (please specify)

Worst Insect/Mite Problem in 2016. Please rank 1-3, with 1 = worst. Please mark ONLY three.	
Insect/Mite Pest	Rank
Armyworms	
Aphids	
Cutworms	
Bean leaf beetle	
Foliage caterpillars	
Grasshoppers	
Leafhoppers	
Seed corn maggots	
Spider mites	
Wireworms	
None	

In-furrow Fungicide Applications Made on Dry Beans in 2016. If you did not make an in-furrow fungicide application, please write "0" for acres treated.	
In-furrow Fungicide (write in name or number from Foliar Fungicide Products List)	Acres Treated

Fungicides and Disease Problems

Foliar Fungicides Used on Dry Beans in 2016. If you did not use a fungicide, please write "0" for acres treated.			
Foliar Fungicide (write in name or number) from the list below)	Acres Treated	No. of Applications	Application Method (circle one)
			air ground
			air ground
Foliar Fungicide Products			
1. Aproach	10. Omega	19. Rorval	
2. Cannonball	11. Priaxor	20. Serenade	
3. Champion	12. Proline	21. Switch	
4. Copper	13. Proline (band)	22. Tebuconazole / generics	
5. Contans	14. Proline (broad)	23. Topsin (banded)	
6. Endura	15. ProPulse	24. Topsin (broadcast)	
7. Headline	16. Quadris / Amstar	25. Vertisan	
8. Incognito	17. Quadris Opti	26. Other (specify)	
9. Microthiol	18. Quilt	27. None used	

Worst Disease Problem in 2016. Please rank 1-3, with 1 = worst. Please mark ONLY three.	
Disease	Rank
Anthracnose	
Bacterial brown spot	
Bacterial wilt	
Common bacterial blight	
Halo blight	
Bean common mosaic virus	
Other viruses (general)	
Root rot	
Rust	
White mold	
None	

Seed Treatment Fungicides Used on Dry Beans in 2016. If you did not use a seed treatment fungicide, please write "0" for acres treated.

Cover photos by

H.J. Kandel

(top - dry beans)

J.J. Knodel

(middle - red-legged grasshopper)

D. Wirth

(bottom - weeds in dry bean field)

For more information on this and other topics, see www.ag.ndsu.edu

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