E1884

2017 DRY BEAN Grower Survey

of Production, Pest Problems and Pesticide Use

in Minnesota and North Dakota

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North Dakota State University

In cooperation with the Northarvest Bean Growers Association

NDSU EXTENSION SERVICE

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Introduction

The 2017 dry bean grower survey is the 28th annual survey of varieties grown, pest problems, pesticide use and grower practices of the Northarvest 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 Northarvest Bean Growers Association developed the survey form (Appendix I). The survey was mailed to all Northarvest bean growers. All participants in the survey were anonymous.

Results of previous surveys dated 1987-1992, 1994-2000, 2002 and 2004-2016 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 Northarvest 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 Northarvest survey unless otherwise noted. Data reported in the tables are broken down by state and also are totaled for the entire Northarvest 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 (for example, 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 Northarvest Bean Growers Association.

Acknowledgments

A grant from the Northarvest Bean Growers Association funded the survey and printing costs.

Production

Table 1. Number of Northarvest dry bean growers responding, acres planted by respondents and total state acres in 2017.

Growers	No. of respondents	Respondents' acres	Total acres[a]	Acres surveyed (% of total)
Minnesota	71	34,820	170,000	20.5
North Dakota	168	91,531	705,000	13
Northarvest	239	126,351	875,000	14.4

[a]Total of dry bean acres planted for Minnesota and North Dakota (source: USDA National Agricultural Statistics Service).

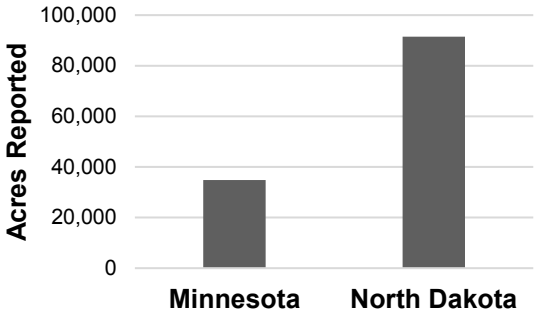

Figure 1. Northarvest dry bean acres planted by state in 2017 (respondents' acres only).

Table 2. Dry bean production by county in 2017.

Minnesota	No. of respon-dents[a]	Acres[b]	North Dakota	No. of respon-dents[a]	Acres[b]
Polk	15	8,004	Grand Forks	32	12,944
Otter Tail	8	4,330	Walsh	34	11,210
Hubbard	3	3,077	Pembina	19	9,878
Benton	2	2,136	Wells	8	8,013
Mahnomen	6	2,053	Benson	10	5,845
Wadena	4	1,937	Steele	17	5,253
Swift	5	1,660	Ramsey	6	4,347
Norman	2	1,515	Traill	12	3,940
Marshall	5	1,424	Ransom	5	3,186
Pennington	2	1,050	Cavalier	6	2,380
Kandiyohi	5	938	LaMoure	5	2,377
Chippewa	4	924	Cass	4	2,350
Becker	2	742	Barnes	6	2,229
Renville	4	652	Griggs	5	2,196
Morrison	3	600	Stutsman	5	2,085
Grant	2	515	Nelson	2	1,940
Stearns	2	450	Foster	4	1,925
Traverse	1	450	Towner	5	1,908
Clay	2	443	McLean	3	1,602
Wilkin	2	387	Pierce	3	1,420
Stevens	2	365	Dickey	3	1,193
McLeod	1	305	Burleigh	2	936
Sherburne	1	220	Richland	2	634
Beltrami	1	200	Eddy	4	620
Big Stone	1	150	Oliver	1	580
Todd	1	125	Mercer	1	230
Crow Wing	1	68	Ward	1	200
Brown	1	55	Rolette	1	110
Meeker	1	45			
Total		**34,820**	**Total**		**91,531**

[a]Some respondents had dry bean acreage in more than one county.
[b]Respondents' acres only.

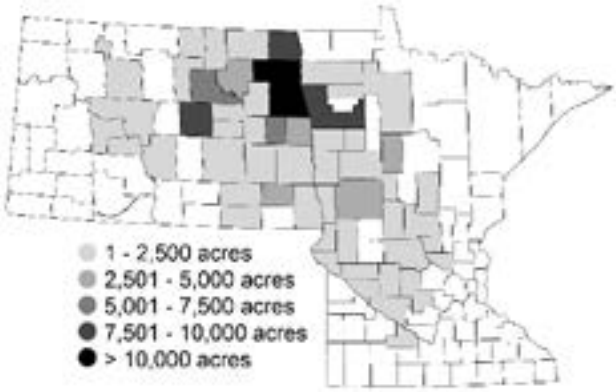

Figure 2. Northarvest dry bean production by county in 2017 (respondents' acres only).

Table 3. Dry bean acres planted, harvested, irrigated, on tile-drained ground and damaged by water in 2017.

	Acres reported (no.)[a]	Acres reported (%)[a]
Minnesota		
Planted	34,820	100
Harvested	34,272	98.4
Irrigated	14,900	42.8
Tile-drained	5,901	16.9
Water damage (beans harvested)	3,802	10.9
Water damage (beans not harvested)	158	0.5
North Dakota		
Planted	91,531	100
Harvested	89,810	98.1
Irrigated	2,396	2.6
Tile-drained	5,219	5.7
Water damage (beans harvested)	6,374	7
Water damage (beans not harvested)	695	0.8
Northarvest		
Planted	126,351	100
Harvested	124,082	98.2
Irrigated	17,296	13.7
Tile-drained	11,120	8.8
Water damage (beans harvested)	10,176	8.1
Water damage (beans not harvested)	853	0.7

[a]Respondents' acres only.

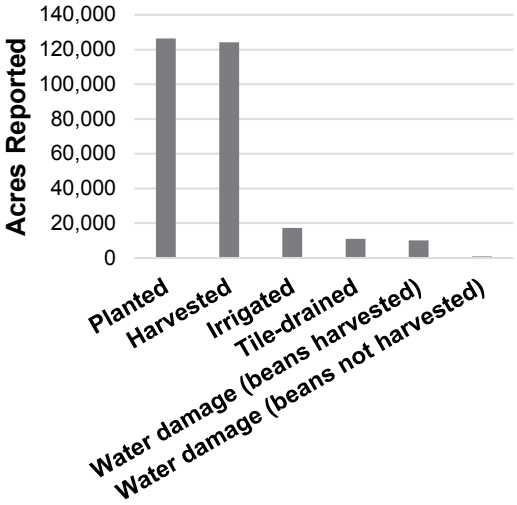

Figure 3. Northarvest respondents' reported acres from Table 3.

Table 4. Dry bean market classes grown in 2017.

Market class	Acres reported (no.)[a]	Acres reported (%)[a]
Minnesota		
Kidney	15,199	43.7
Navy	9,062	26
Black	6,906	19.8
Pinto	3,337	9.6
Pink	316	0.9
Cranberry	0	0
Great Northern	0	0
Small Red	0	0
Total	**34,820**	**100**
North Dakota		
Pinto	67,990	74.3
Navy	11,414	12.5
Black	8,520	9.3
Small Red	1,914	2.1
Great Northern	600	0.7
Pink	524	0.6
Cranberry	439	0.5
Kidney	130	0.1
Total	**91,531**	**100**
Northarvest		
Pinto	71,327	56.5
Navy	20,476	16.2
Black	15,426	12.2
Kidney	15,329	12.1
Small Red	1,914	1.5
Pink	840	0.7
Great Northern	600	0.5
Cranberry	439	0.3
Total	**126,351**	**100**

[a]Respondents' acres only.

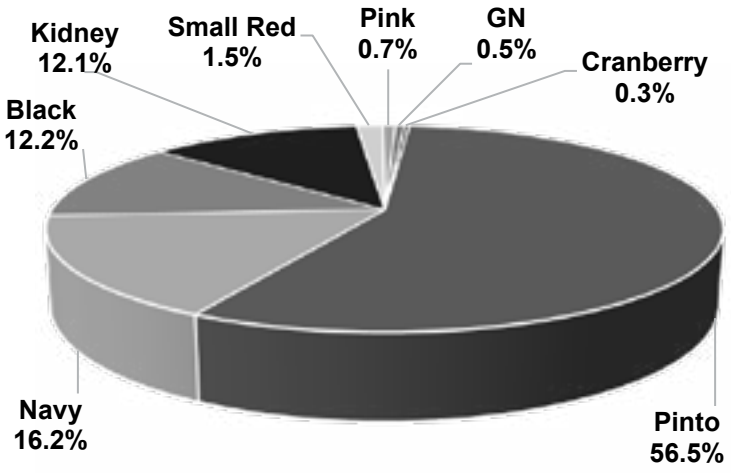

Figure 4. Northarvest dry bean market classes grown in 2017.

Table 5. Dry bean varieties grown in 2017.

		Acres planted[a]					
Variety	**Class**	**Minnesota**	**%[b]**	**North Dakota**	**%[b]**	**Northarvest**	**%[b]**
Eclipse	Black	4,950	14.2	6,906	7.5	11,856	9.4
Zorro	Black	1,802	5.2	1,444	1.6	3,246	2.6
Zenith	Black	154	0.4	0	0	154	0.1
Black Cat	Black	0	0	150	0.2	150	0.1
Black Tails	Black	0	0	20	0	20	0
Total Black	**Black**	**6,906**	**19.8**	**8,520**	**9.3**	**15,426**	**12.2**
Etna	Cranberry	0	0	439	0.5	439	0.3
Total Cranberry	**Cranberry**	**0**	**0**	**439**	**0.5**	**439**	**0.3**
Aries	GN[c]	0	0	300	0.3	300	0.2
Taurus	GN	0	0	300	0.3	300	0.2
Total GN	**GN**	**0**	**0**	**600**	**0.7**	**600**	**0.5**
Montcalm	Kidney	4,019	11.5	65	0.1	4,084	3.2
Clouseau	Kidney	2,504	7.2	0	0	2,504	2
Pink Panther	Kidney	2,377	6.8	0	0	2,377	1.9
Dynasty	Kidney	1,587	4.6	0	0	1,587	1.3
Red Rover	Kidney	1,368	3.9	0	0	1,368	1.1
Red Hawk	Kidney	1,319	3.8	0	0	1,319	1
Talon	Kidney	563	1.6	65	0.1	628	0.5
Beluga	Kidney	535	1.5	0	0	535	0.4
Chaparral	Kidney	450	1.3	0	0	450	0.4
Big Red	Kidney	392	1.1	0	0	392	0.3
Epic	Kidney	45	0.1	0	0	45	0
Cabernet	Kidney	20	0.1	0	0	20	0
Rosie	Kidney	20	0.1	0	0	20	0
Total Kidney	**Kidney**	**15,199**	**43.7**	**130**	**0.1**	**15,329**	**12.1**
HMS Medalist	Navy	2,420	7	7,704	8.4	10,124	8
T9905	Navy	5,662	16.3	1,697	1.9	7,359	5.8
Blizzard	Navy	0	0	990	1.1	990	0.8
DS105W0	Navy	262	0.8	506	0.6	768	0.6
T9903	Navy	0	0	363	0.4	363	0.3
Vigilant	Navy	270	0.8	0	0	270	0.2
COOP 6063	Navy	0	0	154	0.2	154	0.1
Vista	Navy	141	0.4	0	0	141	0.1
Indi	Navy	100	0.3	0	0	100	0.1
Not specified	Navy	80	0.2	0	0	80	0.1
OB 1723	Navy	68	0.2	0	0	68	0.1
COOP 08070	Navy	59	0.2	0	0	59	0
Total Navy	**Navy**	**9,062**	**26**	**11,414**	**12.5**	**20,476**	**16.2**
Floyd	Pink	316	0.9	524	0.6	840	0.7
Total Pink	**Pink**	**316**	**0.9**	**524**	**0.6**	**840**	**0.7**
La Paz	Pinto	742	2.1	15,360	16.8	16,102	12.7
Windbreaker	Pinto	1,219	3.5	9,411	10.3	10,630	8.4
Monterrey	Pinto	60	0.2	10,524	11.5	10,584	8.4
Vibrant (SD)[d]	Pinto	402	1.2	8,854	9.7	9,256	7.3
Torreon	Pinto	0	0	5,696	6.2	5,696	4.5
Sinaloa	Pinto	0	0	4,223	4.6	4,223	3.3
Santa Cruz	Pinto	0	0	3,972	4.3	3,972	3.1
Lariat	Pinto	0	0	3,513	3.8	3,513	2.8
ND Palomino (SD)[d]	Pinto	50	0.1	1,482	1.6	1,532	1.2
Rough Rider	Pinto	264	0.8	1,109	1.2	1,373	1.1
Stampede	Pinto	150	0.4	1,146	1.3	1,296	1
ND 307	Pinto	0	0	985	1.1	985	0.8
Not specified	Pinto	200	0.6	380	0.4	580	0.5
White Mountain (SD)[d]	Pinto	250	0.7	300	0.3	550	0.4
Cowboy	Pinto	0	0	340	0.4	340	0.3
Medicine Hat	Pinto	0	0	275	0.3	275	0.2
Maverick	Pinto	0	0	260	0.3	260	0.2
Radiant (SD)[d]	Pinto	0	0	120	0.1	120	0.1
Topaz	Pinto	0	0	40	0	40	0
Total Pinto	**Pinto**	**3,337**	**9.6**	**67,990**	**74.3**	**71,327**	**56.5**
Ruby	Small Red	0	0	1,374	1.5	1,374	1.1
Merlot	Small Red	0	0	540	0.6	540	0.4
Total Small Red	**Small Red**	**0**	**0**	**1,914**	**2.1**	**1,914**	**1.5**
Grand Total	**All Classes**	**34,820**	**100**	**91,531**	**100**	**126,351**	**100**

[a]Respondents' acres only.
[b]Percent of respondents' total dry bean acreage.
[c]GN = Great Northern.
[d]SD = Slow Darkening pinto variety.

Table 6. Dry bean production problems reported in 2017.

Production problem	Respondents (no.)	Respondents (%)	Acres reported (no.)[a]	Acres reported (%)[a]
Minnesota				
Diseases	21	29.6	10,171	29.2
Drought	14	19.7	6,168	17.7
Hail	19	26.8	6,045	17.4
Water damage (beans harvested)	22	31	3,802	10.9
Harvest	7	9.9	3,095	8.9
Emergence/stand	12	16.9	2,830	8.1
None reported	10	14.1	2,002	5.7
Weeds	14	19.7	2,000	5.7
Wind	3	4.2	687	2
Delayed planting	5	7	570	1.6
Soil salinity	4	5.6	455	1.3
Herbicide drift injury	2	2.8	275	0.8
Applied herbicide injury	1	1.4	245	0.7
Micronutrient deficiency	1	1.4	235	0.7
Water damage (beans not harvested)	9	12.7	175	0.5
Insects	1	1.4	50	0.1
Geese	1	1.4	12	0
North Dakota				
Drought	50	29.8	17,661	19.3
None reported	34	20.2	16,172	17.7
Hail	40	23.8	13,316	14.5
Weeds	50	29.8	7,483	8.2
Emergence/stand	28	16.7	7,008	7.7
Water damage (beans harvested)	48	28.6	6,374	6.9
Delayed planting	16	9.5	5,176	5.7
Diseases	19	11.3	4,917	5.4
Soil salinity	54	32.1	3,524	3.9
Harvest	14	8.3	3,490	3.8
Wind	11	6.5	2,946	3.2
Herbicide drift injury	9	5.4	810	0.9
Water damage (beans not harvested)	23	13.7	776	0.8
Frost	8	4.8	619	0.7
Applied herbicide injury	1	0.6	300	0.3
Insects	1	0.6	200	0.2
Micronutrient deficiency	2	1.2	70	0.1
Geese	1	0.6	40	0
Northarvest				
Drought	64	26.8	23,829	18.9
Hail	59	24.7	19,361	15.3
None reported	44	18.4	18,174	14.4
Diseases	40	16.7	15,088	11.9
Water damage (beans harvested)	70	29.3	10,176	8.1
Emergence/stand	40	16.7	9,838	7.8
Weeds	64	26.8	9,483	7.5
Harvest	21	8.8	6,585	5.2
Delayed planting	21	8.8	5,746	4.5
Soil salinity	58	24.3	3,979	3.1
Wind	14	5.9	3,633	2.9
Herbicide drift injury	11	4.6	1,085	0.9
Water damage (beans not harvested)	32	13.4	951	0.8
Frost	8	3.3	619	0.5
Applied herbicide injury	2	0.8	545	0.4
Micronutrient deficiency	3	1.3	305	0.2
Insects	2	0.8	250	0.2
Geese	2	0.8	52	0

[a]Respondents' acres only.

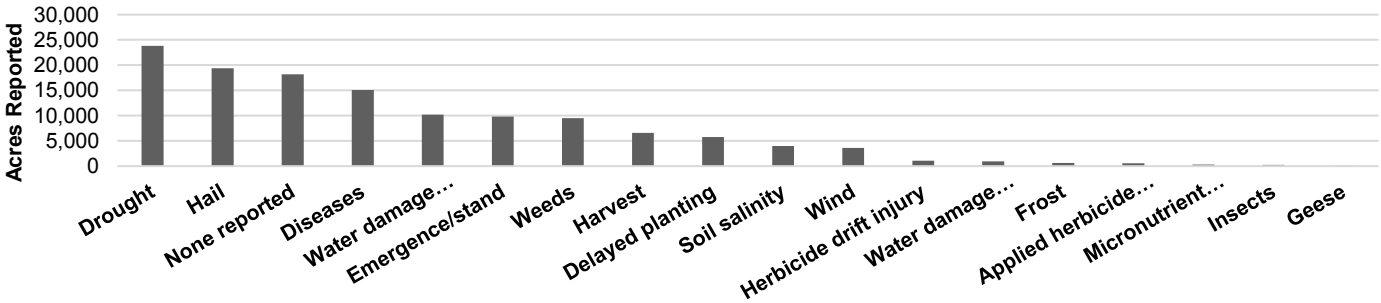

Figure 5. Northarvest respondents' reported acres for dry bean production problems in 2017.

Table 7. Dicamba drift injury on dry bean acreage in 2017.

Dicamba injury	Respondents (no.)	Respondents (%)	Acres reported (no.)[a]	Acres reported (%)[a]
Minnesota				
Yes	2	2.8	345	1
No	69	97.2	34,475	99
Total	**71**	**100**	**34,820**	**100**
North Dakota				
Yes	7	4.2	7,266	8
No	160	95.8	83,890	92
Total	**167**	**100**	**91,156**	**100**
Northarvest				
Yes	9	3.8	7,611	6
No	229	96.2	118,365	94
Total	**238**	**100**	**125,976**	**100**

[a]Respondents' acres only.

Table 8. Reported yield loss due to dicamba drift injury on dry beans in 2017, and whether a successful resolution was reached with the party responsible for dicamba drift.

					Successful resolution	
Dicamba injury	Respondents (no.)	Minimum reported loss (lbs/acre)	Maximum reported loss (lbs/acre)	Average reported loss (lbs/acre)	Yes	No
Minnesota	2	300	1,500	900	0	2
North Dakota	7	100	2,000	529	1	6

Table 9. Nearest and farthest distances from dicamba drift source.

	Nearest distance		Farthest distance	
	Respondents (no.)	Respondents (%)	Respondents (no.)	Respondents (%)
Minnesota				
1 to 100 feet	2	100	0	0
101 to 200 feet	0	0	1	50
Unknown	0	0	1	50
Total	**2**	**100**	**2**	**100**
North Dakota				
1 to 100 feet	3	42.8	0	0
101 to 200 feet	1	14.3	0	0
201 to 300 feet	1	14.3	0	0
401 to 500 feet	1	14.3	1	14.3
Unknown	1	14.3	6	85.7
Total	**7**	**100**	**7**	**100**
Northarvest				
1 to 100 feet	5	55.6	0	0
101 to 200 feet	1	11.1	1	11.1
201 to 300 feet	1	11.1	0	0
401 to 500 feet	1	11.1	1	11.1
Unknown	1	11.1	7	77.8
Total	**9**	**100**	**9**	**100**

Table 10. Future dry bean planting intentions due to risk of dicamba injury.

Planting intention	Respondents (no.)	Respondents (%)
Minnesota		
Yes	70	98.6
No	1	1.4
Total	**71**	**100**
North Dakota		
Yes	160	95.8
No	7	4.2
Total	**167**	**100**
Northarvest		
Yes	230	96.6
No	8	3.4
Total	**238**	**100**

Table 11. Purchased seed size problems that affected acreage planting intentions in 2017.

				Not enough seed			Too much seed		
Variety	Class	Respondents (no.)	Acres reported[a]	Respondents (no.)	Acres affected[a]	Acres affected (%)[a]	Respondents (no.)	Acres affected[a]	Acres affected (%)[a]
Minnesota									
Eclipse	Black	20	4,950	2	21	0.4	0	0	0
HMS Medalist	Navy	14	2,420	1	11	0.5	0	0	0
North Dakota									
HMS Medalist	Navy	30	7,704	1	15	0.2	1	25	0.3
Cowboy	Pinto	3	340	1	50	14.7	0	0	0
La Paz	Pinto	46	15,360	3	460	3	0	0	0
Lariat	Pinto	12	3,513	1	100	2.8	0	0	0
Monterrey	Pinto	39	10,524	4	455	4.3	0	0	0
ND Palomino	Pinto	7	1,482	1	10	0.7	0	0	0
Santa Cruz	Pinto	18	3,972	2	355	8.9	0	0	0
Sinaloa	Pinto	11	4,223	1	100	2.4	0	0	0
Torreon	Pinto	22	5,696	1	70	1.2	0	0	0
Vibrant	Pinto	28	8,854	4	350	4	0	0	0
Windbreaker	Pinto	30	9,411	4	635	6.7	0	0	0
Northarvest									
Eclipse	Black	45	11,856	2	21	0.2	0	0	0
HMS Medalist	Navy	44	10,124	2	26	0.3	1	25	0.2
Cowboy	Pinto	3	340	1	50	14.7	0	0	0
La Paz	Pinto	49	16,102	3	460	2.9	0	0	0
Lariat	Pinto	12	3,513	1	100	2.8	0	0	0
Monterrey	Pinto	41	10,584	4	455	4.3	0	0	0
ND Palomino	Pinto	8	1,532	1	10	0.7	0	0	0
Santa Cruz	Pinto	18	3,972	2	355	8.9	0	0	0
Sinaloa	Pinto	11	4,223	1	100	2.4	0	0	0
Torreon	Pinto	22	5,696	1	70	1.2	0	0	0
Vibrant	Pinto	29	9,256	4	350	3.8	0	0	0
Windbreaker	Pinto	32	10,630	4	635	6	0	0	0

[a]Respondents' acres only.

Table 12. Row spacing by dry bean market class in 2017.

	Black[a]		Cranberry		GN[b]		Kidney		Navy[a]		Pink		Pinto[a]		Red	
Row spacing	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Minnesota																
< 11 inches	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 to 15 inches	1	4	0	0	0	0	0	0	3	11.1	0	0	0	0	0	0
16 to 20 inches	2	8	0	0	0	0	0	0	2	7.4	0	0	1	11.1	0	0
21 to 25 inches	19	76	0	0	0	0	6	30	17	63	2	100	3	33.3	0	0
26 to 30 inches	2	8	0	0	0	0	14	70	5	18.5	0	0	5	55.6	0	0
> 30 inches	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**25**	**100**	**0**	**0**	**0**	**0**	**20**	**100**	**27**	**100**	**2**	**100**	**9**	**100**	**0**	**0**
North Dakota																
< 11 inches	0	0	0	0	0	0	0	0	0	0	0	0	1	0.8	0	0
11 to 15 inches	1	3.4	0	0	0	0	0	0	2	6.1	0	0	5	3.8	1	33.3
16 to 20 inches	2	6.9	0	0	0	0	0	0	2	6.1	0	0	7	5.4	0	0
21 to 25 inches	12	41.4	2	66.7	1	100	0	0	17	51.5	2	66.7	37	28.5	0	0
26 to 30 inches	14	48.3	1	33.3	0	0	1	100	12	36.4	1	33.3	77	59.2	2	66.7
> 30 inches	0	0	0	0	0	0	0	0	0	0	0	0	3	2.3	0	0
Total	**29**	**100**	**3**	**100**	**1**	**100**	**1**	**100**	**33**	**100**	**3**	**100**	**130**	**100**	**3**	**100**
Northarvest																
< 11 inches	1	1.9	0	0	0	0	0	0	0	0	0	0	1	0.7	0	0
11 to 15 inches	2	3.7	0	0	0	0	0	0	5	8.3	0	0	5	3.6	1	33.3
16 to 20 inches	4	7.4	0	0	0	0	0	0	4	6.7	0	0	8	5.8	0	0
21 to 25 inches	31	57.4	2	66.7	1	100	6	28.6	34	56.7	4	80	40	28.8	0	0
26 to 30 inches	16	29.6	1	33.3	0	0	15	71.4	17	28.3	1	20	82	59	2	66.7
> 30 inches	0	0	0	0	0	0	0	0	0	0	0	0	3	2.2	0	0
Total	**54**	**100**	**3**	**100**	**1**	**100**	**21**	**100**	**60**	**100**	**5**	**100**	**139**	**100**	**3**	**100**

[a]Black, navy and pinto varieties are typically Type II (upright) varieties.
[b]GN = Great Northern.

Table 13. Seeding rate by dry bean market class in 2017.

	Black[b]		Cranberry		GN[c]		Kidney		Navy[b]		Pink		Pinto[b]		Red	
Seeding rate[a]	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Minnesota																
< 70,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70 to 79,000	0	0	0	0	0	0	8	38.1	0	0	1	50	4	44.4	0	0
80 to 89,000	1	4.3	0	0	0	0	7	33.3	1	3.8	1	50	4	44.4	0	0
90 to 99,000	1	4.3	0	0	0	0	4	19	0	0	0	0	0	0	0	0
100 to 109,000	5	21.7	0	0	0	0	1	4.8	5	19.2	0	0	1	11.1	0	0
110 to 119,000	10	43.5	0	0	0	0	1	4.8	8	30.8	0	0	0	0	0	0
120 to 129,000	6	26.1	0	0	0	0	0	0	11	42.3	0	0	0	0	0	0
> 129,000	0	0	0	0	0	0	0	0	1	3.8	0	0	0	0	0	0
Total	**23**	**100**	**0**	**0**	**0**	**0**	**21**	**100**	**26**	**100**	**2**	**100**	**9**	**100**	**0**	**0**
North Dakota																
< 70,000	0	0	0	0	0	0	0	0	0	0	0	0	16	13.1	0	0
70 to 79,000	2	7.7	1	50	0	0	0	0	0	0	1	33.3	49	40.2	0	0
80 to 89,000	0	0	0	0	1	100	1	100	1	3.8	2	66.7	43	35.2	1	33.3
90 to 99,000	3	11.5	0	0	0	0	0	0	6	23.1	0	0	9	7.4	1	33.3
100 to 109,000	9	34.6	1	50	0	0	0	0	8	30.8	0	0	1	0.8	1	33.3
110 to 119,000	8	30.8	0	0	0	0	0	0	5	19.2	0	0	1	0.8	0	0
120 to 129,000	2	7.7	0	0	0	0	0	0	5	19.2	0	0	1	0.8	0	0
> 129,000	2	7.7	0	0	0	0	0	0	1	3.8	0	0	2	1.6	0	0
Total	**26**	**100**	**2**	**100**	**1**	**100**	**1**	**100**	**26**	**100**	**3**	**100**	**122**	**100**	**3**	**100**
Northarvest																
< 70,000	0	0	0	0	0	0	0	0	0	0	0	0	16	12.2	0	0
70 to 79,000	2	4.1	1	50	0	0	8	36.4	0	0	2	40	53	40.5	0	0
80 to 89,000	1	2	0	0	1	100	8	36.4	2	3.8	3	60	47	35.9	1	33.3
90 to 99,000	4	8.2	0	0	0	0	4	18.2	6	11.5	0	0	9	6.9	1	33.3
100 to 109,000	14	28.6	1	50	0	0	1	4.5	13	25	0	0	2	1.5	1	33.3
110 to 119,000	18	36.7	0	0	0	0	1	4.5	13	25	0	0	1	0.8	0	0
120 to 129,000	8	16.3	0	0	0	0	0	0	16	30.8	0	0	1	0.8	0	0
> 129,000	2	4.1	0	0	0	0	0	0	2	3.8	0	0	2	1.5	0	0
Total	**49**	**100**	**2**	**100**	**1**	**100**	**22**	**100**	**52**	**100**	**5**	**100**	**131**	**100**	**3**	**100**

[a]Seeds per acre.
[b]Black, navy and pinto varieties are typically Type II (upright) varieties.
[c]GN = Great Northern

Table 14. Difference between seeding rate and established plant stand for dry bean market classes grown in 2017.

	Black[b]		Cranberry		GN[c]		Kidney		Navy[b]		Pink		Pinto[b]		Red	
Difference[a]	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Minnesota																
< 10,000	2	9.1	0	0	0	0	5	25	6	23.1	0	0	1	12.5	0	0
10 to 19,000	15	68.2	0	0	0	0	10	50	13	50	1	100	6	75	0	0
20 to 29,000	4	18.2	0	0	0	0	5	25	5	19.2	0	0	1	12.5	0	0
> 29,000	1	4.5	0	0	0	0	0	0	2	7.7	0	0	0	0	0	0
Total	**22**	**100**	**0**	**0**	**0**	**0**	**20**	**100**	**26**	**100**	**1**	**100**	**8**	**100**	**0**	**0**
North Dakota																
< 10,000	5	21.7	0	0	0	0	1	100	7	36.8	0	0	43	43	1	33.3
10 to 19,000	16	69.6	2	100	1	100	0	0	9	47.4	0	0	51	51	2	66.7
20 to 29,000	2	8.7	0	0	0	0	0	0	1	5.3	1	100	5	5	0	0
> 29,000	0	0	0	0	0	0	0	0	2	10.5	0	0	1	1	0	0
Total	**23**	**100**	**2**	**100**	**1**	**100**	**1**	**100**	**19**	**100**	**1**	**100**	**100**	**100**	**3**	**100**
Northarvest																
< 10,000	7	15.6	0	0	0	0	6	28.6	13	28.9	0	0	44	40.7	1	33.3
10 to 19,000	31	68.9	2	100	1	100	10	47.6	22	48.9	1	50	57	52.8	2	66.7
20 to 29,000	6	13.3	0	0	0	0	5	23.8	6	13.3	1	50	6	5.6	0	0
> 29,000	1	2.2	0	0	0	0	0	0	4	8.9	0	0	1	0.9	0	0
Total	**45**	**100**	**2**	**100**	**1**	**100**	**21**	**100**	**45**	**100**	**2**	**100**	**108**	**100**	**3**	**100**

[a]Plants per acre.
[b]Black, navy and pinto varieties are typically Type II (upright) varieties.
[c]GN = Great Northern

Table 15. Percent of total dry bean acres harvested by direct combining in 2017.

Percent direct combined	Respondents (no.)	Respondents (%)	Acres reported[a]	Acres reported[a] (%)
Minnesota				
1 to 25%	3	4.3	1,460	4.3
26 to 50%	4	5.8	2,023	5.9
51 to 75%	0	0.0	0	0.0
76 to 99%	3	4.3	1,143	3.4
100%	34	49.3	12,321	36.2
No direct harvest	25	36.2	17,073	50.2
Total	**69**	**100.0**	**34,020**	**100.0**
North Dakota				
1 to 25%	11	6.6	9,983	11.2
26 to 50%	12	7.2	11,458	12.8
51 to 75%	2	1.2	1,216	1.4
76 to 99%	21	12.7	7,844	8.8
100%	95	57.2	48,105	53.9
No direct harvest	25	15.1	10,579	11.9
Total	**166**	**100.0**	**89,185**	**100**
Northarvest				
1 to 25%	14	6.0	11,443	9
26 to 50%	16	6.8	13,481	11
51 to 75%	2	0.9	1,216	1
76 to 99%	24	10.2	8,987	7
100%	129	54.9	60,426	49
No direct harvest	50	21.3	27,652	22
Total	**235**	**100.0**	**123,205**	**100**

[a]Respondents' harvested acres only.

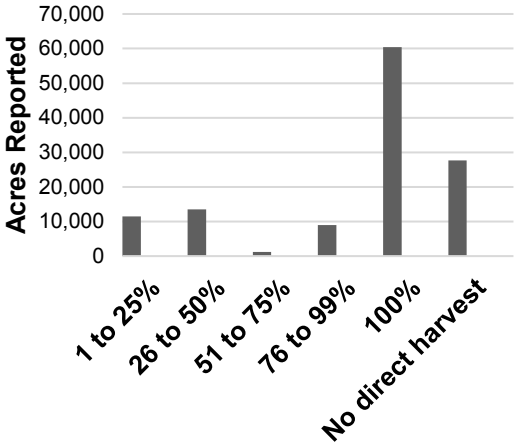

Figure 6. Northarvest percent of dry bean acres harvested by direct combining in 2017.

Table 16. Estimated yield loss in harvested dry beans in 2017.

	Direct Harvest		Conventional Harvest	
Estimated yield loss	Respondents (no.)	Respondents (%)	Respondents (no.)	Respondents (%)
Minnesota				
0%	0	0	1	2.9
1-5%	19	44.2	26	74.3
6-10%	14	32.6	7	20
11-15%	10	23.3	0	0
16-20%	0	0	1	2.9
Total	**43**	**100**	**35**	**100**
North Dakota				
0%	2	1.5	0	0
1-5%	53	38.7	49	69
6-10%	53	38.7	19	26.8
11-15%	22	16.1	3	4.2
16-20%	7	5.1	0	0
Total	**137**	**100**	**71**	**100**
Northarvest				
0%	2	1.1	1	0.9
1-5%	72	40	75	70.8
6-10%	67	37.2	26	24.5
11-15%	32	17.8	3	2.8
16-20%	7	3.9	1	0.9
Total	**180**	**100**	**106**	**100**

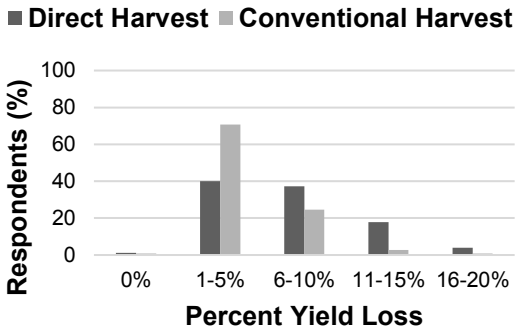

Figure 7. Northarvest estimated yield loss in harvested dry beans in 2017.

Table 17. Dry bean field tillage practices in 2017.

Tillage practice	Acres reported (no.)[a]	Acres reported (%)[a]
Minnesota		
Conventional	31,979	96.2
Minimum	1,191	3.6
Strip-tillage	0	0
No-till	60	0.2
Total	**33,230**	**100**
North Dakota		
Conventional	61,852	69.5
Minimum	13,850	15.6
No-till	6,710	7.5
Strip-tillage	6,552	7.4
Total	**88,964**	**100**
Northarvest		
Conventional	93,831	76.8
Minimum	15,041	12.3
No-till	6,710	5.5
Strip-tillage	6,612	5.4
Total	**122,194**	**100**

[a]Respondents' acres only.

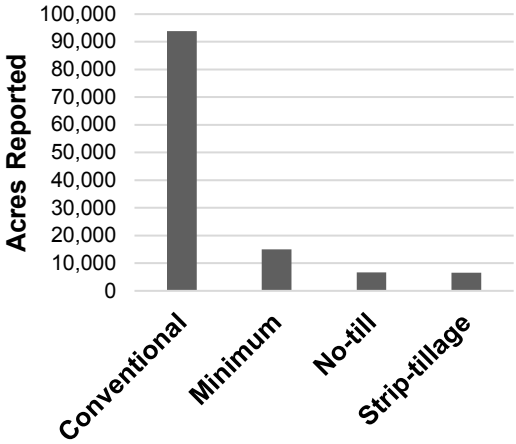

Figure 8. Northarvest dry bean field tillage practices in 2017.

Agronomy

Table 18. Cover crop use on dry bean fields in 2017.

Cover crop use	Respondents (no.)	Respondents (%)	Acres reported (no.)[a]	Acres reported (%)[a]
Minnesota				
Yes	20	28.6	11,215	32.3
No	50	71.4	23,473	67.7
Total	**70**	**100**	**34,688**	**100**
North Dakota				
Yes	15	9	12,484	13.7
No	151	91	78,737	86.3
Total	**166**	**100**	**91,221**	**100**
Northarvest				
Yes	35	14.8	23,699	18.8
No	201	85.2	102,210	81.2
Total	**236**	**100**	**125,909**	**100**

[a]Respondents' acres only.

Table 19. Reasons for cover crop use on dry bean fields in 2017.

Tillage practice	Respondents (no.)	Respondents (%)[a]
Minnesota		
Soil conservation	14	70
Weed control	4	20
Moisture conservation	1	5
No reason given	3	15
North Dakota		
Soil conservation	14	93.3
Weed control	2	13.3
Moisture conservation	0	0
No reason given	1	6.7
Northarvest		
Soil conservation	28	80
Weed control	6	17.1
Moisture conservation	1	2.9
No reason given	4	11.4

[a]Percentages do not total 100 percent because some respondents gave more than one reason.

Table 20. Ground rolling on dry bean fields in 2017.

Timing	Respondents (no.)	Respondents (%)[a]	Acres reported (no.)[b]	Acres reported (%)[b]
Minnesota				
Pre-plant	6	9.1	1,658	4.9
Pre-emerge	25	37.9	9,344	27.4
Post-emerge	2	3	379	1.1
Did not roll	41	62.1	22,715	66.6
Total			**34,096**	**100**
North Dakota				
Pre-plant	17	10.4	11,299	13.1
Pre-emerge	90	54.9	40,868	47.6
Post-emerge	9	5.5	7,300	8.5
Did not roll	64	39	26,466	30.8
Total			**85,933**	**100**
Northarvest				
Pre-plant	23	10	12,957	10.8
Pre-emerge	115	50	50,212	41.8
Post-emerge	11	4.8	7,679	6.4
Did not roll	105	45.7	49,181	41
Total			**120,029**	**100**

[a]Percentages do not total 100 percent because some respondents practiced more than one timing.
[b]Respondents' acres only.

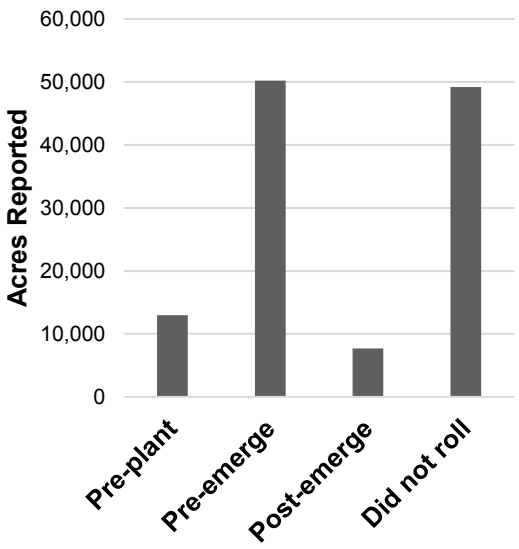

Figure 9. Northarvest ground rolling on dry bean fields in 2017.

Table 21. Ground rolling and direct harvest on dry bean fields in 2017.

	Ground Rolling			
Percent Direct Combined	**Yes**		**No**	
Minnesota	**Respondents (no.)**	**Respondents (%)**	**Respondents (no.)**	**Respondents (%)**
0%	2	6.5	21	52.5
1 to 25%	1	3.2	3	7.5
26 to 50%	1	3.2	3	7.5
51 to 75%	0	0	0	0
76 to 100%	1	3.2	3	7.5
100%	26	83.9	10	25
Total	**31**	**100**	**40**	**100**
North Dakota				
0%	0	0	23	35.9
1 to 25%	7	6.3	7	10.9
26 to 50%	9	8	9	14.1
51 to 75%	1	0.9	2	3.1
76 to 100%	14	12.5	9	14.1
100%	81	72.3	14	21.9
Total	**112**	**100**	**64**	**100**
Northarvest				
0%	2	1.4	44	42.3
1 to 25%	8	5.6	10	9.6
26 to 50%	10	7	12	11.5
51 to 75%	1	0.7	2	1.9
76 to 100%	15	10.5	12	11.5
100%	107	74.8	24	23.1
Total	**143**	**100**	**104**	**100**

Table 22. Use of fertilizers on dry bean fields in 2017.

Fertilizer	Respondents (no.)	Respondents (%)
Minnesota		
Nitrogen	58	95.1
Phosphorus	54	88.5
Potash	44	72.1
Zinc	44	72.1
Sulfur	35	57.4
North Dakota		
Nitrogen	127	87.6
Phosphorus	119	82.1
Potash	55	37.9
Zinc	97	66.9
Sulfur	47	32.4
Northarvest		
Nitrogen	185	89.8
Phosphorus	173	84
Potash	99	48.1
Zinc	141	68.4
Sulfur	82	39.8

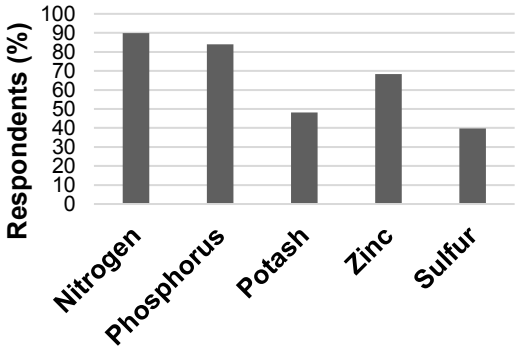

Figure 10. Northarvest use of fertilizers on dry bean fields in 2017.

Table 23. Fertilizer application methods on dry bean fields in 2017.

Fertilizer	Respondents (no.)	Respondents (%)
Minnesota		
Broadcast	64	92.8
In-furrow	26	37.7
Banded	16	23.2
Foliar	12	17.4
North Dakota		
Broadcast	129	84.3
In-furrow	49	32
Banded	32	20.9
Foliar	12	7.8
Northarvest		
Broadcast	193	86.9
In-furrow	75	33.8
Banded	48	21.6
Foliar	24	10.8

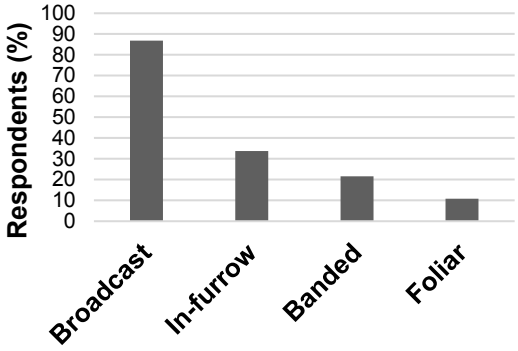

Figure 11. Northarvest fertilizer application methods on dry bean fields in 2017.

Table 24. Use of soil test prior to fertilization of dry bean fields in 2017.

Soil test	Respondents (no.)	Respondents (%)
Minnesota		
Soil test used	55	78.6
Soil test not used	15	21.4
Total	**70**	**100**
North Dakota		
Soil test used	124	76.1
Soil test not used	39	23.9
Total	**163**	**100**
Northarvest		
Soil test used	179	76.8
Soil test not used	54	23.2
Total	**233**	**100**

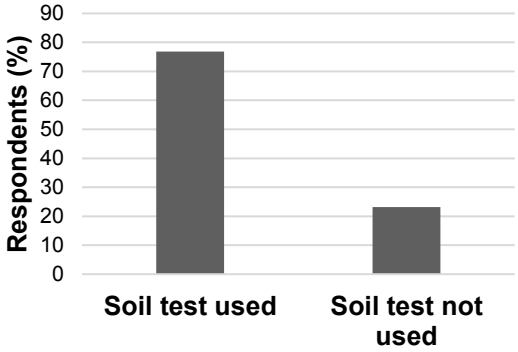

Figure 12. Northarvest use of soil test in 2017.

Table 25. Use of *Rhizobium* inoculants on dry bean fields in 2017.

Rhizobium use	Respondents (no.)	Respondents (%)
Minnesota		
Inoculant used	15	22.7
Inoculant not used	51	77.3
Total	**66**	**100**
North Dakota		
Inoculant used	32	20.6
Inoculant not used	123	79.4
Total	**155**	**100**
Northarvest		
Inoculant used	47	21.3
Inoculant not used	174	78.7
Total	**221**	**100**

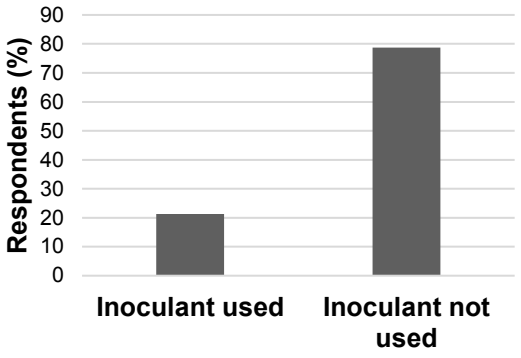

Figure 13. Northarvest use of inoculant in 2017.

Table 26. Use of site-specific nutrient management (SSNM) on dry bean fields in 2017.

Soil test	Respondents (no.)	Respondents (%)
Minnesota		
SSNM used	14	20.9
SSNM not used	53	79.1
Total	**67**	**100**
North Dakota		
SSNM used	36	22.8
SSNM not used	122	77.2
Total	**158**	**100**
Northarvest		
SSNM used	50	22.2
SSNM not used	175	77.8
Total	**225**	**100**

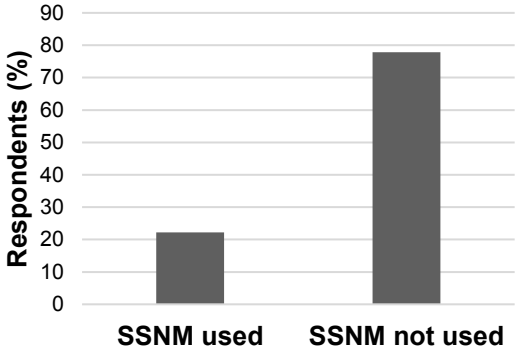

Figure 14. Northarvest use of site-specific nutrient management in 2017.

Table 27. Desiccants used on dry beans in 2017.

Desiccant	Respondents (no.)	Respondents (%)	Acres reported (no.)[a]	Acres reported (%)[a]
Minnesota				
Sharpen	34	48.6	9,384	27.1
No desiccant used	19	27.1	8,665	25
Valor	15	21.4	8,178	23.6
Glyphosate	11	15.7	3,431	9.9
Sodium chlorate	4	5.7	3,101	8.9
Paraquat	7	10	2,895	8.4
Desiccant Total			**34,660**	
North Dakota				
Sharpen	102	61.4	50,564	55.8
Glyphosate	81	48.8	38,614	42.6
Valor	28	16.9	15,339	16.9
Paraquat	30	18.1	11,161	12.3
No desiccant used	27	16.3	8,545	9.4
Sodium chlorate	0	0	0	0
Desiccant Total			**90,554**	
Northarvest				
Sharpen	136	57.6	59,948	47.9
Glyphosate	92	39	42,045	33.6
Valor	43	18.2	23,517	18.8
No desiccant used	46	19.5	17,210	13.7
Paraquat	37	15.7	14,056	11.2
Sodium chlorate	4	1.7	3,101	2.5
Desiccant Total			**125,214**	

[a]Respondents' acres only.

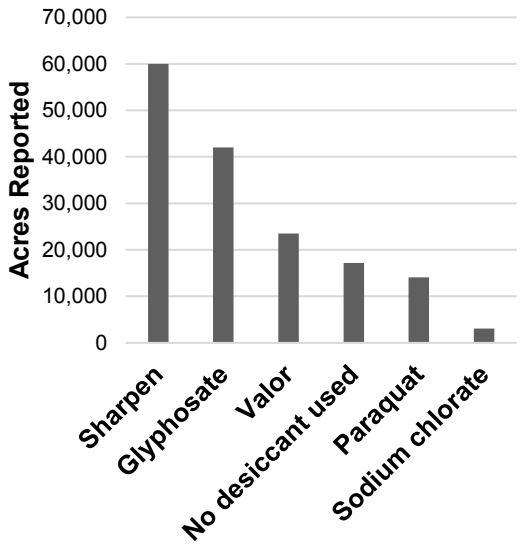

Figure 15. Northarvest desiccants used on dry beans in 2017.

Table 28. Desiccant tank-mixes used on dry beans in 2017.

Desiccant Combination	Respondents (no.)	Acres reported (no.)
Minnesota		
Sharpen + Valor	2	1,000
Glyphosate + Paraquat + Sharpen	1	740
Glyphosate + Sharpen	4	686
Paraquat + Sharpen	2	685
Sharpen + Sodium chlorate	1	570
Glyphosate + Sodium chlorate	1	325
Paraquat + Valor	1	240
Paraquat + Sodium chlorate	1	220
North Dakota		
Glyphosate + Sharpen	47	23,887
Glyphosate + Valor	10	5,240
Paraquat + Sharpen	6	3,615
Glyphosate + Paraquat	5	3,365
Sharpen + Valor	4	1,837
Paraquat + Valor	4	1,378
Glyphosate + Paraquat + Sharpen	4	1,271
Glyphosate + Sharpen + Valor	1	776
Northarvest		
Glyphosate + Sharpen	51	24,573
Glyphosate + Valor	10	5,240
Paraquat + Sharpen	8	4,300
Glyphosate + Paraquat	5	3,365
Sharpen + Valor	6	2,837
Glyphosate + Paraquat + Sharpen	5	2,011
Paraquat + Valor	5	1,618
Glyphosate + Sharpen + Valor	1	776
Sharpen + Sodium chlorate	1	570
Glyphosate + Sodium chlorate	1	325
Paraquat + Sodium chlorate	1	220

Table 29. Frequency of crops in dry bean crop rotation program, 2013-2016.

Crop	2016 Respondents (%)	2015 Respondents (%)	2014 Respondents (%)	2013 Respondents (%)	4-year average Respondents (%)
Minnesota					
Barley	2.9	1.4	0	1.5	1.5
Corn	54.3	32.9	39.1	36.4	40.7
Dry bean	2.9	14.3	26.1	30.3	18.2
Hay/grass	0	1.4	0	1.5	0.7
No crop	0	1.4	4.3	7.6	3.3
Oats	1.4	0	0	1.5	0.7
Potato	4.3	10	5.8	3	5.8
Soybean	0	30	30.4	18.2	19.6
Sugar beet	27.1	7.1	4.3	13.6	13.1
Wheat	21.4	20	11.6	6.1	14.9
North Dakota					
Barley	8.7	2.5	2.6	4.1	4.5
Canola	0	1.3	0	0.7	0.5
Corn	36.6	14.6	34.4	16.6	25.7
Dry bean	3.1	29.7	19.5	44.8	23.8
Field pea	0	1.9	0	1.4	0.8
Flax	0	0.6	0	0	0.2
Hay/grass	1.2	0.6	0	0	0.5
No crop	0	0.6	1.3	3.4	1.3
Potato	1.2	3.2	2.6	2.8	2.4
Soybean	1.2	36.1	11	22.1	17.5
Sugar beet	13	11.4	3.9	4.8	8.4
Sunflower	0	1.3	0	0	0.3
Wheat	65.8	29.1	55.2	27.6	44.8
Northarvest					
Barley	6.9	2.2	1.8	3.3	3.6
Canola	0	0.9	0	0.5	0.3
Corn	42	20.2	35.9	22.7	30.3
Dry bean	3	25	21.5	40.3	22.1
Field pea	0	1.3	0	0.9	0.6
Flax	0	0.4	0	0	0.1
Hay/grass	0.9	0.9	0	0.5	0.6
No crop	0	0.9	2.2	4.7	1.9
Oats	0.4	0	0	0.5	0.2
Potato	2.2	5.3	3.6	2.8	3.5
Soybean	0.9	34.2	17	20.9	18.1
Sugar beet	17.3	10.1	4	7.6	9.9
Sunflower	0	0.9	0	0	0.2
Wheat	52.4	26.3	41.7	20.9	35.6

Table 30. Number of years dry beans are grown in dry bean crop rotation program.

Number of years	Respondents (no.)	Respondents (%)
Minnesota		
1 of past 5 years	28	40
2 of past 5 years	36	51.4
3 of past 5 years	5	7.1
4 of past 5 years	0	0
5 of past 5 years	1	1.4
Total	**70**	**100**
North Dakota		
1 of past 5 years	57	35
2 of past 5 years	68	41.7
3 of past 5 years	31	19
4 of past 5 years	3	1.8
5 of past 5 years	4	2.5
Total	**163**	**100**
Northarvest		
1 of past 5 years	85	36.5
2 of past 5 years	104	44.6
3 of past 5 years	36	15.5
4 of past 5 years	3	1.3
5 of past 5 years	5	2.1
Total	**233**	**100**

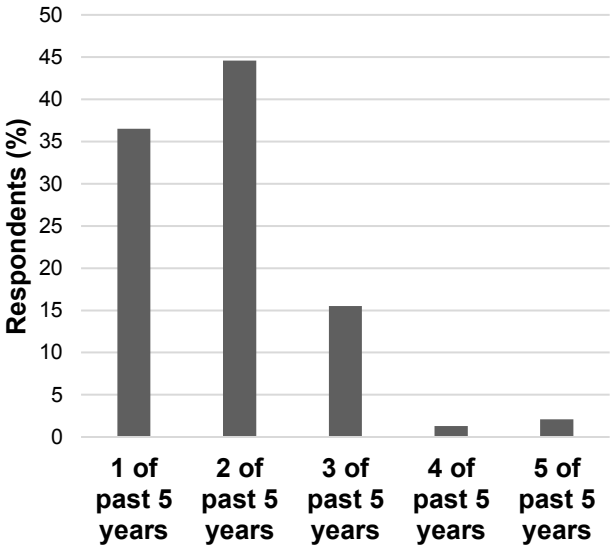

Figure 16. Northarvest number of years dry beans are grown in dry bean crop rotation program.

Insect Pests and Insecticide Use

Table 31. Worst insect problem in dry beans in 2017.

Insect[a]	Respondents (no.)	Respondents (%)	Acres reported (no.)[b,c]	Acres reported (%)[b,c]
Minnesota				
None	44	62.9	22,493	65.8
Leafhoppers	17	24.3	7,592	22.2
Caterpillars	1	1.4	1,600	4.7
Aphids	3	4.3	1,410	4.1
Grasshoppers	2	2.9	610	1.8
Bean leaf beetle	2	2.9	265	0.8
Armyworms	1	1.4	200	0.6
Total	**70**	**100**	**34,170**	**100**
North Dakota				
None	116	72	63,941	72.6
Aphids	10	6.2	4,614	5.2
Grasshoppers	9	5.6	3,491	4
Cutworms	6	3.7	3,430	3.9
Armyworms	2	1.2	2,720	3.1
Caterpillars	3	1.9	2,629	3
Leafhoppers	5	3.1	2,436	2.8
Spider mites	3	1.9	1,890	2.1
Seed corn maggot	2	1.2	1,634	1.9
Wireworms	5	3.1	1,341	1.5
Total	**161**	**100**	**88,126**	**100**
Northarvest				
None	160	69.3	86,434	70.7
Leafhoppers	22	9.5	10,028	8.2
Aphids	13	5.6	6,024	4.9
Caterpillars	4	1.7	4,229	3.5
Grasshoppers	11	4.8	4,101	3.4
Cutworms	6	2.6	3,430	2.8
Armyworms	3	1.3	2,920	2.4
Spider mites	3	1.3	1,890	1.5
Seed corn maggot	2	0.9	1,634	1.3
Wireworms	5	2.2	1,341	1.1
Bean leaf beetle	2	0.9	265	0.2
Total	**231**	**100**	**122,296**	**100**

[a]Ranked as No. 1 insect problem by respondents.
[b]Respondents' acres only.
[c]Insect problem may not have been present across all reported acres.

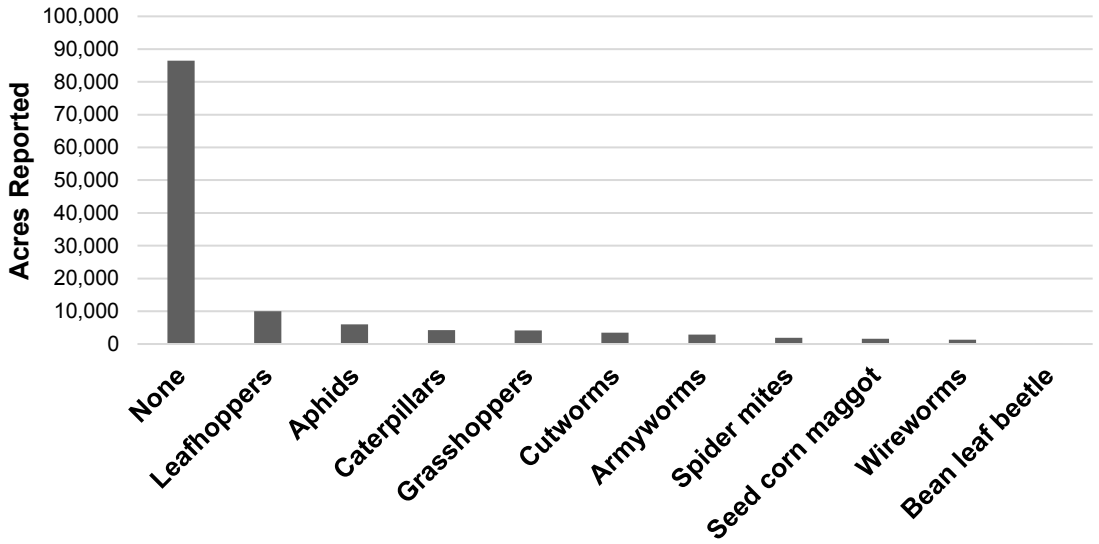

Figure 17. Northarvest worst insect problem in dry beans in 2017.

Table 32. Insects ranked as one of the three worst in dry beans in 2017.

Insect[a]	Respondents (no.)	Respondents (%)	Acres reported (no.)[b,c]	Acres reported (%)[b,c]
Minnesota				
None	44	62.9	22,493	65.8
Leafhoppers	22	31.4	10,642	31.1
Bean leaf beetle	7	10	2,975	8.7
Aphids	5	7.1	2,550	7.5
Caterpillars	3	4.3	2,015	5.9
Seed corn maggot	4	5.7	1,965	5.8
Grasshoppers	4	5.7	1,730	5.1
Spider mites	3	4.3	1,165	3.4
Cutworms	1	1.4	275	0.8
Armyworms	1	1.4	200	0.6
North Dakota				
None	116	72	63,941	72.6
Leafhoppers	17	10.6	10,268	11.7
Grasshoppers	19	11.8	8,121	9.2
Aphids	16	9.9	8,084	9.2
Cutworms	12	7.5	7,704	8.7
Wireworms	15	9.3	6,501	7.4
Caterpillars	8	5	5,019	5.7
Spider mites	11	6.8	4,748	5.4
Armyworms	7	4.3	4,155	4.7
Seed corn maggot	4	2.5	3,004	3.4
Bean leaf beetle	3	1.9	2,676	3
Northarvest				
None	160	69.3	86,434	70.7
Leafhoppers	39	16.9	20,910	17.1
Aphids	21	9.1	10,634	8.7
Grasshoppers	23	10	9,851	8.1
Cutworms	13	5.6	7,979	6.5
Caterpillars	11	4.8	7,034	5.8
Wireworms	15	6.5	6,501	5.3
Spider mites	14	6.1	5,913	4.8
Bean leaf beetle	10	4.3	5,651	4.6
Seed corn maggot	8	3.5	4,969	4.1
Armyworms	8	3.5	4,355	3.6

[a]Ranked as No. 1, 2 or 3 insect problem by respondents.
[b]Respondents' acres only.
[c]Insect problem may not have been present across all reported acres.

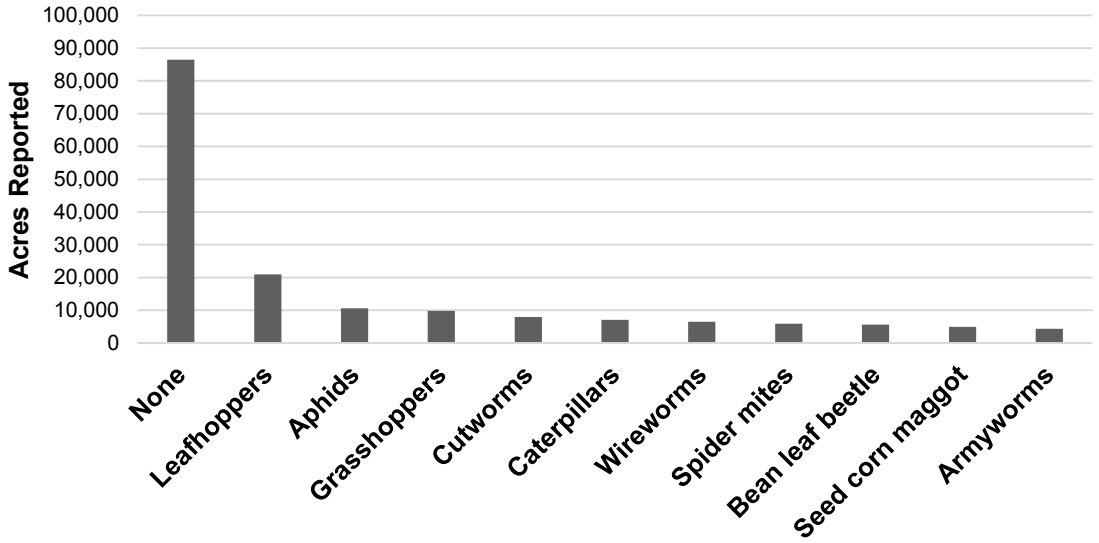

Figure 18. Northarvest insects ranked as one of the three worst in dry beans in 2017.

Table 33. Foliar insecticide use in dry beans in 2017.

Insecticide	Respondents (no.)	Respondents (%)	Acres reported (no.)[a,b]	Acres reported (%)[a,b]
Minnesota				
None	50	73.5	23,069	69.6
Hero	2	2.9	3,809	11.5
Warrior	5	7.4	3,210	9.7
Asana XL	5	7.4	1,582	4.8
Lorsban	3	4.4	1,310	4
Tombstone	1	1.5	800	2.4
Brigade	1	1.5	290	0.9
Baythroid XL	1	1.5	235	0.7
Insecticide Total			**11,236**	**33.9**
North Dakota				
None	150	93.2	82,777	93.6
Warrior	5	3.1	2,296	2.6
Lorsban	3	1.9	2,240	2.5
Baythroid XL	2	1.2	608	0.7
Asana XL	1	0.6	150	0.2
Insecticide Total			**5,294**	**6**
Northarvest				
None	200	87.3	105,846	87.1
Warrior	10	4.4	5,506	4.5
Hero	2	0.9	3,809	3.1
Lorsban	6	2.6	3,550	2.9
Asana XL	6	2.6	1,732	1.4
Baythroid XL	3	1.3	843	0.7
Tombstone	1	0.4	800	0.7
Brigade	1	0.4	290	0.2
Insecticide Total			**16,530**	**13.6**

[a]Respondents' acres only. Multiple applications count as multiple acres.
[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.

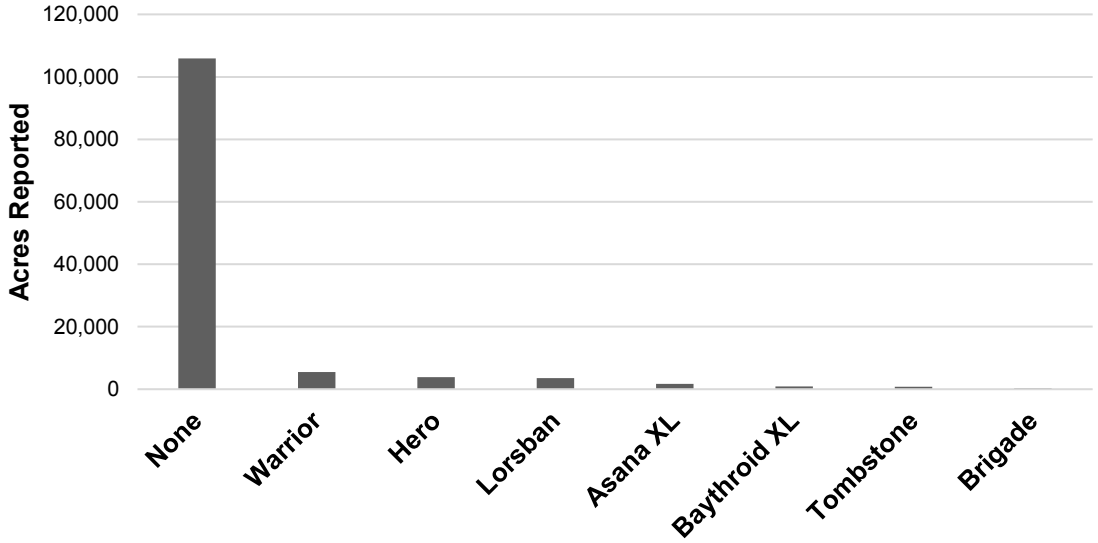

Figure 19. Northarvest foliar insecticide use in dry beans in 2017.

Table 34. Soil insecticide and seed treatment use in dry beans in 2017.

Seed Treatment	Respondents (no.)	Respondents (%)	Acres reported (no.)[a,b]	Acres reported (%)[a,b]
Minnesota				
Cruiser Maxx	21	30.4	11,417	33.8
None	22	31.9	8,745	25.9
Cruiser Maxx Vibrance	8	11.6	5,565	16.5
Don't know	11	15.9	5,135	15.2
Lorsban	9	13	3,860	11.4
Dyna-Shield Imidacloprid	3	4.3	2,622	7.8
Enhance AW	1	1.4	2,269	6.7
Capture LFR[c]	4	5.8	1,645	4.9
Cruiser 5FS	1	1.4	800	2.4
Gaucho 600	1	1.4	590	1.7
Insecticide Total			**33,903**	
North Dakota				
None	64	39.3	27,773	31.4
Cruiser Maxx	47	28.8	26,458	29.9
Don't know	31	19	19,962	22.5
Cruiser Maxx Vibrance	10	6.1	6,963	7.9
Lorsban	10	6.1	4,794	5.4
Cruiser 5FS	4	2.5	2,507	2.8
Capture LFR[c]	4	2.5	2,140	2.4
Gaucho 600	2	1.2	1,050	1.2
Dyna-Shield Imidacloprid	2	1.2	633	0.7
Insecticide Total			**64,507**	
Northarvest				
Cruiser Maxx	68	29.3	37,875	31
None	86	37.1	36,518	29.9
Don't know	42	18.1	25,097	20.5
Cruiser Maxx Vibrance	18	7.8	12,528	10.2
Lorsban	19	8.2	8,654	7.1
Capture LFR[c]	8	3.4	3,785	3.1
Cruiser 5FS	5	2.2	3,307	2.7
Dyna-Shield Imidacloprid	5	2.2	3,255	2.7
Enhance AW	1	0.4	2,269	1.9
Gaucho 600	3	1.3	1,640	1.3
Insecticide Total			**98,410**	

[a]Respondents' acres only.
[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]Soil-applied insecticide.

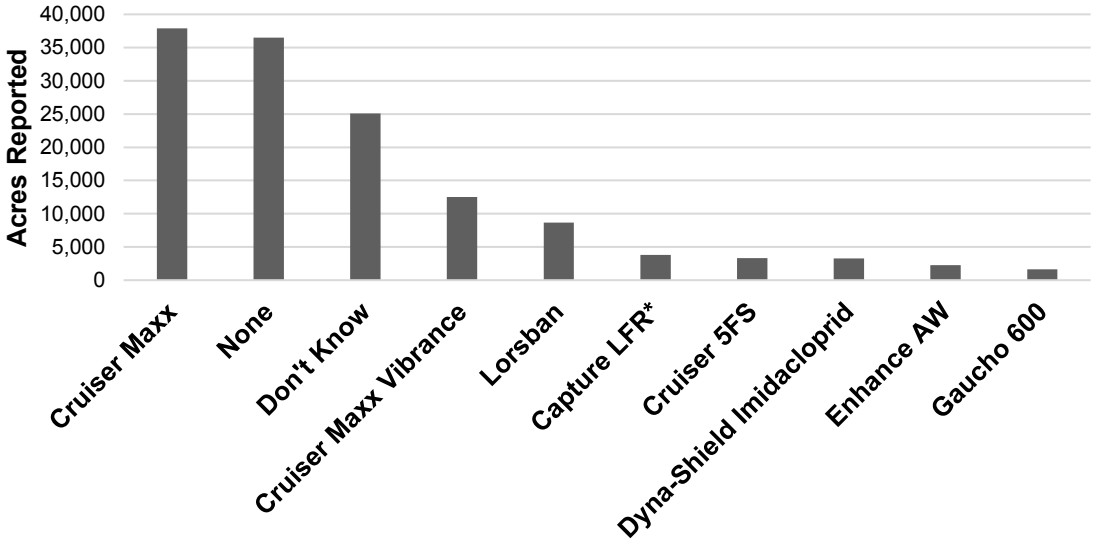

Figure 20. Northarvest insecticide seed treatment and soil insecticide use in dry beans in 2017.

Plant Diseases and Fungicide Use

Table 35. Worst disease problem in dry beans in 2017.

Disease[a]	Respondents (no.)	Respondents (%)	Acres reported (no.)[b,c]	Acres reported (%)[b,c]
Minnesota				
White mold	46	68.7	24,567	74.7
None	16	23.9	6,638	20.2
Bacterial wilt	2	3	715	2.2
Anthracnose	2	3	705	2.1
Common bacterial blight	1	1.5	275	0.8
Total	**67**	**100**	**32,900**	**100**
North Dakota				
White mold	74	50.3	40,388	48.8
Common bacterial blight	19	12.9	13,059	15.8
None	27	18.4	11,945	14.4
Rust	10	6.8	5,468	6.6
Root rot	7	4.8	5,040	6.1
Viruses (general)	6	4.1	4,251	5.1
Anthracnose	3	2	1,650	2
Bacterial brown spot	1	0.7	1,000	1.2
Total	**147**	**100**	**82,801**	**100**
Northarvest				
White mold	120	56.1	64,955	56.1
None	43	20.1	18,583	16.1
Common bacterial blight	20	9.3	13,334	11.5
Rust	0	0	5,468	4.7
Root rot	7	3.3	5,040	4.4
Viruses (general)	6	2.8	4,251	3.7
Anthracnose	5	2.3	2,355	2
Bacterial brown spot	1	0.5	1,000	0.9
Bacterial wilt	2	0.9	715	0.6
Total	**214**	**100**	**115,701**	**100**

[a]Ranked as No. 1 disease problem by respondents.
[b]Respondents' acres only.
[c]Disease problem may not have been present across all reported acres.

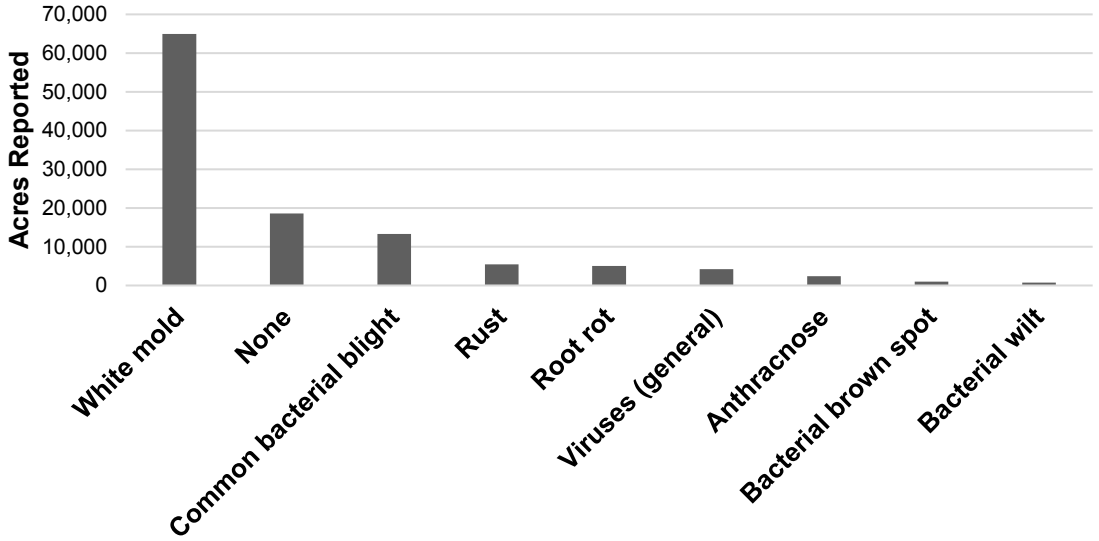

Figure 21. Northarvest worst disease problem in dry beans in 2017.

Table 36. Diseases ranked as one of the three worst in dry beans in 2017.

Disease[a]	Respondents (no.)	Respondents (%)	Acres reported (no.)[b,c]	Acres reported (%)[b,c]
Minnesota				
White mold	48	71.6	24,967	75.9
Common bacterial blight	21	31.3	16,011	48.7
Root rot	23	34.3	14,915	45.3
None	16	23.9	6,638	20.2
Anthracnose	6	9	2,330	7.1
Bacterial wilt	4	6	1,585	4.8
Bacterial brown spot	3	4.5	1,470	4.5
Bean common mosaic virus	1	1.5	900	2.7
Halo blight	1	1.5	430	1.3
Rust	2	3	328	1
Viruses (general)	1	1.5	240	0.7
North Dakota				
White mold	100	68	55,716	67.3
Rust	49	33.3	30,682	37.1
Common bacterial blight	51	34.7	29,844	36
Root rot	30	20.4	22,351	27
Bacterial brown spot	18	12.2	12,353	14.9
None	27	18.4	11,945	14.4
Halo blight	9	6.1	6,583	8
Viruses (general)	13	8.8	6,086	7.4
Anthracnose	9	6.1	4,015	4.8
Bacterial wilt	3	2	925	1.1
Northarvest				
White mold	148	69.2	80,683	69.7
Common bacterial blight	72	33.6	45,855	39.6
Root rot	53	24.8	37,267	32.2
Rust	51	23.8	31,010	26.8
None	43	20.1	18,583	16.1
Bacterial brown spot	21	9.8	13,822	11.9
Halo blight	10	4.7	7,013	6.1
Anthracnose	15	7	6,345	5.5
Viruses (general)	14	6.5	6,326	5.5
Bacterial wilt	7	3.3	2,510	2.2
Bean common mosaic virus	1	0.5	900	0.8

[a]Ranked as No. 1, 2 or 3 disease problem by respondents.
[b]Respondents' acres only.
[c]Disease problem may not have been present across all reported acres.

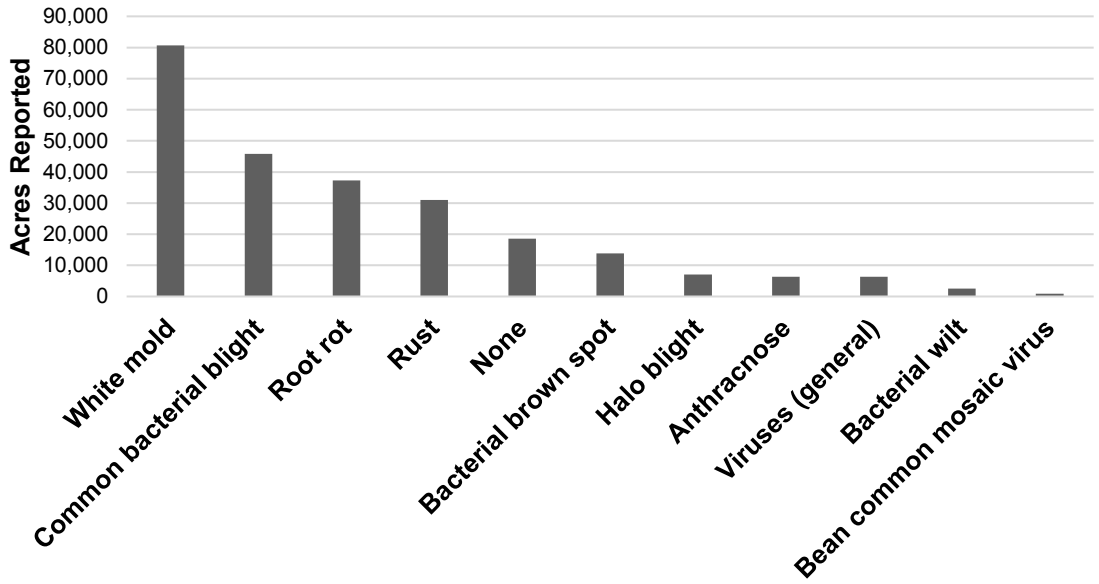

Figure 22. Northarvest diseases ranked as one of the three worst in dry beans in 2017.

Table 37. Foliar and banded fungicide use in dry beans in 2017.

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	25	36.2	14,516	43.6	11,371	18.9	3,145	5.2
Topsin broadcast	18	26.1	10,095	30.3	8,765	14.6	1,330	2.2
Omega	3	4.3	9,218	27.7	7,618	12.6	1,600	2.7
T-methyl	13	18.8	7,849	23.5	7,609	12.6	240	0.4
Proline broadcast	4	5.8	5,002	15	790	1.3	4,212	7
ProPulse	3	4.3	4,609	13.8	4,609	7.7	0	0
Champ	2	2.9	4,172	12.5	200	0.3	3,972	6.6
Calcium	1	1.4	1,740	5.2	1,740	2.9	0	0
Priaxor	4	5.8	1,570	4.7	1,570	2.6	0	0
Incognito	3	4.3	1,070	3.2	780	1.3	290	0.5
Aproach	1	1.4	300	0.9	300	0.5	0	0
Headline	1	1.4	88	0.3	88	0.1	0	0
None	16	23.2	4,203	12.6				
Fungicide Total			**60,229**		**45,440**	**75.4**	**14,789**	**24.6**
North Dakota								
T-methyl	31	18.9	25,592	28.6	25,392	27.7	200	0.2
Topsin broadcast	32	19.5	19,471	21.8	19,321	21.1	150	0.2
Endura	35	21.3	16,648	18.6	16,028	17.5	620	0.7
Priaxor	20	12.2	9,228	10.3	8,128	8.9	1,100	1.2
Incognito	4	2.4	5,565	6.2	5,334	5.8	231	0.3
Tebuconazole	4	2.4	2,995	3.4	2,695	2.9	300	0.3
Folicur	3	1.8	2,955	3.3	2,955	3.2	0	0
Aproach	4	2.4	1,836	2.1	1,836	2	0	0
Proline broadcast	4	2.4	1,702	1.9	1,702	1.9	0	0
Omega	2	1.2	1,460	1.6	1,460	1.6	0	0
Headline	4	2.4	1,319	1.5	1,319	1.4	0	0
Onset	1	0.6	719	0.8	719	0.8	0	0
Proline banded	1	0.6	700	0.8	700	0.8	0	0
Quadris/Amstar	3	1.8	674	0.8	674	0.7	0	0
Bravo	1	0.6	500	0.6	500	0.5	0	0
Topsin banded	1	0.6	248	0.3	248	0.3	0	0
ProPulse	1	0.6	50	0.1	50	0.1	0	0
Vertisan	1	0.6	44	0	44	0	0	0
None	61	37.2	26,998	30.2				
Fungicide Total			**91,706**		**89,105**	**97.2**	**2,601**	**2.8**
Northarvest								
T-methyl	44	18.9	33,441	27.3	33,001	21.7	440	0.3
Endura	60	25.8	31,164	25.4	27,399	18	3,765	2.5
Topsin broadcast	50	21.5	29,566	24.1	28,086	18.5	1,480	1
Priaxor	24	10.3	10,798	8.8	9,698	6.4	1,100	0.7
Omega	5	2.1	10,678	8.7	9,078	6	1,600	1.1
Proline broadcast	8	3.4	6,704	5.5	2,492	1.6	4,212	2.8
Incognito	7	3	6,635	5.4	6,114	4	521	0.3
ProPulse	4	1.7	4,659	3.8	4,659	3.1	0	0
Champ	2	0.9	4,172	3.4	200	0.1	3,972	2.6
Tebuconazole	4	1.7	2,995	2.4	2,695	1.8	300	0.2
Folicur	3	1.3	2,955	2.4	2,955	1.9	0	0
Aproach	5	2.1	2,136	1.7	2,136	1.4	0	0
Calcium	1	0.4	1,740	1.4	1,740	1.1	0	0
Headline	5	2.1	1,407	1.1	1,407	0.9	0	0
Onset	1	0.4	719	0.6	719	0.5	0	0
Proline banded	1	0.4	700	0.6	700	0.5	0	0
Quadris/Amstar	3	1.3	674	0.5	674	0.4	0	0
Bravo	1	0.4	500	0.4	500	0.3	0	0
Topsin banded	1	0.4	248	0.2	248	0.2	0	0
Vertisan	1	0.4	44	0	44	0	0	0
None	77	33	31,201	25.4				
Fungicide Total			**151,935**		**134,545**	**88.6**	**17,390**	**11.4**

[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.

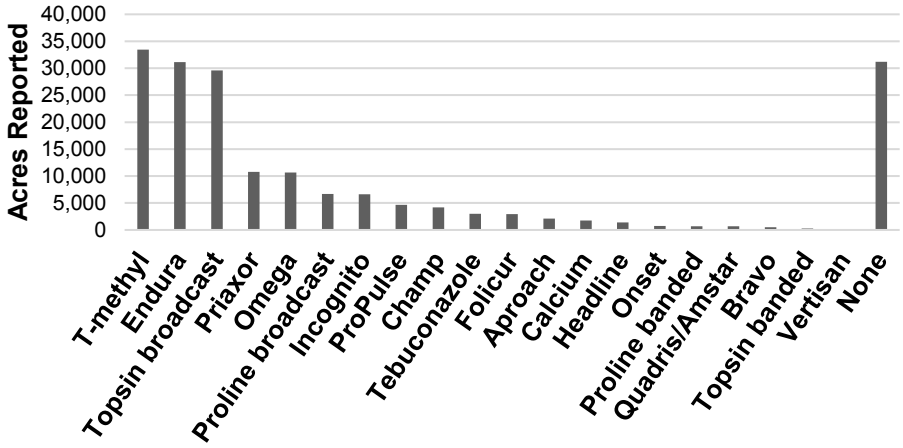

Figure 23. Northarvest foliar and banded fungicide use in dry beans in 2017.

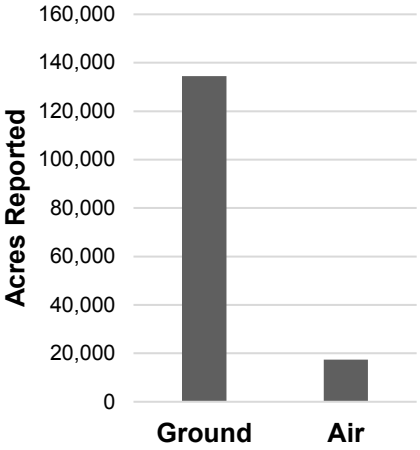

Figure 24. Northarvest fungicide application method in dry beans in 2017.

Table 38. In-furrow fungicide use in dry beans in 2017.

Seed treatment	Respondents (no.)	Respondents (%)	Total acres treated (no.)[a]	Total acres treated (%)[a]
Minnesota				
Headline	6	8.6	3,410	10.1
AZteroid FC	0	0	0	0
None	64	91.4	30,220	89.9
Fungicide Total			**3,410**	**10.1**
North Dakota				
AZteroid FC	1	0.6	906	1
Headline	1	0.6	20	0
None	162	98.8	88,530	98.6
Fungicide Total			**926**	**1**
Northarvest				
Headline	7	3	3,430	2.8
AZteroid FC	1	0.4	906	0.7
None	226	96.6	118,750	96.2
Fungicide Total			**4,336**	**3.5**

[a]Respondents' acres only.

Figure 25. Northarvest in-furrow fungicide use in dry beans in 2017.

Table 39. Fungicide seed treatment use in dry beans in 2017.

Seed treatment	Respondents (no.)	Respondents (%)[b]	Total acres treated (no.)[a]	Total acres treated (%)[a,b]
Minnesota				
Cruiser Maxx	19	27.9	9,690	30.1
Apron Maxx	12	17.6	6,744	20.9
Apron, Apron XL	11	16.2	6,167	19.2
Cruiser Maxx Vibrance	8	11.8	5,565	17.3
Dynasty	9	13.2	5,337	16.6
Rancona	8	11.8	5,307	16.5
Maxim	7	10.3	5,167	16
Don't know	6	8.8	3,510	10.9
Chloroneb	1	1.5	1,986	6.2
Vibrance	2	2.9	1,970	6.1
Captan	4	5.9	1,860	5.8
Rancona Summit	1	1.5	1,600	5
Vitavax	1	1.5	1,100	3.4
Heads Up	1	1.5	50	0.2
None	16	23.5	4,018	12.5
Seed Treatment Total			**56,053**	
North Dakota				
Apron, Apron XL	27	16.6	18,464	20.7
Cruiser Maxx	28	17.2	16,690	18.7
Rancona	16	9.8	12,286	13.8
Dynasty	17	10.4	12,111	13.6
Maxim	16	9.8	11,577	13
Apron Maxx	18	11	9,085	10.2
Cruiser Maxx Vibrance	11	6.7	8,132	9.1
Don't know	16	9.8	7,180	8.1
Vibrance	3	1.8	1,963	2.2
Stamina	2	1.2	1,950	2.2
Streptomycin	2	1.2	1,229	1.4
Captan	4	2.5	752	0.8
EverGol Energy	1	0.6	700	0.8
Obvius	2	1.2	670	0.8
Vibrance Maxx	2	1.2	500	0.6
None	58	35.6	28,748	32.3
Seed Treatment Total			**103,289**	
Northarvest				
Cruiser Maxx	47	20.3	26,380	21.7
Apron, Apron XL	38	16.5	24,631	20.3
Rancona	24	10.4	17,593	14.5
Dynasty	26	11.3	17,448	14.4
Maxim	23	10	16,744	13.8
Apron Maxx	30	13	15,829	13
Cruiser Maxx Vibrance	19	8.2	13,697	11.3
Don't know	22	9.5	10,690	8.8
Vibrance	5	2.2	3,933	3.2
Captan	8	3.5	2,612	2.2
Chloroneb	1	0.4	1,986	1.6
Stamina	2	0.9	1,950	1.6
Rancona Summit	1	0.4	1,600	1.3
Streptomycin	2	0.9	1,229	1
Vitavax	1	0.4	1,100	0.9
EverGol Energy	1	0.4	700	0.6
Obvius	2	0.9	670	0.6
Vibrance Maxx	2	0.9	500	0.4
Heads Up	1	0.4	50	0
None	74	32	32,766	27
Seed Treatment Total			**159,342**	

[a]Respondents' acres only. Includes acreage treated with more than one product.
[b]Percentages do not total 100 percent because some respondents treated the same acreage with more than one product.

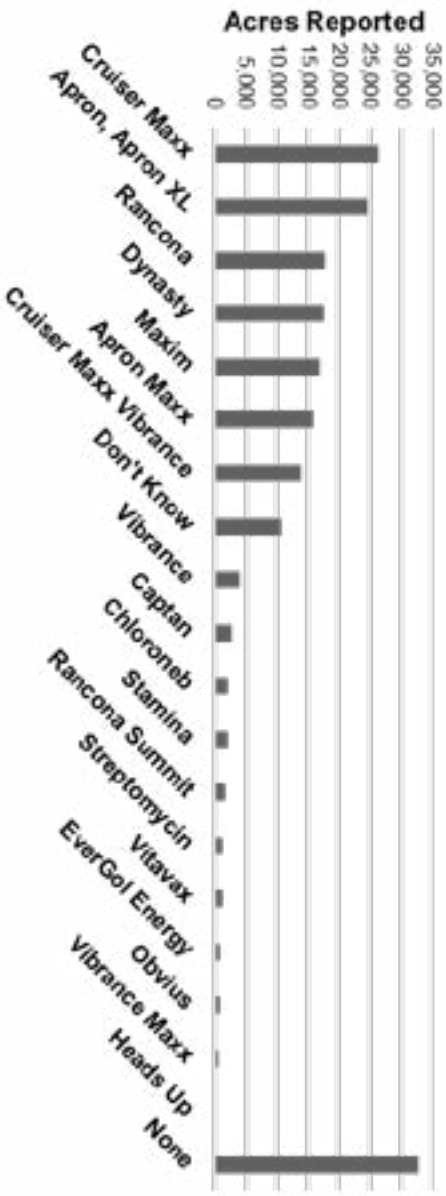

Figure 26. Northarvest fungicide seed treatment use in dry beans in 2017.

Weeds and Herbicide Use

Table 40. Worst weed problem in dry beans in 2017.

Weed[a]	Respondents (no.)	Respondents (%)	Acres reported (no.)[b,c]	Acres reported (%)[b,c]
Minnesota				
Lambsquarters	22	31.9	11,873	35.3
Ragweed	13	18.8	5,393	16
Waterhemp	15	21.7	5,145	15.3
Nightshade	4	5.8	2,811	8.4
Wild buckwheat	1	1.4	2,269	6.7
None	4	5.8	1,612	4.8
Foxtail	1	1.4	1,200	3.6
Redroot pigweed	3	4.3	1,160	3.4
Kochia	1	1.4	1,100	3.3
Canada thistle	2	2.9	660	2
Sweetclover	1	1.4	200	0.6
Smartweed	1	1.4	120	0.4
Sunflower	1	1.4	117	0.3
Total	**69**	**100**	**33,660**	**100**
North Dakota				
Kochia	52	31.5	28,838	31.8
Lambsquarters	27	16.4	14,785	16.3
Ragweed	22	13.3	13,613	15
Wild mustard	8	4.8	4,941	5.4
Biennial wormwood	10	6.1	4,896	5.4
Wild buckwheat	6	3.6	4,189	4.6
Nightshade	9	5.5	3,895	4.3
Waterhemp	5	3	2,610	2.9
Marestail	4	2.4	2,380	2.6
Canada thistle	3	1.8	2,263	2.5
Cocklebur	2	1.2	1,910	2.1
Foxtail	3	1.8	1,552	1.7
Redroot pigweed	6	3.6	1,355	1.5
Lanceleaf sage	1	0.6	776	0.9
Wild oat	2	1.2	740	0.8
None	1	0.6	630	0.7
Volunteer grain	2	1.2	540	0.6
Dock	1	0.6	455	0.5
Smartweed	1	0.6	300	0.3
Total	**165**	**100**	**90,668**	**100**
Northharvest				
Kochia	53	22.6	29,938	24.1
Lambsquarters	49	20.9	26,658	21.4
Ragweed	35	15	19,006	15.3
Waterhemp	20	8.5	7,755	6.2
Nightshade	13	5.6	6,706	5.4
Wild buckwheat	7	3	6,458	5.2
Wild mustard	8	3.4	4,941	4
Biennial wormwood	10	4.3	4,896	3.9
Canada thistle	5	2.1	2,923	2.4
Foxtail	4	1.7	2,752	2.2
Redroot pigweed	9	3.8	2,515	2
Marestail	4	1.7	2,380	1.9
None	5	2.1	2,242	1.8
Cocklebur	2	0.9	1,910	1.5
Lanceleaf sage	1	0.4	776	0.6
Wild oat	2	0.9	740	0.6
Volunteer grain	2	0.9	540	0.4
Dock	1	0.4	455	0.4
Smartweed	2	0.9	420	0.3
Sweetclover	1	0.4	200	0.2
Sunflower	1	0.4	117	0.1
Total	**234**	**100**	**124,328**	**100**

[a]Ranked as No. 1 weed problem by respondents.
[b]Respondents' acres only.
[c]Weed problem may not have been present across all reported acres.

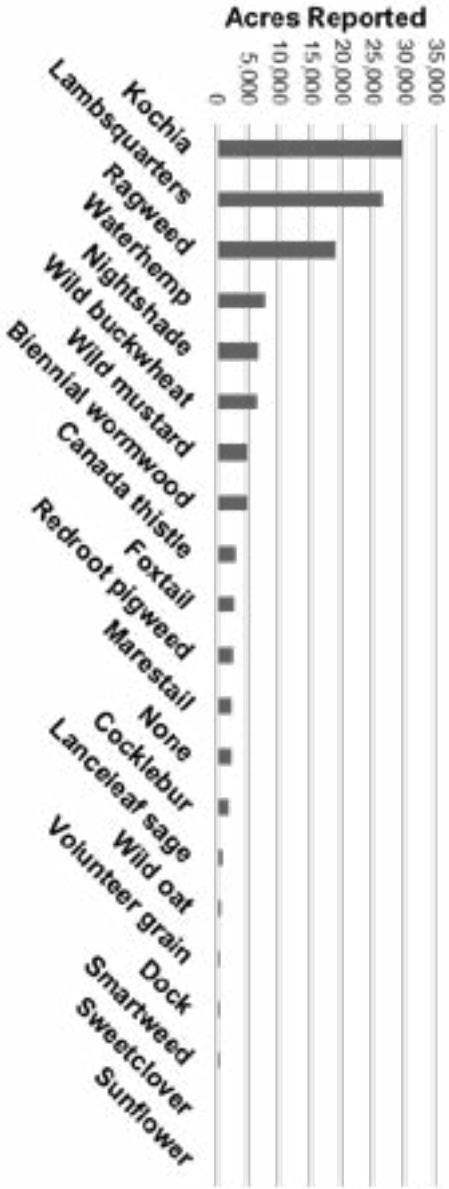

Figure 27. Northharvest worst weed problem in dry beans in 2017.

Table 41. Weeds ranked as one of the three worst in dry beans in 2017.

Weed[a]	Respondents (no.)	Respondents (%)	Acres reported (no.)[b]	Acres reported (%)[b]
Minnesota				
Lambsquarters	47	68.1	22,265	66.1
Ragweed	37	53.6	20,662	61.4
Nightshade	16	23.2	10,902	32.4
Waterhemp	24	34.8	8,786	26.1
Redroot pigweed	18	26.1	6,795	20.2
Wild buckwheat	5	7.2	6,009	17.9
Kochia	6	8.7	3,353	10
Biennial wormwood	3	4.3	2,410	7.2
Foxtail	3	4.3	2,350	7
Wild mustard	3	4.3	2,004	6
Canada thistle	7	10.1	1,862	5.5
Cocklebur	3	4.3	1,834	5.4
None	4	5.8	1,612	4.8
Lanceleaf sage	1	1.4	1,099	3.3
Volunteer canola	2	2.9	604	1.8
Dock	1	1.4	373	1.1
Sweetclover	1	1.4	200	0.6
Volunteer grain	1	1.4	150	0.4
Smartweed	1	1.4	120	0.4
Sunflower	1	1.4	117	0.3
North Dakota				
Kochia	82	49.7	43,741	48.2
Lambsquarters	63	38.2	36,089	39.8
Redroot pigweed	53	32.1	29,353	32.4
Ragweed	41	24.8	26,412	29.1
Nightshade	42	25.5	25,254	27.9
Biennial wormwood	26	15.8	13,585	15
Canada thistle	30	18.2	13,140	14.5
Volunteer grain	21	12.7	12,879	14.2
Wild buckwheat	18	10.9	11,602	12.8
Wild mustard	25	15.2	11,493	12.7
Cocklebur	13	7.9	6,326	7
Foxtail	12	7.3	6,255	6.9
Waterhemp	13	7.9	5,525	6.1
Wild oat	11	6.7	4,459	4.9
Marestail	6	3.6	3,343	3.7
Dock	3	1.8	3,055	3.4
Black medic	3	1.8	2,370	2.6
Volunteer canola	5	3	2,263	2.5
Sunflower	1	0.6	1,250	1.4
Venice mallow	3	1.8	1,110	1.2
Lanceleaf sage	1	0.6	776	0.9
Sweetclover	1	0.6	700	0.8
None	1	0.6	630	0.7
Dandelion	1	0.6	531	0.6
Smartweed	2	1.2	450	0.5
Northarvest				
Lambsquarters	110	47	58,354	46.9
Kochia	88	37.6	47,094	37.9
Ragweed	78	33.3	47,074	37.9
Nightshade	58	24.8	36,156	29.1
Redroot pigweed	71	30.3	36,148	29.1
Wild buckwheat	23	9.8	17,611	14.2
Biennial wormwood	29	12.4	15,995	12.9
Canada thistle	37	15.8	15,002	12.1
Waterhemp	37	15.8	14,311	11.5
Wild mustard	28	12	13,497	10.9
Volunteer grain	22	9.4	13,029	10.5
Foxtail	15	6.4	8,605	6.9
Cocklebur	16	6.8	8,160	6.6
Wild oat	11	4.7	4,459	3.6
Dock	4	1.7	3,428	2.8
Marestail	6	2.6	3,343	2.7
Volunteer canola	7	3	2,867	2.3
Black medic	3	1.3	2,370	1.9
None	5	2.1	2,242	1.8
Lanceleaf sage	2	0.9	1,875	1.5
Sunflower	2	0.9	1,367	1.1
Venice mallow	3	1.3	1,110	0.9
Sweetclover	2	0.9	900	0.7
Smartweed	3	1.3	570	0.5
Dandelion	1	0.4	531	0.4

[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.

Figure 28. Northarvest weeds ranked as one of the three worst in dry beans in 2017.

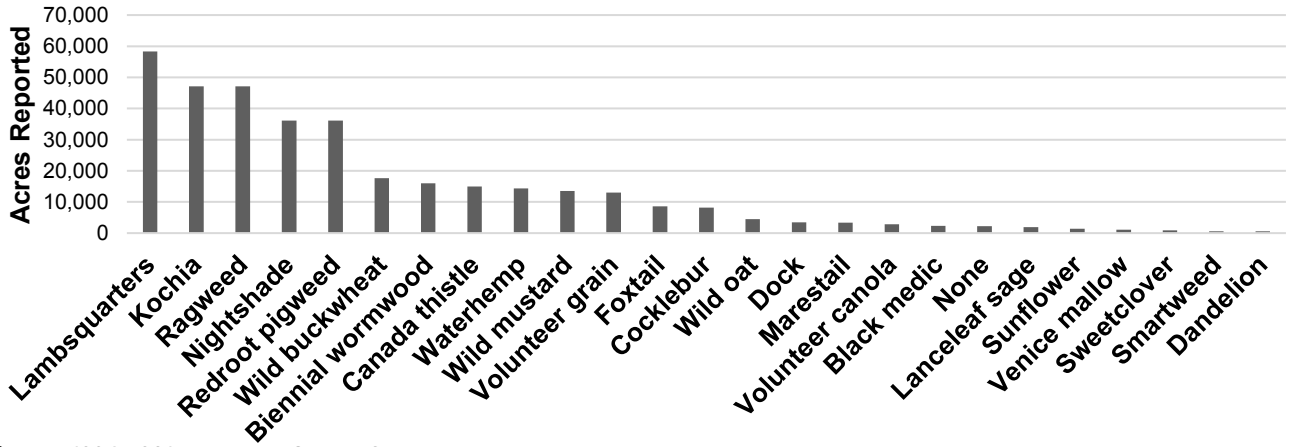

Table 42. Weed control practices used in dry beans in 2017.

Herbicide or other practice	Respondents (no.)	Respondents (%)	Acres reported (no.)[a]	Acres reported (%)[b]
Minnesota				
Raptor	50	73.5	31,706	92.9
Basagran/generics	46	67.6	30,544	89.5
Reflex	39	57.4	20,254	59.4
Select/generics	21	30.9	18,206	53.3
Prowl	18	26.5	10,679	31.3
Outlook	12	17.6	9,082	26.6
Dual	13	19.1	7,909	23.2
Sonalan	18	26.5	7,527	22.1
Permit	15	22.1	7,409	21.7
Eptam	10	14.7	6,541	19.2
Rezult	13	19.1	5,106	15
Trifluralin	3	4.4	2,900	8.5
Assure	3	4.4	2,750	8.1
Spartan Charge	2	2.9	2,367	6.9
Varisto	7	10.3	2,312	6.8
Pursuit	3	4.4	1,887	5.5
Glyphosate (postharvest)	3	4.4	1,278	3.7
Glyphosate (preplant)	5	7.4	1,065	3.1
Spartan Elite	2	2.9	1,050	3.1
Fusilade DX	2	2.9	890	2.6
BroadAxe	2	2.9	255	0.7
Poast	1	1.5	200	0.6
Cultivation	20	29.4	17,667	51.8
Rotary hoe	4	5.9	2,799	8.2
Manual labor	4	5.9	176	0.5
Herbicide Total[c]			**171,917**	
North Dakota				
Basagran/generics	108	65.1	70,479	78.9
Raptor	94	56.6	55,480	62.1
Select/generics	68	41	52,121	58.3
Reflex	78	47	44,183	49.4
Varisto	54	32.5	30,857	34.5
Spartan Charge	48	28.9	28,087	31.4
Glyphosate (preplant)	38	22.9	24,744	27.7
Sonalan	49	29.5	19,588	21.9
Glyphosate (postharvest)	20	12	14,432	16.2
Rezult	20	12	13,567	15.2
Pursuit	24	14.5	12,052	13.5
Spartan Elite	16	9.6	11,829	13.2
Prowl	22	13.3	10,393	11.6
Assure	13	7.8	8,161	9.1
Permit	9	5.4	6,328	7.1
Trifluralin	9	5.4	5,750	6.4
Eptam	6	3.6	4,947	5.5
Outlook	9	5.4	4,855	5.4
Poast	12	7.2	4,372	4.9
Dual	10	6	3,926	4.4
BroadAxe	5	3	3,347	3.7
Fusilade DX	1	0.6	710	0.8
Cultivation	35	21.1	26,506	29.7
Rotary hoe	5	3	3,633	4.1
Manual labor	4	2.4	984	1.1
Herbicide Total[c]			**430,208**	

Herbicide or other practice	Respondents (no.)	Respondents (%)	Acres reported (no.)[a]	Acres reported (%)[b]
Northarvest				
Basagran/generics	154	65.8	101,023	81.8
Raptor	144	61.5	87,186	70.6
Select/generics	89	38	70,327	57
Reflex	117	50	64,437	52.2
Varisto	61	26.1	33,169	26.9
Spartan Charge	50	21.4	30,454	24.7
Sonalan	67	28.6	27,115	22
Glyphosate (preplant)	43	18.4	25,809	20.9
Prowl	40	17.1	21,072	17.1
Rezult	33	14.1	18,673	15.1
Glyphosate (postharvest)	23	9.8	15,710	12.7
Pursuit	27	11.5	13,939	11.3
Outlook	21	9	13,937	11.3
Permit	24	10.3	13,737	11.1
Spartan Elite	18	7.7	12,879	10.4
Dual	23	9.8	11,835	9.6
Eptam	16	6.8	11,488	9.3
Assure	16	6.8	10,911	8.8
Trifluralin	12	5.1	8,650	7
Poast	13	5.6	4,572	3.7
BroadAxe	7	3	3,602	2.9
Fusilade DX	3	1.3	1,600	1.3
Cultivation	55	23.5	44,173	35.8
Rotary hoe	9	3.8	6,432	5.2
Manual labor	8	3.4	1,160	0.9
Herbicide Total[c]			**602,125**	

[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.

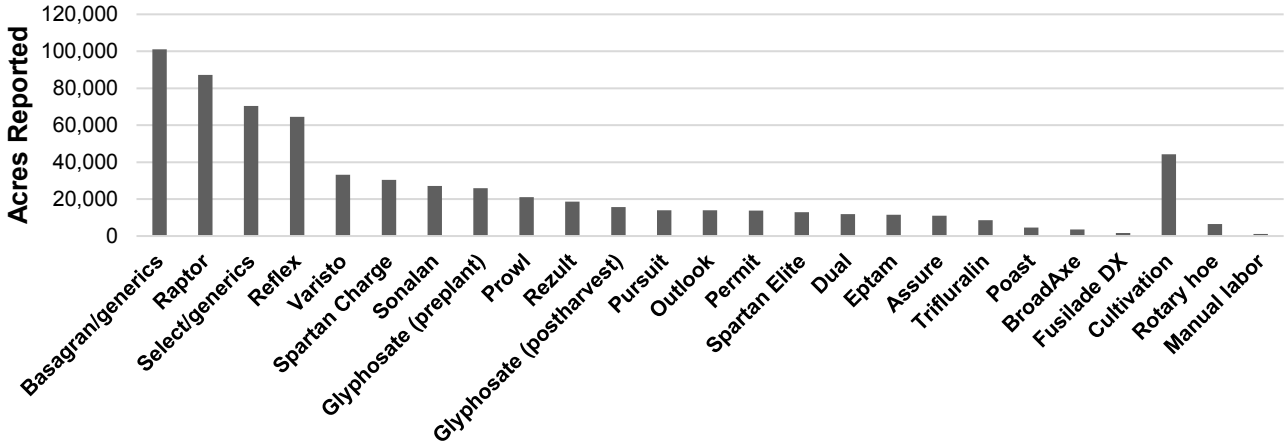

Figure 29. Northarvest weed control practices used in dry beans in 2017.

Scouting and Threshold Practices

Table 43. Scouting practices in dry beans in 2017.

	Insects		Diseases		Weeds	
Minnesota	**Respon-dents (no.)**	**Respon-dents (%)**	**Respon-dents (no.)**	**Respon-dents (%)**	**Respon-dents (no.)**	**Respon-dents (%)**
Crop consultant	30	42.3	26	37.7	28	40
Grower	26	36.6	26	37.7	32	45.7
Both	12	16.9	15	21.7	10	14.3
Don't scout	3	4.2	2	2.9	0	0
Total	**71**	**100**	**69**	**100**	**70**	**100**
North Dakota						
Crop consultant	78	47	81	48.8	76	46.1
Grower	74	44.6	76	45.8	79	47.9
Both	8	4.8	9	5.4	10	6.1
Don't scout	6	3.6	0	0	0	0
Total	**166**	**100**	**166**	**100**	**165**	**100**
Northarvest						
Crop consultant	108	45.6	107	45.5	104	44.3
Grower	100	42.2	102	43.4	111	47.2
Both	20	8.4	24	10.2	20	8.5
Don't scout	9	3.8	2	0.9	0	0
Total	**237**	**100**	**235**	**100**	**235**	**100**

Table 44. Use of economic thresholds for insects in dry beans in 2017.

	Respondents (no.)	Respondents (%)
Minnesota		
Economic thresholds used	65	94.2
Economic thresholds not used	4	5.8
Total	**69**	**100**
North Dakota		
Economic thresholds used	158	95.8
Economic thresholds not used	7	4.2
Total	**165**	**100**
Northarvest		
Economic thresholds used	223	95.3
Economic thresholds not used	11	4.7
Total	**234**	**100**

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APPENDIX I.

PLEASE COMPLETE ALL REQUESTED INFORMATION IN THE FOLLOWING TABLES FOR YOUR 2017 DRY BEAN CROP

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

Dry Bean Production in 2017	Acres
Total dry bean acres planted	
Total dry bean acres harvested	
Total irrigated dry bean acres	
Total dry bean acres on tile-drained ground	

Dry Bean Classes, Varieties and Acres Grown in 2017		
Bean Class	**Variety**	**Acres**
Black	Black Cat	
	Eclipse	
	Zorro	
	Other black (please specify)	
Great Northern	Aries	
	Matterhorn	
	Orion	
	Powderhorn	
	Taurus	
	Other GN (please specify)	
Kidney	Beluga	
	Big Red	
	Cabernet	
	California Early LRK	
	Clouseau	
	Foxfire	
	Majesty	
	Montcalm	
	Pink Panther	
	Red Hawk	
	Red Rover	
	Rosie	
	Talon	
	Other kidney (please specify)	
Navy	Blizzard	
	Ensign	
	HMS Medalist	
	Merlin	
	Norstar	
	T9905	
	Teton	
	Vigilant	
	Vista	
	Other navy (please specify)	

Dry Bean Classes, Varieties and Acres Grown in 2017		
Bean Class	**Variety**	**Acres**
Pink	Floyd	
	ISB 473	
	Rogers 922	
	Rosetta	
	Sedona	
	Other pink (please specify)	
Pinto	Buster	
	El Dorado	
	La Paz	
	Lariat	
	Maverick	
	Monterrey	
	ND 307	
	ND Palomino (SD)*	
	Radiant (SD)*	
	Santa Cruz	
	Sequoia	
	Sinaloa	
	Sonora	
	Stampede	
	Torreon	
	Vibrant (SD)*	
	Windbreaker	
	Other pinto (please specify)	
Small Red	Merlot	
	Rio Rojo	
	Ruby	
	Other red (please specify)	
Other Class	Other variety (please specify)	

***SD = Slow-darkening pinto variety. These varieties retain their white color longer than non-SD varieties.**

Do you consider the new slow-darkening (SD) pintos a good alternative for pinto bean production in the region?		
Yes	**No**	**Don't know**

If more seed of SD pintos was available, would you grow more SD pintos compared with regular darkening pintos?		
Yes	**No**	**I don't grow pintos**

Production Problems

For each production problem, please fill in acreage affected for each bean class you produced in 2017. Space is provided for up to three bean classes.			
	Bean Class:_____	Bean Class:_____	Bean Class:_____
Production Problem	**Acres Affected**	**Acres Affected**	**Acres Affected**
Herbicide drift injury *List herbicide(s)			
Applied herbicide injury *List herbicide(s)			
Delayed planting			
Disease			
Drought			
Emergence/stand			
Frost damage			
Hail damage			
Harvest			
Insects			
Micronutrient deficiency			
Soil salinity			
Water damage (beans harvested)			
Water damage (beans NOT harvested)			
Weeds			
Wind damage			
Other problem (please specify)			

Did you experience yield loss in your 2017 dry bean crop due to dicamba drift?	
Yes	**No**

If you answered 'Yes', how much yield loss occurred to your dry beans due to dicamba drift? Space is provided for up to three bean classes.	
Bean Class	**Yield Loss**

If known, what were the nearest and farthest distances from the source of dicamba drift to injury in the affected field(s)?
Nearest distance:
Farthest distance:
Unknown

If known, how long after dicamba application (at the drift source) did symptoms appear on dry beans?
Time for symptoms to appear:
Unknown

If you experienced dicamba drift on your dry beans, was there a successful resolution or settlement with the party responsible for dicamba drift?	
Yes	**No**

Will potential injury from dicamba drift prevent you from planting dry beans in 2018?	
Yes	**No**

Agronomy

Please list row spacing, planting rate and established stand for each bean class you planted in 2017.			
Bean Class	**Row Spacing (inches)**	**Planting Rate (plants per acre)**	**Established Stand (plants per acre)**

Did the size of your purchased seed affect your ability to plant your intended dry bean acreage in 2017?		
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 2017.	
Year	**List of Crops**
2016	
2015	
2014	
2013	

Please list acreage for each tillage type listed below for your dry bean fields in 2017.			
Tillage Type	**Acreage**	**Tillage Type**	**Acreage**
Conventional		Strip-till	
Minimum		No-till	

Cover Crops in Dry Beans in 2017. Please answer the questions in the table below.

Did you use a cover crop on your dry bean ground in 2017? Yes No

If you used a cover crop, what plant species did you use?

Seasonally, when did you use the crop (circle all the apply)?

Prior to planting dry beans | During dry bean production | After dry bean harvest

What was the purpose(s) of the cover crop (moisture conservation, soil conservation, weed control, etc.)

Did you use a ground roller on your dry bean ground in 2017?

Timing	Bean Class	Acres Rolled	Percent rolled acres direct combined
Preplant			
Pre-emerge			
Post-emerge			
Didn't roll			

Please indicate pounds per acre for fertilizer components in dry beans in 2017 and answer the fertility questions .

Nitrogen	Phosphate	Potash	Zinc	Sulfur

Did you inoculate with Rhizobium?	**Yes**	**No**
Did you soil test prior to fertilizer applications?	**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 2017? Please circle all that apply.

Broadcast | Banded | In-furrow | Foliar

Harvest: Please circle answer for each question.

What percentage of your dry bean crop was harvested using direct combining in 2017?

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 indirect harvest methods (knifing/undercutting, swathing, Pickett, etc.)?

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

Insecticides and Insect Pests

Foliar Insecticides Used on Dry Beans in 2017.
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
			air	ground
			air	ground

Foliar Insecticide Products

1. Acephate/Orthene
2. Asana XL
3. Baythroid XL
4. Besiege
5. Blackhawk
6. Brigade/generics
7. Coragen
8. Declare
9. Dimethoate
10. Hero
11. Lorsban/generics
12. Mustang Maxx
13. Sevin
14. Sivanto Prime
15. Tombstone
16. Transform
17. Voliam Xpress
18. Warrior/generics
19. None used
20. Other (specify)

Seed Treatment Insecticides Used on Dry Beans in 2017.
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
2. Capture LFR
3. Cruiser 5FS
4. Cruiser Maxx
5. Dyna-Shield Imidacloprid 5
6. Enhance AW
7. Gaucho 600
8. Lorsban
9. Don't know
10. None used
11. Other (specify)

Worst Insect/Mite Problem in Dry Beans in 2017. Please rank 1-3, with 1 = worst. Please rank ONLY the top three.

Insect/Mite	Rank	Insect/Mite	Rank
Aphids		Leafhoppers	
Armyworms		Seed corn maggot	
Bean leaf beetle		Spider mites	
Cutworms		Wireworms	
Foliage caterpillars		None	
Grasshoppers			

Field Scouting in Dry Beans in 2017. For each question, please circle the best answer that applies to your operation.

How do you scout for insects?

I do it | Crop consultant | Don't scout

How do you scout for diseases?

I do it | Crop consultant | Don't scout

How do you scout for weeds?

I do it | Crop consultant | Don't scout

Do you follow recommended economic thresholds when making insect control decisions?

Yes No

Fungicides and Disease Problems

Foliar Fungicides Used on Dry Beans in 2017.
If you did not use a foliar 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 for each application)	
			air	ground
			air	ground
			air	ground

Foliar Fungicide Products

1. Aproach	12. Microthiol	23. Satori
2. Aprovia Top	13. Omega	24. Serenade
3. Bravo	14. Onset	25. Switch
4. Cannonball	15. Orius	26. T-methyl
5. Champ	16. Priaxor	27. Tebuzol
6. Echo	17. Proline	28. Topsin
7. Endura	18. ProPulse	29. Vertisan
8. Equation	19. Quadris	30. None used
9. Headline	20. Quadris Opti	31. Other (specify)
10. Incognito	21. Quilt	
11. Kocide	22. Rovral	

Seed Treatment Fungicides Used on Dry Beans in 2017.
If you did not use a seed treatment fungicide, please write "0" for acres treated.

Seed Treatment Fungicide (write in name or number from the list below)	Acres Treated

Seed Treatment Fungicide Products

1. Allegiance	10. Maxim	19. Vibrance
2. Apron Maxx	11. Mertect	20. Vibrance Maxx
3. Apron XL	12. Obvious	21. Vitaflo
4. Captan	13. Prevail	22. Vitavax
5. Chloroneb	14. Rancona	23. None used
6. Cruiser Maxx	15. Rancona Summit	24. Other (specify)
7. Cruiser Maxx Vibrance	16. Rizolex	
8. Dynasty	17. Stamina	
9. EverGol Energy	18. Thiram	

In-furrow Fungicide Applications Made on Dry Beans in 2017. 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 Product list.	Acres Treated

Worst Disease Problem in Dry Beans in 2017. Please rank 1-3, with 1 = worst. Please rank ONLY the top three.

Disease	Rank	Disease	Rank
Anthracnose		Other viruses (general)	
Bacterial brown spot		Root rot	
Bacterial wilt		Rust	
Bean common mosaic virus		White mold	
Common bacterial blight		None	
Halo blight			

Herbicides and Weed Problems

Weed Control Practices Used on Dry Beans in 2017. Count double herbicide applications, double cultivation, etc., as double acres.

Weed Control Used (write in name or number from the list below)	Bean Class	Acres Treated

Weed Control Products and Practices

1. Assure	10. Permit	19. Spartan/Charge
2. Basagran/gen.	11. Poast	20. Spartan Elite
3. BroadAxe	12. Prowl	21. Trifluralin
4. Dual/generics	13. Pursuit	22. Varisto
5. Eptam	14. Raptor	23. Cultivation
6. Fusiliade DX	15. Reflex	24. Rotary hoe
7. Glyphosate (preplant)	16. Rezult	25. Manual labor
8. Glyphosate (postharvest)	17. Select/gen.	26. None
9. Outlook	18. Sonalan	27. Other (specify)

Worst Weed Problem in Dry Beans in 2017. Please rank 1-3, with 1 = worst. Please rank ONLY the top three.

Weed	Rank	Weed	Rank
Biennial wormwood		Smartweed	
Black medic		Sunflower	
Canada thistle		Venice mallow	
Cocklebur		Volunteer canola	
Foxtail		Volunteer grain	
Kochia		Waterhemp	
Lambsquarters		Wild buckwheat	
Lanceleaf sage		Wild mustard	
Nightshade		Wild oat	
Ragweed		None	
Redroot pigweed		Other (specify)	

Desiccants Used on Dry Beans in 2017. Count double applications as double acres.

Desiccants Used (Write in name or number from the list below. If tank mixed, please write products on the same line). EXAMPLE: 1+3 or Glyphosate+Sharpen	Bean Class	Acres Treated

Desiccant Products

1. Glyphosate	3. Sharpen	5. Valor
2. Paraquat	4. Sodium chlorate (Leafex, Defol)	

Thank you for completing the 2017 Dry Bean Grower Survey!

Cover photos (top to bottom)

J. Orsorno (NDSU)
bean pods

S.G. Markell (NDSU)
dry bean white mold

J. Gavloski (Manitoba Agriculture)
cutworms dingy cutworm larvae

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

1M-2-08; 600-12-08; 600-6-09; 400-4-10; 400-2-11; 300-2-12; 400-2-13; 300-3-14; 400-3-15; 400-3-16; 400-3-17; 400-4-18