E-1640

2012 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 2012 dry bean grower survey is the 23rd annual assessment 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 2004-2011 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.

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.

Production

Table 1. Number of Northarvest dry bean growers responding, acres planted by respondents and total state acres in 2012.

Growers	No. of respondents	Respondents' acres	Total acres[a]	Acres surveyed (% of total)
Minnesota	54	25,226	160,000	15.8
North Dakota	97	62,447	700,000	8.9
Northarvest	151	49,165	860,000	10.2

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

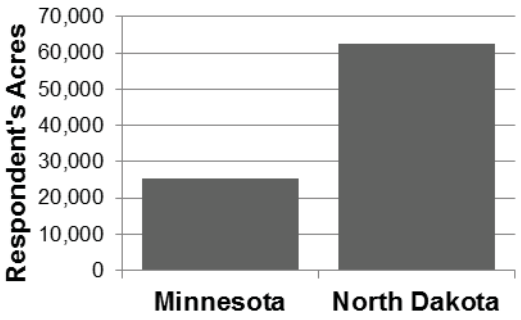


Figure 1. Northarvest dry bean acres planted by state in 2012.

Table 2. Dry bean production by county in 2012.

Minnesota	No. of respon-dents[a]	Acres[b]	North Dakota	No. of respon-dents[a]	Acres[b]
Polk	12	6,922	Grand Forks	16	10,731
Hubbard	2	2,547	Wells	12	7,317
Otter Tail	5	2,308	Walsh	22	7,082
Grant	2	1,480	Pembina	14	6,904
Norman	1	1,300	McLean	4	4,320
Renville	7	1,219	Benson	4	3,985
Swift	5	1,121	Nelson	2	3,720
Stearns	1	960	Traill	5	3,215
Marshall	3	914	Ramsey	3	2,900
Kandiyohi	4	805	Steele	6	2,254
Wadena	3	758	Cavalier	6	1,772
Traverse	2	730	Cass	4	1,710
Pope	1	650	Ransom	2	1,280
Morrison	1	500	Barnes	2	1,260
Mahnomen	1	400	Richland	3	1,107
Crow Wing	1	378	Pierce	2	940
Stevens	1	345	Stutsman	2	610
Beltrami	1	299	Oliver	1	450
Becker	1	290	Towner	1	400
McLeod	2	255	Eddy	2	260
Sibley	2	210	Burleigh	2	230
Todd	1	210	**Total**		**62,447**
Douglas	1	200			
Red Lake	1	149			
Clay	1	125			
Sherburne	1	115			
Yellow Medicine	1	36			
Total		**25,226**			

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

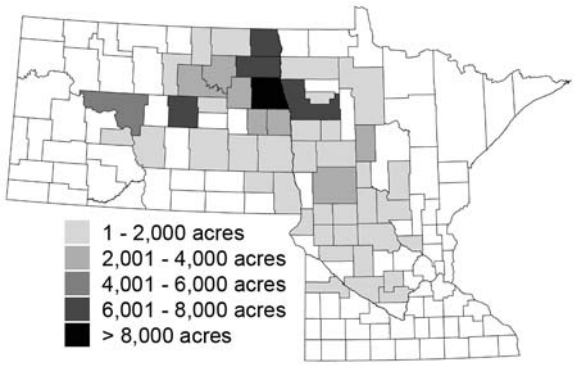


Figure 2. Northarvest dry bean production by county in 2012.

Table 3. Dry bean acres harvested, irrigated, on tile-drained ground, and damaged by hail, frost and water in 2012.

	Acres reported (no.)[a]	Acres reported (%)[a]
Minnesota		
Harvested	24,886	98.7
Irrigated	8,321	33
Tile-drained	5,912	23.4
Water-damaged	861	3.4
Hail-damaged	643	2.5
Frost-damaged	598	2.4
North Dakota		
Harvested	60,146	96.3
Hail-damaged	2,410	3.9
Tile-drained	2,325	3.7
Irrigated	1,111	1.8
Water-damaged	826	1.3
Frost-damaged	326	0.5
Northarvest		
Harvested	85,032	97
Irrigated	9,432	10.8
Tile-drained	8,237	9.4
Hail-damaged	3,053	3.5
Water-damaged	1,687	1.9
Frost-damaged	924	1.1

[a]Respondents' acres only.

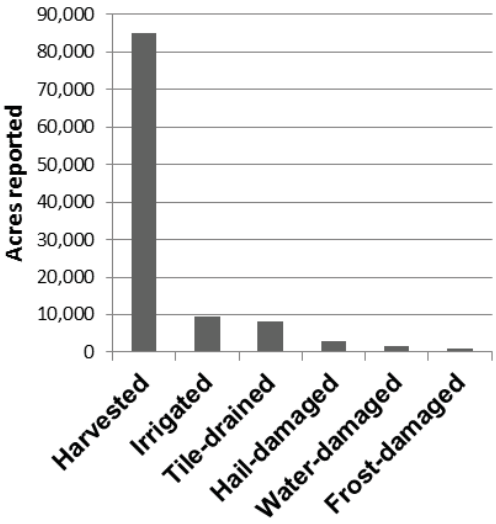


Figure 3. Northarvest respondents' reported acres from Table 3.

Table 4. Dry bean market classes grown in 2012.

Market class	Acres reported (no.)[a]	Acres reported (%)[a]
Minnesota		
Kidney	12,360	49
Navy	7,094	28.1
Pink	2,648	10.5
Pinto	1,614	6.4
Black	1,260	5
Red	250	1
Total	**25,226**	**100**
North Dakota		
Pinto	41,544	66.5
Navy	10,769	17.2
Black	7,398	11.8
Great Northern	1,116	1.8
Pink	1,100	1.8
Red	360	0.6
Otebo	160	0.3
Total	**62,447**	**100**
Northarvest		
Pinto	43,158	49.2
Navy	17,863	20.4
Kidney	12,360	14.1
Black	8,658	9.9
Pink	3,748	4.3
Great Northern	1,116	1.3
Red	610	0.7
Otebo	160	0.2
Total	**87,673**	**100**

[a]Respondents' acres only.

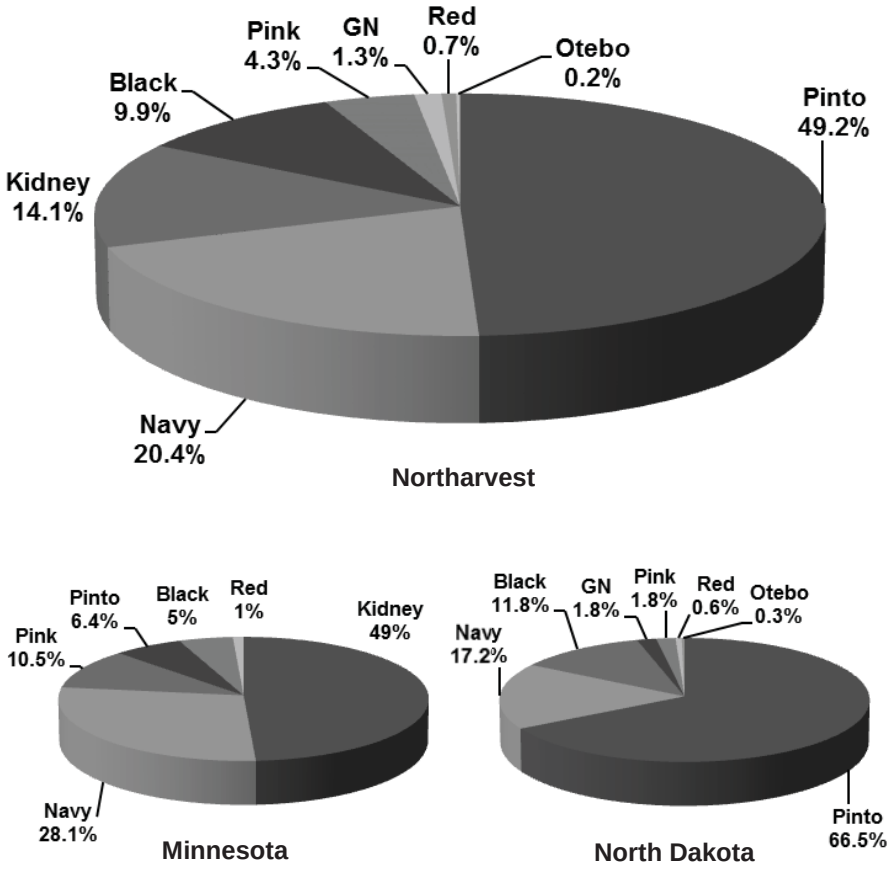
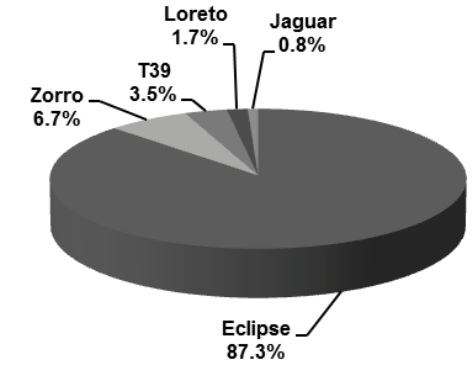


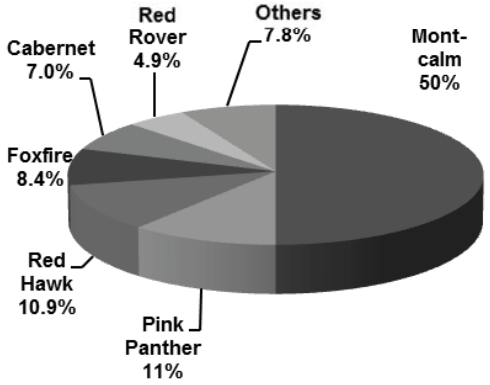
Figure 4. Northarvest dry bean market classes grown in 2012.

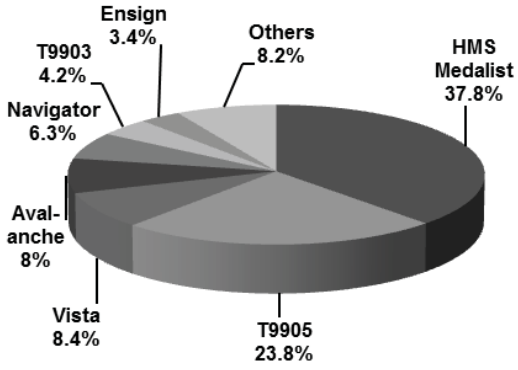
Table 5. Dry bean varieties grown in 2012.

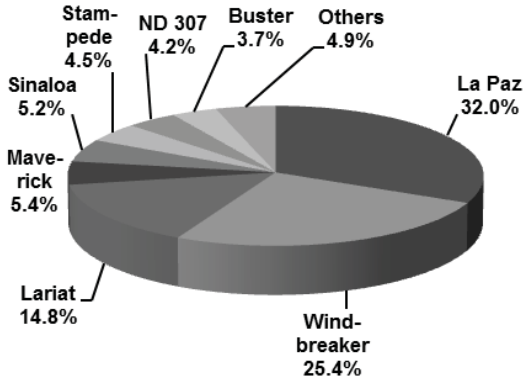
		Acres planted[a]					
Variety	Class	Minnesota	%[b]	North Dakota	%[b]	Northarvest	%[b]
Eclipse	Black	1,107	4.4	6,453	10.3	7,560	8.6
Zorro	Black	80	0.3	500	0.8	580	0.7
T39	Black	0	0	300	0.5	300	0.3
Loreto	Black	0	0	145	0.2	145	0.2
Jaguar	Black	73	0.3	6,453	10.3	73	0.1
Total Black	**Black**	**1,260**	**5**	**7,398**	**11.8**	**8,658**	**9.9**
Orion	GN	0	0	636	1	636	0.7
Not specified	GN	0	0	480	0.8	480	0.5
Total Great Northern	**GN**	**0**	**0**	**1,116**	**1.8**	**1,116**	**1.3**
Montcalm	Kidney	6,181	24.5	0	0	6,181	7.1
Pink Panther	Kidney	1,354	5.4	0	0	1,354	1.5
Red Hawk	Kidney	1,345	5.3	0	0	1,345	1.5
Foxfire	Kidney	1,044	4.1	0	0	1,044	1.2
Cabernet	Kidney	861	3.4	0	0	861	1
Red Rover	Kidney	610	2.4	0	0	610	0.7
Cal Early LRK	Kidney	460	1.8	0	0	460	0.5
Beluga	Kidney	405	1.6	0	0	405	0.5
Clouseau	Kidney	100	0.4	0	0	100	0.1
Total Kidney	**Kidney**	**12,360**	**49**	**0**	**0**	**12,360**	**14.1**
HMS Medalist	Navy	1,736	6.9	5,020	8	6,756	7.7
T9905	Navy	3,630	14.4	615	1	4,245	4.8
Vista	Navy	1,097	4.3	400	0.6	1,497	1.7
Avalanche	Navy	80	0.3	1,349	2.2	1,429	1.6
Navigator	Navy	0	0	1,121	1.8	1,121	1.3
T9903	Navy	0	0	750	1.2	750	0.9
Ensign	Navy	100	0.4	500	0.8	600	0.7
Indi	Navy	0	0	474	0.8	474	0.5
Not specified	Navy	300	1.2	114	0.2	414	0.5
Norstar	Navy	10	0	401	0.6	411	0.5
COOP 02084	Navy	141	0.6	0	0	141	0.2
Merlin	Navy	0	0	25	0	25	0
Total Navy	**Navy**	**7,094**	**28.1**	**10,769**	**17.2**	**17,863**	**20.4**
Not specified	Otebo	0	0	160	0.3	160	0.2
Total Otebo	**Otebo**	**0**	**0**	**160**	**0.3**	**160**	**0.2**
Sedona	Pink	1,660	6.6	300	0.5	1,960	2.2
Floyd	Pink	289	1.1	450	0.7	739	0.8
ROG 922	Pink	400	1.6	0	0	400	0.5
Not specified	Pink	0	0	350	0.6	350	0.4
ISB 473	Pink	299	1.2	0	0	299	0.3
Total Pink	**Pink**	**2,648**	**10.5**	**1,100**	**1.8**	**3,748**	**4.3**
La Paz	Pinto	233	0.9	13,598	21.8	13,831	15.8
Windbreaker	Pinto	441	1.7	10,513	16.8	10,954	12.5
Lariat	Pinto	240	1	6,130	9.8	6,370	7.3
Maverick	Pinto	400	1.6	1,911	3.1	2,311	2.6
Sinaloa	Pinto	0	0	2,260	3.6	2,260	2.6
Stampede	Pinto	0	0	1,923	3.1	1,923	2.2
ND 307	Pinto	0	0	1,800	2.9	1,800	2.1
Buster	Pinto	300	1.2	1,300	2.1	1,600	1.8
Sonora	Pinto	0	0	575	0.9	575	0.7
Topaz	Pinto	0	0	318	0.5	318	0.4
ProVita 06185	Pinto	0	0	285	0.5	285	0.3
Medicine Hat	Pinto	0	0	200	0.3	200	0.2
GTS 904	Pinto	0	0	190	0.3	190	0.2
Othello	Pinto	0	0	150	0.2	150	0.2
Pintoba	Pinto	0	0	125	0.2	125	0.1
Mariah	Pinto	0	0	116	0.2	116	0.1
Not specified	Pinto	0	0	80	0.1	80	0.1
Sequoia	Pinto	0	0	70	0.1	70	0.1
Total Pinto	**Pinto**	**1,614**	**6.4**	**41,544**	**66.5**	**43,158**	**49.2**
Merlot	Red	250	1	225	0.4	475	0.5
Ryder	Red	0	0	135	0.2	135	0.2
Total Red		250	1	360	0.6	610	0.7
Grand Total	**All Classes**	**25,226**	**100**	**62,447**	**100**	**87,673**	**100**

[a]Respondents' acres only.
[b]Percent of respondents' total dry bean acreage.









Figures 5-8 (from top to bottom): major Black, Kidney, Navy and Pinto varieties grown by Northarvest survey respondents (% acreage for class).

Table 6. Worst dry bean production problem reported in 2012.

Worst production problem	Respondents (no.)	Respondents (%)	Acres reported (no.)[a]	Acres reported (%)[a]
Minnesota				
Drought	5	9.3	4,211	16.7
Weeds	14	25.9	3,428	13.6
None	7	13	2,800	11.1
Disease	5	9.3	1,324	5.2
Harvest	7	13	1,210	4.8
Insects	2	3.7	870	3.4
Excess water	8	14.8	500	2
Applied herbicide injury	2	3.7	488	1.9
Hail	1	1.9	250	1
Emergence/stand	3	5.6	200	0.8
Total	**54**	**100**	**15,281**	**60.6**
North Dakota				
Weeds	23	23.7	12,851	20.6
None	18	18.6	10,584	16.9
Drought	13	13.4	6,364	10.2
Disease	14	14.4	4,478	7.2
Insects	5	5.2	2,630	4.2
Emergence/stand	6	6.2	1,109	1.8
Harvest	5	5.2	1,099	1.8
Applied herbicide injury	2	2.1	800	1.3
Excess water	7	7.2	411	0.7
Salinity	1	1	250	0.4
Wind	2	2.1	160	0.3
Hail	1	1	93	0.1
Total	**97**	**100**	**40,829**	**65.4**
Northarvest				
Weeds	37	24.5	16,279	18.6
None	25	16.6	13,384	15.3
Drought	18	11.9	10,575	12.1
Disease	19	12.6	5,802	6.6
Insects	7	4.6	3,500	4
Harvest	12	7.9	2,309	2.6
Emergence/stand	9	6	1,309	1.5
Applied herbicide injury	4	2.6	1,288	1.5
Excess water	15	9.9	911	1
Hail	2	1.3	343	0.4
Salinity	1	0.7	250	0.3
Wind	2	1.3	160	0.2
Total	**151**	**100**	**56,110**	**64**

[a]Respondents' acres only.

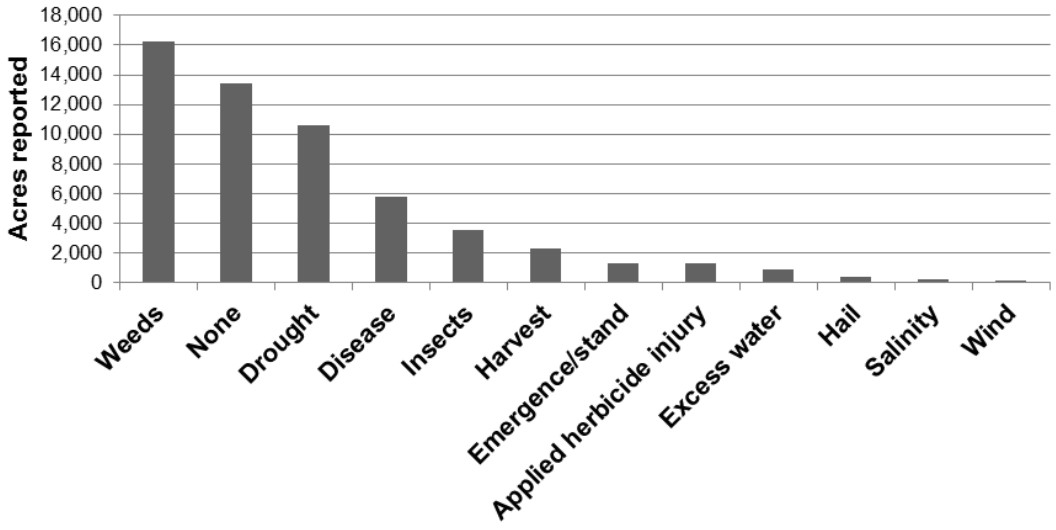


Figure 9. Northarvest respondents' reported acres for worst dry bean production problem in 2012.

Table 7. Row spacing by dry bean market class in 2012.

	Black		Great Northern		Kidney		Navy		Otebo		Pink		Pinto		Red	
Row spacing	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Minnesota																
< 11 inches	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 to 15 inches	1	14.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 to 20 inches	0	0	0	0	0	0	2	8.3	0	0	0	0	0	0	0	0
21 to 25 inches	5	71.4	0	0	6	28.6	17	70.8	0	0	4	44.4	2	40	1	100
26 to 30 inches	1	14.3	0	0	15	71.4	4	16.7	0	0	5	55.6	3	60	0	0
> 30 inches	0	0	0	0	0	0	1	4.2	0	0	0	0	0	0	0	0
Total	**7**	**100**	**0**	**0**	**21**	**100**	**24**	**100**	**0**	**0**	**9**	**100**	**5**	**100**	**1**	**100**
North Dakota																
< 11 inches	1	4.8	0	0	0	0	1	3.8	0	0	0	0	2	2.8	0	0
11 to 15 inches	4	19	0	0	0	0	1	3.8	1	100	0	0	18	25	0	0
16 to 20 inches	1	4.8	0	0	0	0	1	3.8	0	0	0	0	2	2.8	0	0
21 to 25 inches	6	28.6	0	0	0	0	14	53.8	0	0	5	100	18	25	1	50
26 to 30 inches	9	42.9	2	100	0	0	9	34.6	0	0	0	0	30	41.7	1	50
> 30 inches	0	0	0	0	0	0	0	0	0	0	0	0	2	2.8	0	0
Total	**21**	**100**	**2**	**100**	**0**	**0**	**26**	**100**	**1**	**100**	**5**	**100**	**72**	**100**	**2**	**100**
Northarvest																
< 11 inches	1	3.6	0	0	0	0	1	2	0	0	0	0	2	2.6	0	0
11 to 15 inches	5	17.9	0	0	0	0	1	2	1	100	0	0	18	23.4	0	0
16 to 20 inches	1	3.6	0	0	0	0	3	6	0	0	0	0	2	2.6	0	0
21 to 25 inches	11	39.3	0	0	6	28.6	31	62	0	0	9	64.3	20	26	2	66.7
26 to 30 inches	10	35.7	2	100	15	71.4	13	26	0	0	5	35.7	33	42.9	1	33.3
> 30 inches	0	0	0	0	0	0	1	2	0	0	0	0	2	2.6	0	0
Total	**28**	**100**	**2**	**100**	**21**	**100**	**50**	**100**	**1**	**100**	**14**	**100**	**77**	**100**	**3**	**100**

Table 8. Seeding rate by dry bean market class in 2012.

	Black		Great Northern		Kidney		Navy		Otebo		Pink		Pinto		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	7	33.3	0	0	0	0	3	33.3	3	60	0	0
80 to 89,000	0	0	0	0	12	57.1	1	4.2	0	0	6	66.7	2	40	1	100
90 to 99,000	0	0	0	0	2	9.5	1	4.2	0	0	0	0	0	0	0	0
100 to 109,000	2	33.3	0	0	0	0	4	16.7	0	0	0	0	0	0	0	0
110 to 119,000	2	33.3	0	0	0	0	5	20.8	0	0	0	0	0	0	0	0
120 to 129,000	2	33.3	0	0	0	0	10	41.7	0	0	0	0	0	0	0	0
> 129,000	0	0	0	0	0	0	3	12.5	0	0	0	0	0	0	0	0
Total	**6**	**100**	**0**	**0**	**21**	**100**	**24**	**100**	**0**	**0**	**9**	**100**	**5**	**100**	**1**	**100**
North Dakota																
< 70,000	0	0	0	0	0	0	0	0	0	0	1	20	10	14.1	0	0
70 to 79,000	0	0	2	100	0	0	0	0	0	0	2	40	41	57.7	1	50
80 to 89,000	0	0	0	0	0	0	0	0	0	0	0	0	16	22.5	0	0
90 to 99,000	7	33.3	0	0	0	0	8	32	1	100	2	40	2	2.8	0	0
100 to 109,000	3	14.3	0	0	0	0	3	12	0	0	0	0	1	1.4	0	0
110 to 119,000	10	47.6	0	0	0	0	9	36	0	0	0	0	0	0	1	50
120 to 129,000	0	0	0	0	0	0	2	8	0	0	0	0	0	0	0	0
> 129,000	1	4.8	0	0	0	0	3	12	0	0	0	0	1	1.4	0	0
Total	**21**	**100**	**2**	**100**	**0**	**0**	**25**	**100**	**1**	**100**	**5**	**100**	**71**	**100**	**2**	**100**
Northarvest																
< 70,000	0	0	0	0	0	0	0	0	0	0	1	7.1	10	13.2	0	0
70 to 79,000	0	0	2	100	7	33.3	0	0	0	0	5	35.7	44	57.9	1	33.3
80 to 89,000	0	0	0	0	12	57.1	1	2	0	0	6	42.9	18	23.7	1	33.3
90 to 99,000	7	25.9	0	0	2	9.5	9	18.4	1	100	2	14.3	2	2.6	0	0
100 to 109,000	5	18.5	0	0	0	0	7	14.3	0	0	0	0	1	1.3	0	0
110 to 119,000	12	44.4	0	0	0	0	14	28.6	0	0	0	0	0	0	1	33.3
120 to 129,000	2	7.4	0	0	0	0	12	24.5	0	0	0	0	0	0	0	0
> 129,000	1	3.7	0	0	0	0	6	12.2	0	0	0	0	1	1.3	0	0
Total	**27**	**100**	**2**	**100**	**21**	**100**	**49**	**100**	**1**	**100**	**14**	**100**	**76**	**100**	**3**	**100**

[a]Live seeds per acre.

Table 9. Percent of total dry bean acres harvested by direct combining in 2012.

Percent direct combined	Respondents (no.)	Respondents (%)
Minnesota		
0%	24	46.2
1-25%	3	5.8
26-50%	1	1.9
51-75%	1	1.9
76-100%	23	44.2
Total	**52**	**100**
North Dakota		
0%	17	20.7
1-25%	9	11
26-50%	4	4.9
51-75%	3	3.7
76-100%	49	59.8
Total	**82**	**100**
Northarvest		
0%	41	30.6
1-25%	12	9
26-50%	5	3.7
51-75%	4	3
76-100%	72	53.7
Total	**134**	**100**

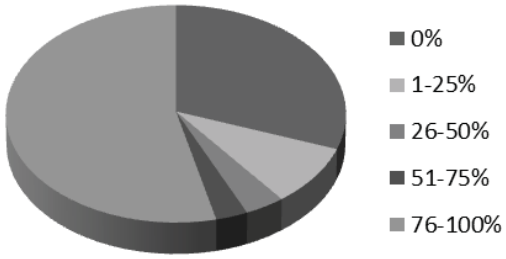


Figure 10. Northarvest percent acres harvested by direct combining in 2012.

Table 10. Estimated yield loss in direct-harvested dry bean in 2012.

Estimated yield loss	Respondents (no.)	Respondents (%)
Minnesota		
1-5%	13	26
6-10%	13	26
11-15%	2	4
16-20%	0	0
Did not use direct harvest	22	44
Total	**50**	**100**
North Dakota		
1-5%	26	32.1
6-10%	25	30.9
11-15%	6	7.4
16-20%	8	9.9
Did not use direct harvest	16	19.8
Total	**81**	**100**
Northarvest		
1-5%	39	29.8
6-10%	38	29
11-15%	8	6.1
16-20%	8	6.1
Did not use direct harvest	38	29
Total	**131**	**100**

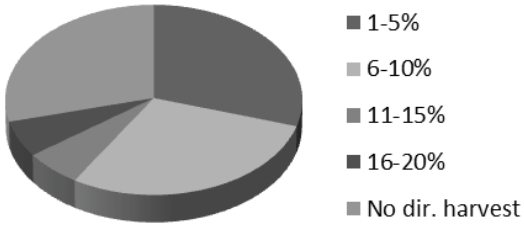


Figure 11. Northarvest estimated yield loss in direct-harvested dry bean in 2012.

Table 11. Estimated yield loss in conventionally harvested dry bean in 2012.

Estimated yield loss	Respondents (no.)	Respondents (%)
Minnesota		
0%	3	6
1-5%	26	52
6-10%	4	8
11-15%	0	0
No conv. harvest	17	34
Total	**50**	**100**
North Dakota		
0%	2	2.5
1-5%	38	46.9
6-10%	5	6.2
11-15%	3	3.7
No conv. harvest	33	40.7
Total	**81**	**100**
Northarvest		
0%	5	3.8
1-5%	64	48.9
6-10%	9	6.9
11-15%	3	2.3
No conv. harvest	50	38.2
Total	**131**	**100**

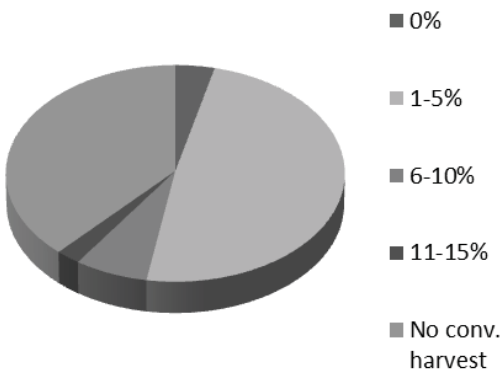


Figure 12. Northarvest estimated yield loss in conventionally harvested dry bean in 2012.

Table 12. Type II dry bean row spacing by dry bean market class in 2012.

	Black		Navy		Pinto	
Row spacing	Respondents (no.)	Respondents (%)	Respondents (no.)	Respondents (%)	Respondents (no.)	Respondents (%)
Minnesota						
< 11 inches	0	0	0	0	0	0
11 to 15 inches	1	14.3	0	0	0	0
16 to 20 inches	0	0	2	8.3	0	0
21 to 25 inches	5	71.4	17	70.8	2	40
26 to 30 inches	1	14.3	4	16.7	3	60
> 30 inches	0	0	1	4.2	0	0
Total	**7**	**100**	**24**	**100**	**5**	**100**
North Dakota						
< 11 inches	1	4.8	1	3.8	2	2.8
11 to 15 inches	4	19	1	3.8	18	25
16 to 20 inches	1	4.8	1	3.8	2	2.8
21 to 25 inches	6	28.6	14	53.8	18	25
26 to 30 inches	9	42.9	9	34.6	30	41.7
> 30 inches	0	0	0	0	2	2.8
Total	**21**	**100**	**26**	**100**	**72**	**100**
Northarvest						
< 11 inches	1	3.6	1	2	2	2.6
11 to 15 inches	5	17.9	1	2	18	23.4
16 to 20 inches	1	3.6	3	6	2	2.6
21 to 25 inches	11	39.3	31	62	20	26
26 to 30 inches	10	35.7	13	26	33	42.9
> 30 inches	0	0	1	2	2	2.6
Total	**28**	**100**	**50**	**100**	**77**	**100**

Table 13. Type II dry bean seeding rate by dry bean market class in 2012.

	Black		Navy		Pinto	
Seeding rate[a]	Respondents (no.)	Respondents (%)	Respondents (no.)	Respondents (%)	Respondents (no.)	Respondents (%)
Minnesota						
< 70,000	0	0	0	0	0	0
70 to 79,000	0	0	0	0	3	60
80 to 89,000	0	0	1	4.2	2	40
90 to 99,000	0	0	1	4.2	0	0
100 to 109,000	2	33.3	4	16.7	0	0
110 to 119,000	2	33.3	5	20.8	0	0
120 to 129,000	2	33.3	10	41.7	0	0
> 129,000	0	0	3	12.5	0	0
Total	**6**	**100**	**24**	**100**	**5**	**100**
North Dakota						
< 70,000	0	0	0	0	10	14.1
70 to 79,000	0	0	0	0	41	57.7
80 to 89,000	0	0	0	0	16	22.5
90 to 99,000	7	33.3	8	32	2	2.8
100 to 109,000	3	14.3	3	12	1	1.4
110 to 119,000	10	47.6	9	36	0	0
120 to 129,000	0	0	2	8	0	0
> 129,000	1	4.8	3	12	1	1.4
Total	**21**	**100**	**25**	**100**	**71**	**100**
Northarvest						
< 70,000	0	0	0	0	10	13.2
70 to 79,000	0	0	0	0	44	57.9
80 to 89,000	0	0	1	2	18	23.7
90 to 99,000	7	25.9	9	18.4	2	2.6
100 to 109,000	5	18.5	7	14.3	1	1.3
110 to 119,000	12	44.4	14	28.6	0	0
120 to 129,000	2	7.4	12	24.5	0	0
> 129,000	1	3.7	6	12.2	1	1.3
Total	**27**	**100**	**49**	**100**	**76**	**100**

[a]Live seeds per acre.

Table 14. Dry bean field tillage practices in 2012.

Tillage practice	Acres reported (no.)[a]	Acres reported (%)[a]
Minnesota		
Conventional	25,026	99.2
Strip or minimum tillage	200	0.8
No-till	0	0
Total	**25,226**	**100**
North Dakota		
Conventional	52,168	84.8
Strip or minimum tillage	4,323	7
No-till	5,035	8.2
Total	**61,526**	**100**
Northarvest		
Conventional	77,194	89
Strip or minimum tillage	4,523	5.2
No-till	5,035	5.8
Total	**86,752**	**100**

[a]Respondents' acres only.

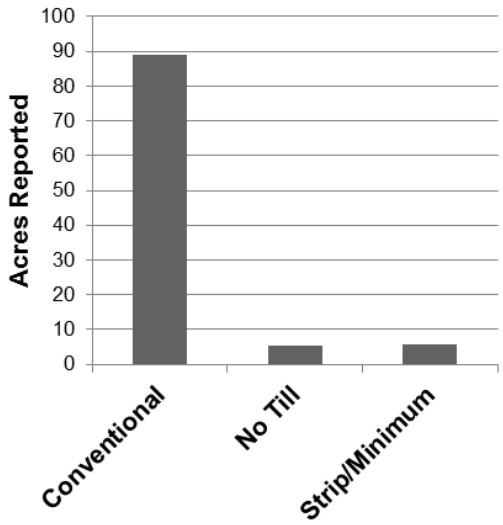


Figure 13. Northarvest dry bean field tillage practices in 2012.

Table 15. Use of fertilizers on dry bean fields in 2012.

Fertilizer	Respondents (no.)	Respondents (%)
Minnesota		
Nitrogen	49	100
Phosphorus	42	85.7
Potash	37	75.5
Zinc	33	67.3
Sulfur	15	30.6
North Dakota		
Nitrogen	78	88.6
Phosphorus	80	90.9
Zinc	28	31.8
Potash	61	69.3
Sulfur	8	9.1
Northarvest		
Nitrogen	127	92.7
Phosphorus	122	89.1
Zinc	65	47.4
Potash	94	68.6
Sulfur	23	16.8

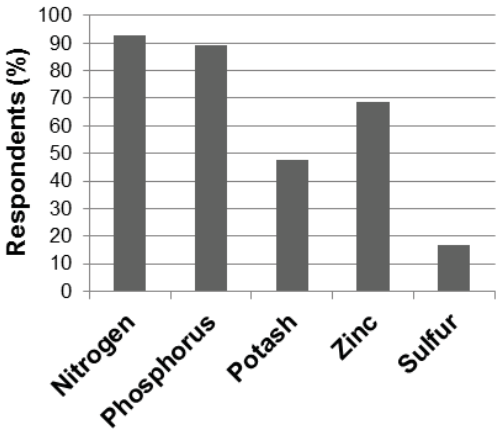


Figure 14. Northarvest use of fertilizers on dry bean fields in 2012.

Table 16. Use of soil test prior to fertilization of dry bean fields in 2012.

Soil test	Respondents (no.)	Respondents (%)
Minnesota		
Soil test used	38	77.6
Soil test not used	11	22.4
Total	**49**	**100**
North Dakota		
Soil test used	72	80
Soil test not used	18	20
Total	**90**	**100**
Northarvest		
Soil test used	110	79.1
Soil test not used	29	20.9
Total	**139**	**100**

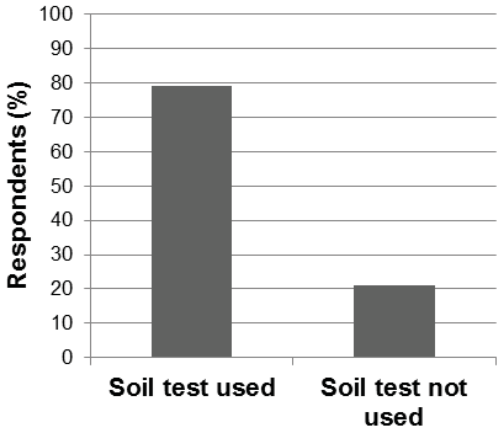


Figure 15. Northarvest use of soil test in 2012.

Table 17. Use of *Rhizobium* inoculants on dry bean fields in 2012.

Rhizobium use	Respondents (no.)	Respondents (%)
Minnesota		
Inoculant used	6	12.5
Inoculant not used	42	87.5
Total	**48**	**100**
North Dakota		
Inoculant used	10	12
Inoculant not used	73	88
Total	**83**	**100**
Northarvest		
Inoculant used	16	12.2
Inoculant not used	115	87.8
Total	**131**	**100**

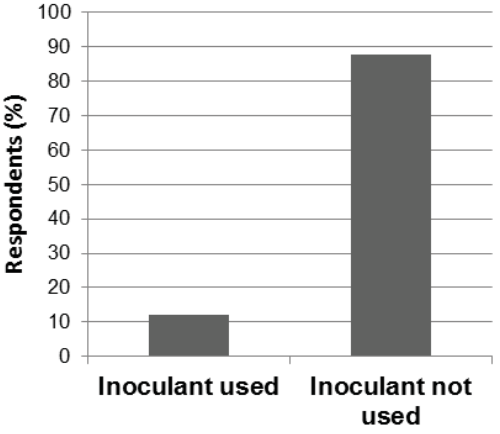


Figure 16. Northarvest use of inoculant in 2012.

Table 18. Use of site-specific nutrient management on dry bean fields in 2012.

Soil test	Respondents (no.)	Respondents (%)
Minnesota		
Site-specific nutrient management used	9	18.4
Site-specific nutrient management not used	40	81.6
Total	**49**	**100**
North Dakota		
Site-specific nutrient management used	16	18.4
Site-specific nutrient management not used	71	81.6
Total	**87**	**100**
Northarvest		
Site-specific nutrient management used	25	18.4
Site-specific nutrient management not used	111	81.6
Total	**136**	**100**

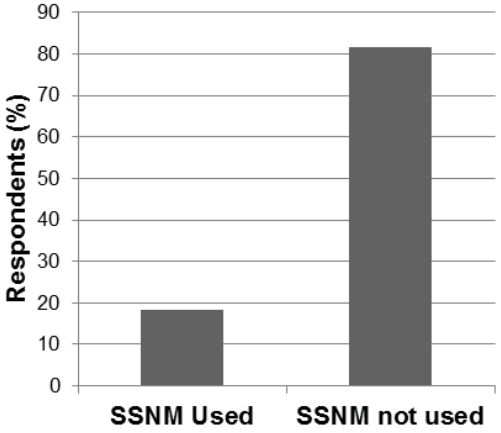


Figure 17. Northarvest use of site-specific nutrient management in 2012.

Table 19. Dessicants used on dry bean in 2012.

Dessicant	Respon-dents (no.)	Respon-dents (%)	Acres reported (no.)[a]	Acres reported (%)[a]
Minnesota				
Valor	21	42.9	6,942	31
Did not dessicate	10	20.4	4,837	21.6
Glyphosate	7	14.3	1,245	5.6
Sodium chlorate	5	10.2	1,080	4.8
Paraquat	3	6.1	525	2.3
Sharpen	2	4.1	217	1
Aim	1	2	38	0.2
North Dakota				
Glyphosate	28	29.5	16,195	26.5
Did not dessicate	25	26.3	9,154	15
Valor	17	17.9	6,222	10.2
Sharpen	10	10.5	3,744	6.1
Paraquat	14	14.7	3,735	6.1
Sodium chlorate	5	5.3	3,257	5.3
Aim	1	1.1	100	0.2
Northarvest				
Glyphosate	35	24.3	17,440	20.9
Did not dessicate	35	24.3	13,991	16.7
Valor	38	26.4	13,164	15.7
Sodium chlorate	10	6.9	4,337	5.2
Paraquat	17	11.8	4,260	5.1
Sharpen	12	8.3	3,961	4.7
Aim	2	1.4	138	0.2

[a]Respondents' acres only.

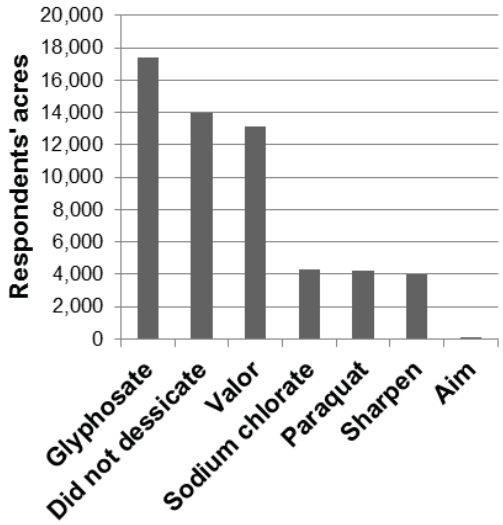


Figure 18. Northarvest dessicants used on dry bean in 2012.

Table 20. Frequency of crops in dry bean crop rotation program, 2008-2011.

Crop	2011 Respon-dents (%)	2010 Respon-dents (%)	2009 Respon-dents (%)	2008 Respon-dents (%)	4-year average Respon-dents (%)
Minnesota					
Corn	54.2	23.7	32.8	26.1	34.2
Soybean	0	29	11.9	26.1	16.8
Wheat	22.2	14.5	20.9	8.7	16.6
Dry bean	0	10.5	28.4	26.1	16.3
Sugarbeet	13.9	13.2	0	7.3	8.6
Potato	2.8	5.3	1.5	1.5	2.8
Barley	5.6	1.3	1.5	1.5	2.5
Alfalfa	0	1.3	3	2.9	1.8
Oat	1.4	1.3	0	0	0.7
North Dakota					
Wheat	58.4	24.1	43.6	22.5	37.2
Dry bean	3.5	33.9	25.5	49	28
Corn	21.2	4.5	16.4	11.2	13.3
Soybean	0.9	19.6	5.4	4.1	7.5
Sugarbeet	10.6	8	2.7	3.1	6.1
Barley	2.7	1.8	1.8	5.1	2.9
No crop	0.9	1.8	1.8	1	1.4
Canola	0	3.6	0	0	0.9
CRP	0.9	0.9	0.9	1	0.9
Potato	0	0.9	0.9	1	0.7
Sunflower	0.9	0.9	0	1	0.7
Alfalfa	0	0	0.9	1	0.5
Northarvest					
Wheat	44.3	20.2	35	16.8	29.1
Dry bean	2.2	24.5	26.6	39.5	23.2
Corn	34.1	12.2	22.6	17.4	21.6
Soybean	0.5	23.4	7.9	13.2	11.3
Sugarbeet	11.9	10.1	1.7	4.8	7.1
Barley	3.8	1.6	1.7	3.6	2.7
Potato	1.1	2.7	1.1	1.2	1.5
Alfalfa	0	0.5	1.7	1.8	1
No crop	0.5	1.1	1.1	0.6	0.8
CRP	0.5	0.5	0.6	0.6	0.6
Canola	0	2.1	0	0	0.5
Sunflower	0.5	0.5	0	0.6	0.4
Oat	0.5	0.5	0	0	0.3

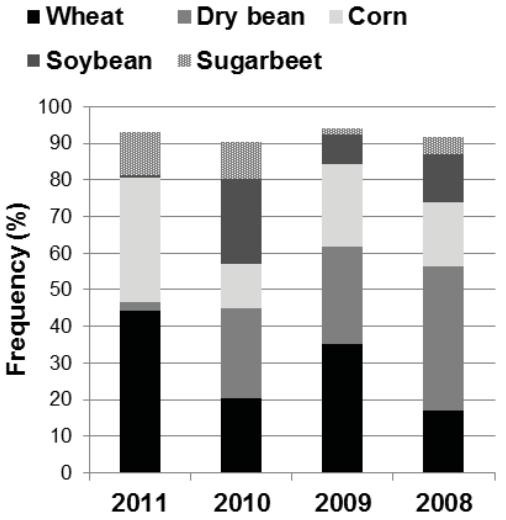


Figure 19. Northarvest frequency of major crops in dry bean crop rotation program, 2008-2011.

Table 21. Number of years dry bean is grown in dry bean crop rotation program.

Number of years	Respondents (%)
Minnesota	
Every 2 years	14.8
Every 3 years	35.2
Every 4 years	20.4
Every 5 years	29.6
North Dakota	
Every year	2.3
Every 2 years	46
Every 3 years	23
Every 4 years	20.7
Every 5 years	8
Northarvest	
Every year	1.4
Every 2 years	34
Every 3 years	27.7
Every 4 years	20.6
Every 5 years	16.3

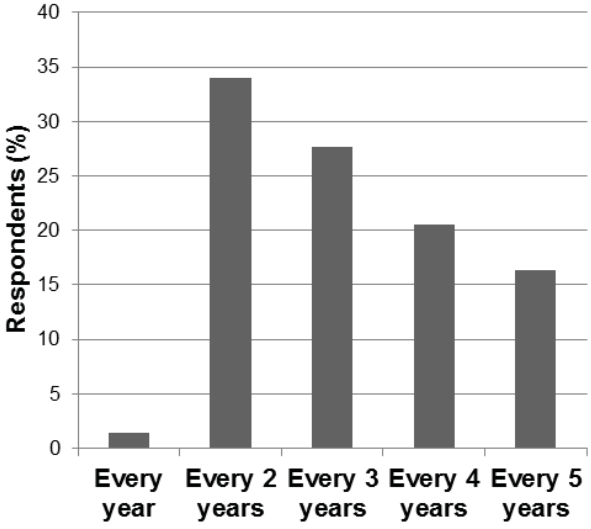


Figure 20. Northarvest number of years dry bean is grown in dry bean crop rotation program.

Insect Pests and Insecticide Use

Table 22. Worst insect problem in dry bean in 2012.

Insect[a]	Respondents (no.)	Respondents (%)	Acres reported (no.)[b,c]	Acres reported (%)[b,c]
Minnesota				
Leafhoppers	33	61.1	15,014	59.5
None	14	25.9	5,879	23.3
Spider mites	3	5.6	2,600	10.3
Seed corn maggot	2	3.7	1,068	4.2
Bean leaf beetle	1	1.9	465	1.8
Wireworms	1	1.9	200	0.8
Total	**54**	**100**	**25,226**	**100**
North Dakota				
None	52	53.6	30,016	48.1
Leafhoppers	10	10.3	8,547	13.7
Wireworms	8	8.2	6,185	9.9
Spider mites	6	6.2	6,042	9.7
Grasshoppers	9	9.3	4,612	7.4
Cutworms	4	4.1	2,597	4.2
Aphids	5	5.2	2,051	3.3
Bean leaf beetle	2	2.1	1,310	2.1
Seed corn maggot	1	1	1,087	1.7
Total	**97**	**100**	**62,447**	**100**
Northarvest				
None	66	43.7	35,895	40.9
Leafhoppers	43	28.5	23,561	26.9
Spider mites	9	6	8,642	9.9
Wireworms	9	6	6,385	7.3
Grasshoppers	9	6	4,612	5.3
Cutworms	4	2.6	2,597	3
Seed corn maggot	3	2	2,155	2.5
Aphids	5	3.3	2,051	2.3
Bean leaf beetle	3	2	1,775	2
Total	**151**	**100**	**87,673**	**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.

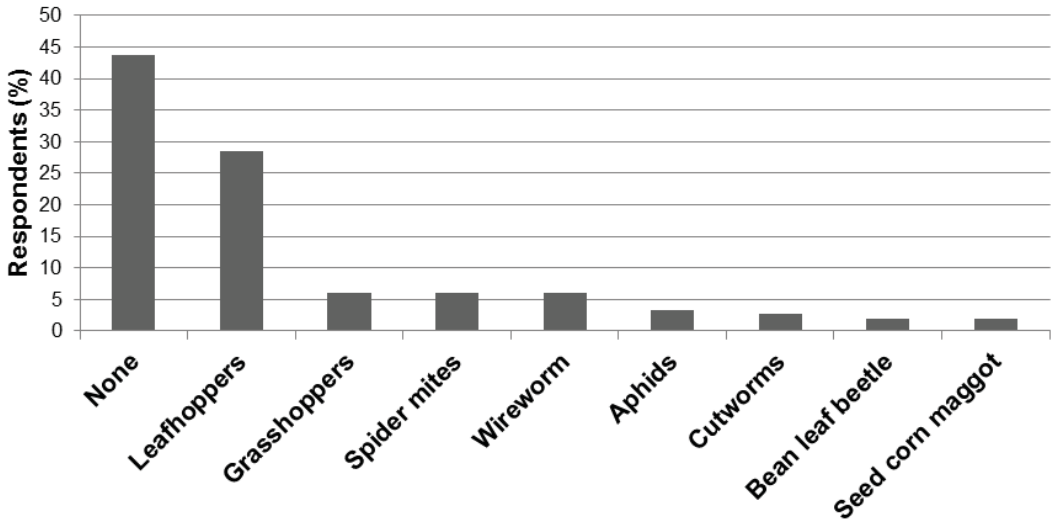


Figure 21. Northarvest worst insect problem in dry bean in 2012.

Table 23. Insects ranked as one of the three worst in dry bean in 2012.

Insect[a]	Respondents (no.)	Respondents (%)	Acres reported (no.)[b,c]	Acres reported (%)[b,c]
Minnesota				
Leafhoppers	36	66.7	17,414	69
None	14	25.9	5,879	23.3
Spider mites	11	20.4	4,816	19.1
Aphids	11	20.4	4,598	18.2
Seed corn maggot	5	9.3	3,401	13.5
Grasshoppers	7	13	2,870	11.4
Bean leaf beetle	8	14.8	2,461	9.8
Cutworms	3	5.6	2,150	8.5
Wireworms	3	5.6	793	3.1
Foliage caterpillars	1	1.9	155	0.6
North Dakota				
None	52	53.6	30,016	48.1
Leafhoppers	19	19.6	16,725	26.8
Cutworms	20	20.6	14,665	23.5
Wireworms	18	18.6	13,588	21.8
Spider mites	14	14.4	11,623	18.6
Grasshoppers	17	17.5	9,206	14.7
Seed corn maggot	6	6.2	6,119	9.8
Bean leaf beetle	4	4.1	3,342	5.4
Aphids	8	8.2	2,739	4.4
Armyworms	1	1	2,000	3.2
Foliage caterpillars	1	1	491	0.8
Northarvest				
None	66	43.7	35,895	40.9
Leafhoppers	55	36.4	34,139	38.9
Cutworms	23	15.2	16,815	19.2
Spider mites	25	16.6	16,439	18.8
Wireworms	21	13.9	14,381	16.4
Grasshoppers	24	15.9	12,076	13.8
Seed corn maggot	11	7.3	9,520	10.9
Aphids	19	12.6	7,337	8.4
Bean leaf beetle	12	7.9	5,803	6.6
Armyworms	1	0.7	2,000	2.3
Foliage caterpillars	2	1.3	646	0.7

[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.

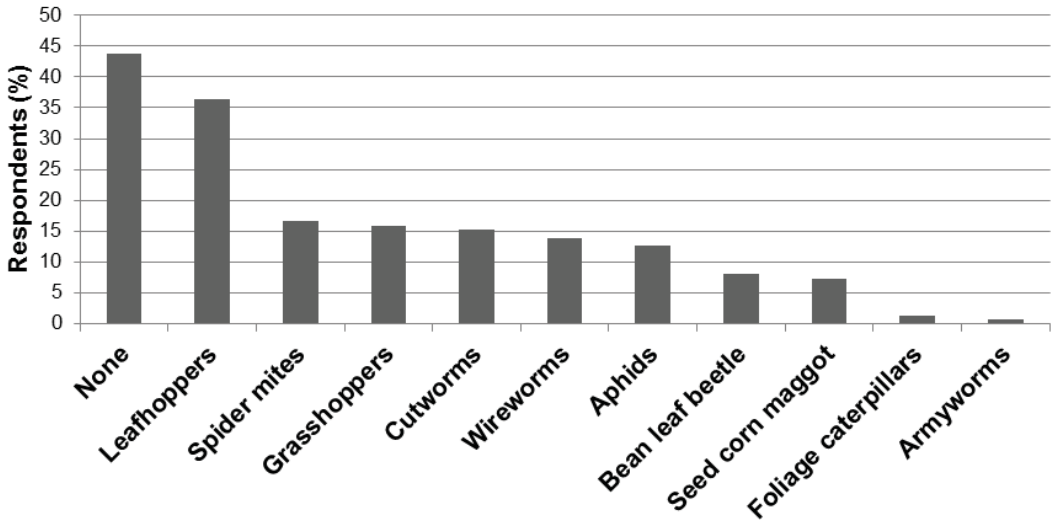


Figure 22. Northarvest insects ranked as one of the three worst in dry bean in 2012.

Table 24. Foliar insecticide use in dry bean in 2012.

Insecticide	Respondents (no.)	Respondents (%)	Acres reported (no.)[a,b]	Acres reported (%)[a,b]
Minnesota				
Asana XL	10	18.5	2,773	11
Lambda-Cy	2	3.7	2,000	7.9
Hero	1	1.9	1,895	7.5
Warrior II	5	9.3	1,755	7
Adjourn	1	1.9	1,456	5.8
Tombstone	2	3.7	1,060	4.2
Baythroid XL	2	3.7	686	2.7
Dimethoate	2	3.7	465	1.8
Mustang Max	1	1.9	68	0.3
None	32	59.3	15,416	61.1
Insecticide Total			**12,158**	**48.2**
North Dakota				
Asana XL	4	4.1	2,562	4.1
Lambda-Cy	3	3.1	2,550	4.1
Brigade	1	1	1,000	1.6
Warrior II	1	1	1,000	1.6
Tombstone	1	1	491	0.8
Grizzly Z	1	1	400	0.6
Silencer	1	1	275	0.4
None	87	89.7	54,824	87.8
Insecticide Total			**8,278**	**13.3**
Northarvest				
Asana XL	14	9.3	5,335	6.1
Lambda-Cy	5	3.3	4,550	5.2
Warrior II	6	4	2,755	3.1
Hero	1	0.7	1,895	2.2
Tombstone	3	2	1,551	1.8
Adjourn	1	0.7	1,456	1.7
Brigade	1	0.7	1,000	1.1
Baythroid XL	2	1.3	686	0.8
Dimethoate	2	1.3	465	0.5
Grizzly Z	1	0.7	400	0.5
Silencer	1	0.7	275	0.3
Mustang Max	1	0.7	68	0.1
None	119	78.8	70,240	80.1
Insecticide Total			**20,436**	**23.3**

[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.

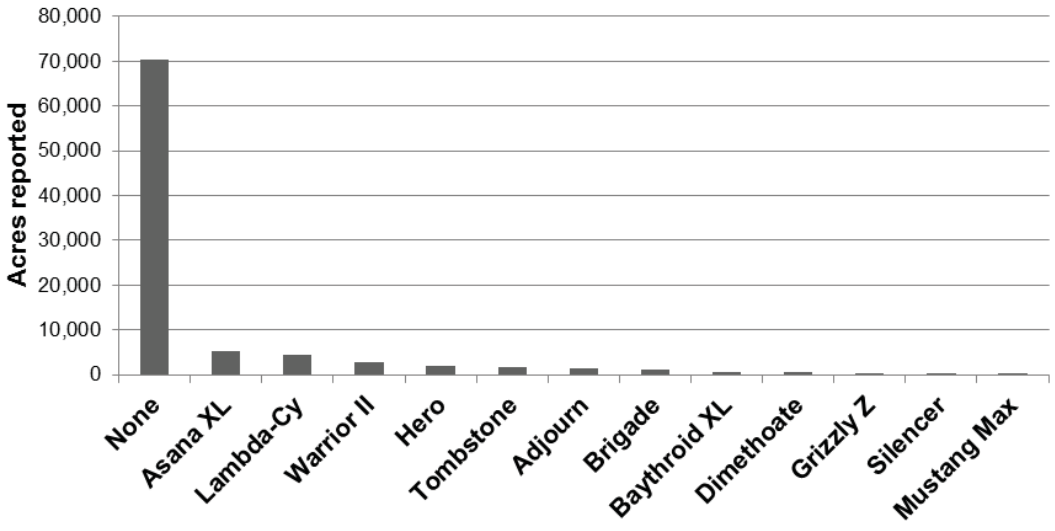


Figure 23. Northarvest foliar insecticide use in dry bean in 2012.

Table 25. Insecticide seed treatment use in dry bean in 2012.

Seed Treatment	Respondents (no.)	Respondents (%)	Acres reported (no.)[a,b]	Acres reported (%)[a,b]
Minnesota				
Lorsban	23	42.6	13,717	54.4
Cruiser	21	38.9	8,087	32.1
Unknown	3	5.6	916	3.6
Gaucho	3	5.6	707	2.8
Enhance AW	1	1.9	410	1.6
None	11	20.4	4,477	17.7
Seed Treatment Total			**23,837**	**94.5**
North Dakota				
Cruiser	36	37.1	19,573	31.3
Lorsban	19	19.6	18,291	29.3
Gaucho	6	6.2	2,810	4.5
Unknown	4	4.1	2,277	3.6
Dyna-Shield	1	1	1,000	1.6
None	38	39.2	20,776	33.3
Seed Treatment Total			**43,951**	**70.4**
Northarvest				
Lorsban	42	27.8	32,008	36.5
Cruiser	57	37.7	27,660	31.5
Gaucho	9	6	3,517	4
Unknown	7	4.6	3,193	3.6
Dyna-Shield	1	0.7	1,000	1.1
Enhance AW	1	0.7	410	0.5
None	49	32.5	25,253	28.8
Seed Treatment Total			**67,788**	**77.3**

[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.

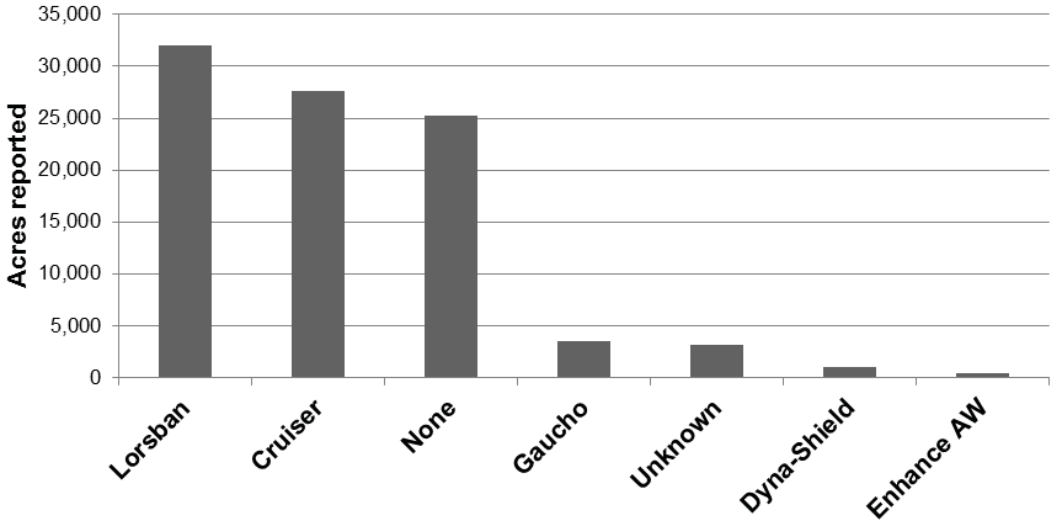


Figure 24. Northarvest insecticide seed treatment use in dry bean in 2012.

Table 26. Worst disease problem in dry bean in 2012.

Disease[a]	Respondents (no.)	Respondents (%)	Acres reported (no.)[b,c]	Acres reported (%)[b,c]
Minnesota				
White mold	16	32	8,698	35.9
None	17	34	7,407	30.5
Root rot	11	22	6,049	24.9
Bacterial blight	6	12	2,098	8.7
Total	**50**	**100**	**24,252**	**100**
North Dakota				
White mold	51	54.8	35,637	59.9
None	28	30.1	14,329	24.1
Bacterial blight	9	9.7	6,481	10.9
Root rot	4	4.3	2,600	4.4
Anthracnose	1	1.1	400	0.7
Total	**93**	**100**	**59,447**	**100**
Northarvest				
White mold	67	46.9	44,335	53.2
None	45	31.5	21,736	26.1
Root rot	15	10.5	8,649	10.4
Bacterial blight	15	10.5	8,579	10.3
Anthracnose	1	0.7	40	0
Total	**143**	**100**	**83,339**	**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.

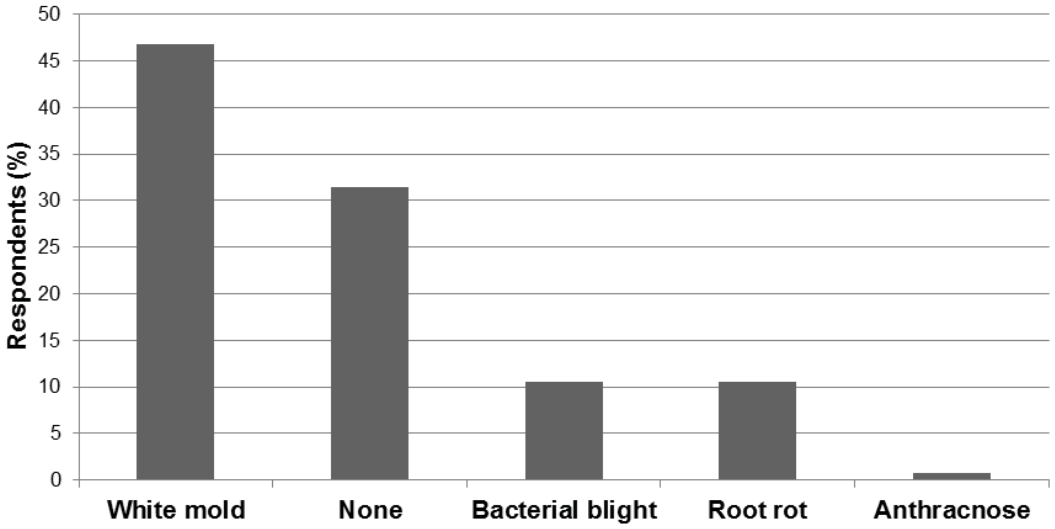


Figure 25. Northarvest worst disease problem in dry bean in 2012.

Table 27. Diseases ranked as one of the three worst in dry bean in 2012.

Disease[a]	Respondents (no.)	Respondents (%)	Acres reported (no.)[b,c]	Acres reported (%)[b,c]
Minnesota				
White mold	30	60	17,051	70.3
Root rot	22	44	14,447	59.6
Bacterial blight	17	34	8,363	34.5
None	17	34	7,407	30.5
Rust	4	8	1,860	7.7
Bacterial leaf spot	4	8	1,791	7.4
Anthracnose	1	2	386	1.6
Bean common mosaic virus	2	4	90	0.4
North Dakota				
White mold	59	63.4	40,702	68.5
Bacterial blight	28	30.1	22,493	37.8
None	28	30.1	14,329	24.1
Root rot	20	21.5	14,074	23.7
Rust	18	19.4	9,163	15.4
Anthracnose	10	10.8	6,206	10.4
Viruses (general)	2	2.2	1,991	3.3
Bacterial leaf spot	2	2.2	1,238	2.1
Bean common mosaic virus	2	2.2	688	1.2
Northarvest				
White mold	89	62.2	57,753	69.3
Bacterial blight	45	31.5	30,856	37
Root rot	42	29.4	28,521	34.2
None	45	31.5	21,736	26.1
Rust	22	15.4	11,023	13.2
Anthracnose	11	7.7	6,592	7.9
Bacterial leaf spot	6	4.2	3,029	3.6
Viruses (general)	2	1.4	1,991	2.4
Bean common mosaic virus	4	2.8	778	0.9

[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.

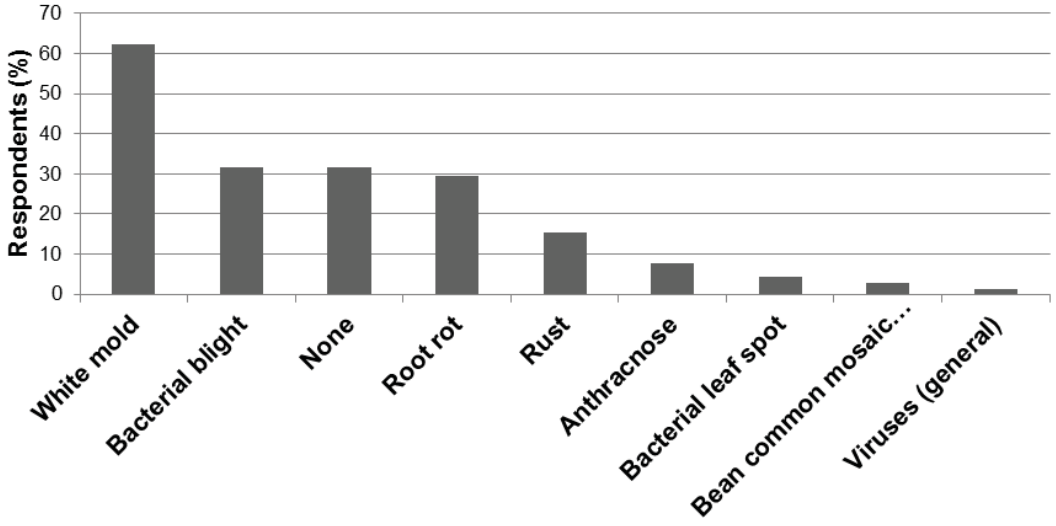


Figure 26. Northarvest diseases ranked as one of the three worst in dry bean in 2012.

Table 28. Foliar and banded fungicide use in dry bean in 2012.

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								
Topsin broadcast	16	31.4	10,656	31.6	5,246	49.2	5,410	50.8
Headline	8	15.7	7,890	23.4	5,490	69.6	2,400	30.4
Proline	14	27.5	6,987	20.7	6,387	91.4	600	8.6
Endura	4	7.8	3,975	11.8	3,975	100.0	0	0.0
Omega	1	2	1,895	5.6	1,895	100.0	0	0.0
Champion	2	3.9	1,378	4.1	1,378	100.0	0	0.0
Proline banded	1	2	650	1.9	650	100.0	0	0.0
Contans	1	2	196	0.6	196	100.0	0	0.0
Serenade	1	2	100	0.3	100	100.0	0	0.0
None	21	41.2	8,781	26.0	0	0.0	0	0.0
Fungicide Total			**33,727**		**25,317**	**75.1**	**8,410**	**24.9**
North Dakota								
Topsin broadcast	26	27.7	24,755	50.3	23,755	96.0	1,000	4.0
Endura	23	24.5	11,974	24.4	10,921	91.2	1,053	8.8
Headline	14	14.9	7,048	14.3	6,118	86.8	930	13.2
Folicur	4	4.3	4,137	8.4	4,137	100.0	0	0.0
Omega	2	2.1	610	1.2	610	100.0	0	0.0
Proline	2	2.1	410	0.8	410	100.0	0	0.0
Incognito	2	2.1	179	0.4	179	100.0	0	0.0
Topsin banded	1	1.1	60	0.1	60	100.0	0	0.0
None	58	61.7	32,790	66.7	0	0.0	0	0.0
Fungicide Total			**49,173**		**46,190**	**93.9**	**2,983**	**6.1**
Northarvest								
Topsin broadcast	42	29	35,411	42.7	29,001	81.9	6,410	18.1
Endura	27	18.6	15,949	19.2	14,896	93.4	1,053	6.6
Headline	22	15.2	14,938	18.0	11,608	77.7	3,330	22.3
Proline	16	11	7,397	8.9	6,797	91.9	600	8.1
Folicur	4	2.8	4,137	5.0	4,137	100.0	0	0.0
Omega	3	2.1	2,505	3.0	2,505	100.0	0	0.0
Champion	2	1.4	1,378	1.7	1,378	100.0	0	0.0
Proline banded	1	0.7	650	0.8	650	100.0	0	0.0
Contans	1	0.7	196	0.2	196	100.0	0	0.0
Incognito	2	1.4	179	0.2	179	100.0	0	0.0
Serenade	1	0.7	100	0.1	100	100.0	0	0.0
Topsin banded	1	0.7	60	0.1	60	100.0	0	0.0
None	79	54.5	41,571	50.1		0.0	0	0.0
Fungicide Total			**82,900**		**71,507**	**86.3**	**11,393**	**13.7**

[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.

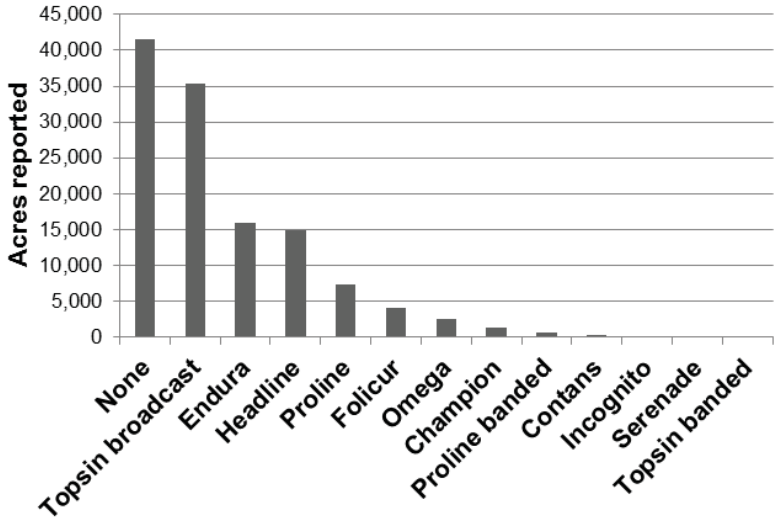


Figure 27. Northarvest foliar and banded fungicide use in dry bean in 2012.

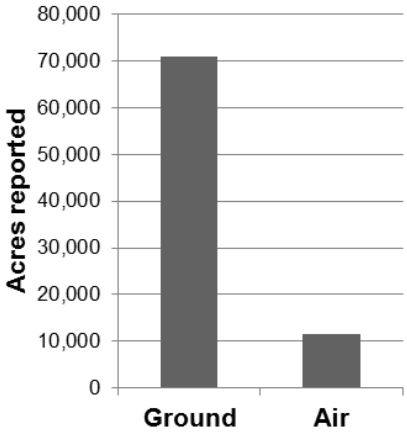


Figure 28. Northarvest fungicide application method in dry bean in 2012.

Table 29. Fungicide seed treatment use in dry bean in 2012.

Seed treatment	Respondents (no.)	Respondents (%)[b]	Total acres treated (no.)[a]	Total acres treated (%)[a,b]
Minnesota				
Apron	12	23.1	7,101	29.1
Maxim	12	23.1	7,101	29.1
Dynasty	4	7.7	5,473	22.4
Not specified	6	11.5	2,924	12
Headline	2	3.8	1,750	7.2
Kodiak	2	3.8	851	3.5
Rancona	1	1.9	728	3
Captan	1	1.9	650	2.7
None	29	55.8	8,432	34.6
Seed Treatment Total			**26,578**	
North Dakota				
Apron	25	26.9	20,525	34.6
Maxim	19	20.4	13,543	22.8
Not specified	15	16.1	9,552	16.1
Dynasty	7	7.5	5,800	9.8
Rancona	4	4.3	4,260	7.2
Streptomycin	2	2.2	534	0.9
Captan	1	1.1	400	0.7
None	51	54.8	28,470	47.9
Seed Treatment Total			**54,614**	
Northarvest				
Apron	37	25.5	27,626	33
Maxim	31	21.4	20,644	24.6
Not specified	21	14.5	12,476	14.9
Dynasty	11	7.6	11,273	13.5
Rancona	5	3.4	4,988	6
Headline	2	1.4	1,750	2.1
Captan	2	1.4	1,050	1.3
Kodiak	2	1.4	851	1
Streptomycin	2	1.4	534	0.6
None	80	55.2	36,902	44
Seed Treatment Total			**81,192**	

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

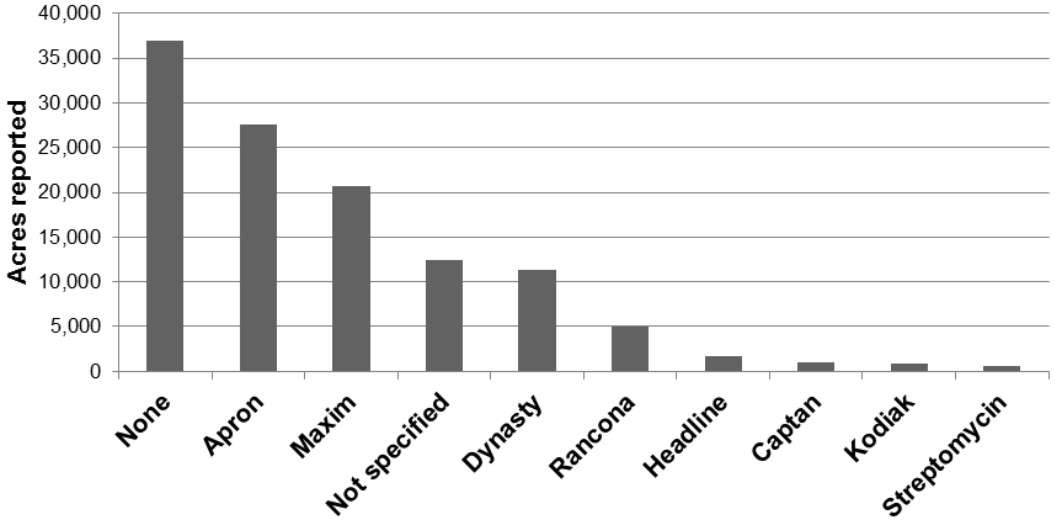


Figure 29. Northarvest fungicide seed treatment use in dry bean in 2012.

Weeds and Herbicide Use

Table 30. Worst weed problem in dry bean in 2012.

Weed[a]	Respon-dents (no.)	Respon-dents (%)	Acres reported (no.)[b,c]	Acres reported (%)[b,c]
Minnesota				
Ragweed	10	19.6	7,500	30
Lambsquarters	21	41.2	6,498	26
Nightshade	5	9.8	4,178	16.7
Redroot pigweed	2	3.9	1,720	6.9
Waterhemp	5	9.8	1,308	5.2
Kochia	2	3.9	1,175	4.7
Wild buckwheat	1	2	1,150	4.6
Foxtail	1	2	1,050	4.2
Velvetleaf	2	3.9	255	1
Cocklebur	1	2	130	0.5
Proso millet	1	2	70	0.3
Total	**51**	**100**	**25,034**	**100**
North Dakota				
Kochia	25	26	13,996	22.6
Nightshade	12	12.5	13,509	21.9
Lambsquarters	14	14.6	8,736	14.1
Redroot pigweed	10	10.4	7,900	12.8
Volunteer grain	6	6.3	2,974	4.8
Cocklebur	4	4.2	2,710	4.4
Ragweed	6	6.3	2,531	4.1
Wild buckwheat	3	3.1	2,524	4.1
Biennial wormwood	4	4.2	2,288	3.7
False chamomile	2	2.1	1,408	2.3
Canada thistle	4	4.2	1,084	1.8
Wild oat	2	2.1	980	1.6
Wild mustard	2	2.1	567	0.9
Volunteer canola	1	1	440	0.7
None	1	1	150	0.2
Total	**96**	**100**	**61,797**	**100**
Northharvest				
Nightshade	17	11.6	17,687	20.4
Lambsquarters	35	23.8	15,234	17.5
Kochia	27	18.4	15,171	17.5
Ragweed	16	10.9	10,031	11.6
Redroot pigweed	12	8.2	9,620	11.1
Biennial wormwood	5	3.4	3,438	4
Volunteer grain	6	4.1	2,974	3.4
Cocklebur	5	3.4	2,840	3.3
Wild buckwheat	3	2	2,524	2.9
False chamomile	2	1.4	1,408	1.6
Waterhemp	5	3.4	1,308	1.5
Canada thistle	4	2.7	1,084	1.2
Foxtail	1	0.7	1,050	1.2
Wild oat	2	1.4	980	1.1
Wild mustard	2	1.4	567	0.7
Volunteer canola	1	0.7	440	0.5
Velvetleaf	2	1.4	255	0.3
None	1	0.7	150	0.2
Proso millet	1	0.7	70	0.1
Total	**147**	**100**	**86,831**	**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.

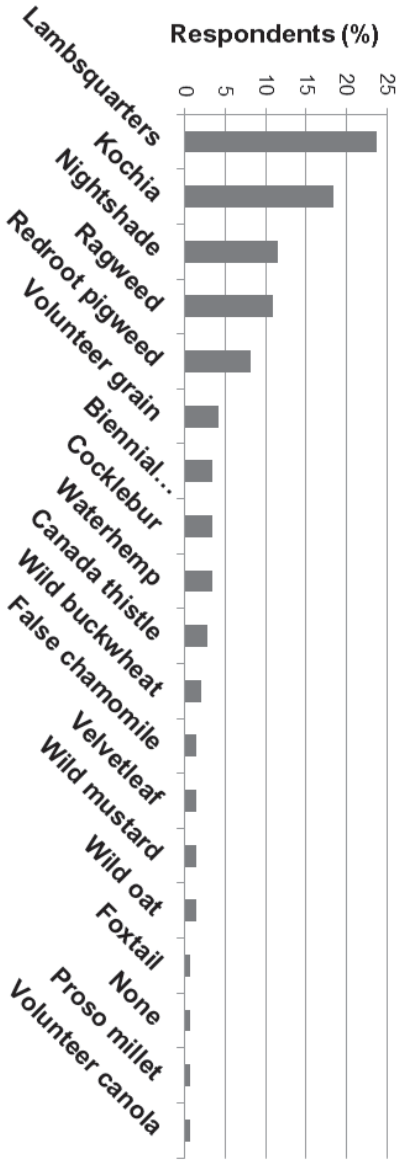


Figure 30. Northharvest worst weed problem in dry bean in 2012.

Table 31. Weeds ranked as one of the three worst in dry bean in 2012.

Weed[a]	Respondents (no.)	Respondents (%)	Acres reported (no.)[b]	Acres reported (%)[b]
Minnesota				
Lambsquarters	39	76.5	18,445	73.7
Ragweed	27	52.9	15,601	62.3
Nightshade	17	33.3	10,358	41.4
Redroot pigweed	23	45.1	9,815	39.2
None	10	19.6	4,018	16.1
Kochia	7	13.7	3,800	15.2
Foxtail	4	7.8	3,250	13
Wild buckwheat	4	7.8	3,147	12.6
Cocklebur	4	7.8	1,460	5.8
Volunteer grain	5	9.8	1,377	5.5
Waterhemp	6	11.8	1,338	5.3
Canada thistle	1	2	1,150	4.6
Wild oat	1	2	620	2.5
Not specified	1	2	268	1.1
Velvetleaf	2	3.9	255	1
Wild sunflower	1	2	130	0.5
Proso millet	1	2	70	0.3
North Dakota				
Lambsquarters	40	41.7	31,182	50.5
Kochia	42	43.8	26,653	43.1
Redroot pigweed	39	40.6	22,614	36.6
Nightshade	28	29.2	21,462	34.7
Biennial wormwood	22	22.9	17,617	28.5
Canada thistle	28	29.2	14,930	24.2
Ragweed	14	14.6	13,303	21.5
Volunteer grain	19	19.8	10,813	17.5
Cocklebur	13	13.5	8,201	13.3
Foxtail	9	9.4	4,453	7.2
Wild buckwheat	5	5.2	3,364	5.4
Wild oat	7	7.3	3,282	5.3
None	10	10.4	3,094	5
False chamomile	2	2.1	1,408	2.3
Wild mustard	5	5.2	1,346	2.2
Lanceleaf sage	1	1	440	0.7
Mallow	1	1	440	0.7
Volunteer canola	1	1	440	0.7
Sandbur	1	1	275	0.4
Milkweed	1	1	74	0.1
Northarvest				
Lambsquarters	79	53.7	49,627	57.2
Redroot pigweed	62	42.2	32,429	37.3
Nightshade	45	30.6	31,820	36.6
Kochia	49	33.3	30,453	35.1
Ragweed	41	27.9	28,904	33.3
Biennial wormwood	26	17.7	20,764	23.9
Canada thistle	29	19.7	16,080	18.5
Volunteer grain	24	16.3	12,190	14
Cocklebur	17	11.6	9,661	11.1
Foxtail	13	8.8	7,703	8.9
None	20	13.6	7,112	8.2
Wild oat	8	5.4	3,902	4.5
Wild buckwheat	5	3.4	3,364	3.9
False chamomile	2	1.4	1,408	1.6
Wild mustard	5	3.4	1,346	1.6
Waterhemp	6	4.1	1,338	1.5
Lanceleaf sage	1	0.7	440	0.5
Mallow	1	0.7	440	0.5
Volunteer canola	1	0.7	440	0.5
Sandbur	1	0.7	275	0.3
Not specified	1	0.7	268	0.3
Velvetleaf	2	1.4	255	0.3
Wild sunflower	1	0.7	130	0.1
Milkweed	1	0.7	74	0.1
Proso millet	1	0.7	70	0.1

[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.

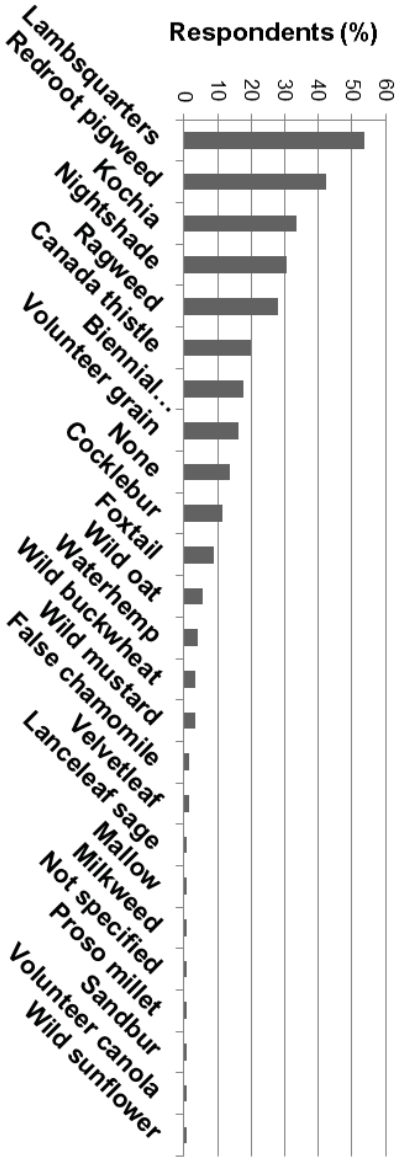


Figure 31. Northarvest weeds ranked as one of the three worst in dry bean in 2012.

Table 32. Weed control practices used in dry bean in 2012.

Herbicide or other practice	Acres reported (no.)[a]	Acres reported (%)[b]
Minnesota		
Raptor	19,559	81.4
Rezult	16,912	70.4
Reflex	14,161	58.9
Select	8,494	35.4
Cultivation	6,999	29.1
Sonalan (spring)	6,795	28.3
Prowl	5,702	23.7
Basagran	5,337	22.2
Dual	4,751	19.8
Trifluralin (spring)	4,457	18.6
Outlook	3,648	15.2
Glyphosate (preplant)	2,230	9.3
Permit	1,216	5.1
Trifluralin (fall)	1,150	4.8
Eptam (spring)	1,058	4.4
Poast	778	3.2
Assure	615	2.6
Rotary hoe	533	2.2
Pursuit	493	2.1
Spartan	305	1.3
Manual labor	176	0.7
Herbicide Total[c]	**97,661**	
North Dakota		
Rezult	53,901	88.3
Raptor	48,031	78.7
Reflex	28,298	46.4
Basagran	21,447	35.1
Sonalan (spring)	19,751	32.4
Select	19,515	32
Spartan	16,897	27.7
Cultivation	14,909	24.4
Pursuit	13,301	21.8
Prowl	12,541	20.5
Permit	9,375	15.4
Trifluralin (spring)	7,011	11.5
Glyphosate (preplant)	4,570	7.5
Assure	3,616	5.9
Rotary hoe	2,110	3.5
Poast	1,700	2.8
Intensity	817	1.3
Eptam (spring)	400	0.7
Dual	160	0.3
Outlook	150	0.2
Herbicide Total[c]	**261,481**	
Northarvest		
Rezult	70,813	83.2
Raptor	67,590	79.5
Reflex	42,459	49.9
Select	28,009	32.9
Basagran	26,784	31.5
Sonalan (spring)	26,546	31.2
Cultivation	21,908	25.8
Prowl	18,243	21.4
Spartan	17,202	20.2
Pursuit	13,794	16.2
Trifluralin (spring)	11,468	13.5
Permit	10,591	12.5
Glyphosate (preplant)	6,800	8
Dual	4,911	5.8
Assure	4,231	5
Outlook	3,798	4.5
Rotary hoe	2,643	3.1
Poast	2,478	2.9
Eptam (spring)	1,458	1.7
Trifluralin (fall)	1,150	1.4
Intensity	817	1
Manual labor	176	0.2
Herbicide Total[c]	**359,142**	

[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.

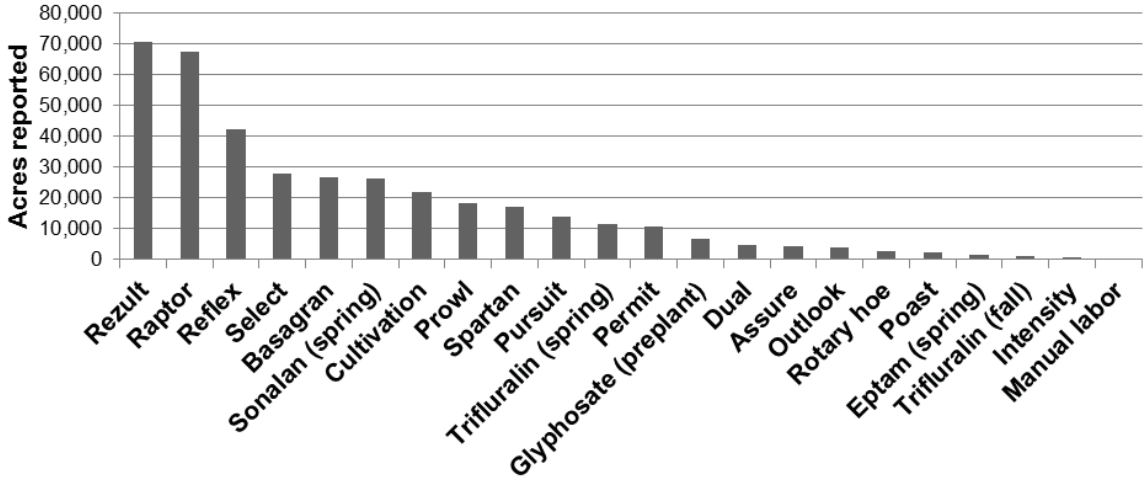


Figure 32. Northarvest weed control practices used in dry bean in 2012.

Table 33. Weed control practices used by dry bean market class in 2012.

Herbicide or other practice	Black	Great Northern	Kidney	Navy	Otebo	Pink	Pinto	Red
				% Acres Treated[a,b]				
Minnesota								
Assure	39.7		1	0		0	0	0
Basagran	15.1		29.2	19		17.1	5.6	0
Cultivation	0		18.8	49.9		24.1	44.9	0
Dual	45.5		24.8	8.5		30.6	0	0
Eptam (spring)	0		5.8	5.8		0	0	0
Glyphosate (preplant)	0		2.7	16.2		22.2	11.8	0
Manual labor	0		0.9	1.1		0	0	0
Outlook	0		28.9	4.7		3.6	0	0
Permit	15.1		5.6	4.3		0	5.6	0
Poast	0		6.5	0.7		0	0	0
Prowl	9.5		32.4	13.7		37.8	0	0
Pursuit	7.7		0	5.6		0	0	0
Raptor	86		89.1	62.4		114.7	65.9	0
Reflex	25.6		56	68.8		72.1	34.1	100
Rezult	84.9		64.5	60.4		97.6	94.4	100
Rotary hoe	0		0	0		0	33	0
Select	45.5		21.5	38.4		98.5	11.8	0
Sonalan (spring)	7.7		19.8	41		0	0	0
Spartan	0		0	4.3		0	0	0
Trifluralin (fall)	0		0	16.2		0	0	0
Trifluralin (spring)	55.6		16	17.8		26.8	82.6	100
North Dakota								
Assure	0	0		7.6	0	31.8	6.1	0
Basagran	39.9	0		61	0	9.1	28.3	147.2
Cultivation	8.2	0		29.5	0	59.1	25.4	73.6
Dual	0	0		0.8	0	0	0.2	0
Eptam (spring)	0	0		0	0	0	1	0
Glyphosate (preplant)	8.8	0		0	0	0	9.7	0
Intensity	0	0		0	0	0	2	0
Outlook	0	0		0	0	0	0.4	0
Permit	28.4	0		11.8	0	31.8	14.1	0
Poast	0	0		1.4	0	20	3.3	0
Prowl	37.5	0		23.9	0	47.3	16.6	0
Pursuit	36.9	0		28.9	0	0	18.6	0
Raptor	65.5	100		87.4	100	68.2	78.3	100
Reflex	48.6	100		69.6	100	0	39.6	26.4
Rezult	91.2	100		78	100	68.2	91.2	26.4
Rotary hoe	4.9	0		0	0	27.3	3.6	0
Select	52.5	57		3.9	0	27.3	35.5	0
Sonalan (spring)	13.4	43		52	100	10.9	30.3	73.6
Spartan	26	0		15.3	0	31.8	32	26.4
Trifluralin (spring)	12.2	0		22.5	0	0	9.2	0
Northarvest								
Assure	5.8	0	1	4.5	0	9.3	5.9	0
Basagran	36.3	0	29.2	44.2	0	14.8	27.4	86.9
Cultivation	7	0	18.8	37.7	0	34.4	26.2	43.4
Dual	6.6	0	24.8	3.8	0	21.6	0.2	0
Eptam (spring)	0	0	5.8	2.3	0	0	1	0
Glyphosate (preplant)	7.5	0	2.7	6.5	0	15.7	9.8	0
Intensity	0	0	0	0	0	0	1.9	0
Manual labor	0	0	0.9	0.4	0	0	0	0
Outlook	0	0	28.9	1.9	0	2.5	0.4	0
Permit	26.4	0	5.6	8.8	0	9.3	13.8	0
Poast	0	0	6.5	1.1	0	5.9	3.2	0
Prowl	33.4	0	32.4	19.8	0	40.6	16	0
Pursuit	32.7	0	0	19.5	0	0	17.9	0
Raptor	68.4	100	89.1	77.4	100	101.1	77.8	59
Reflex	45.2	100	56	69.3	100	51	39.4	56.6
Rezult	90.3	100	64.5	71	100	89	91.3	56.6
Rotary hoe	4.2	0	0	0	0	8	4.7	0
Select	51.5	57	21.5	17.7	0	77.6	34.5	0
Sonalan (spring)	12.6	43	19.8	47.6	100	3.2	32.3	84.4
Spartan	22.2	0	0	10.9	0	9.3	30.8	15.6
Trifluralin (fall)	0	0	0	6.5	0	0	0	0
Trifluralin (spring)	18.5	0	16	20.6	0	18.9	8.9	0

[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.

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APPENDIX I.

Please circle or fill in the requested information on pest problems and pesticide used on your 2012 dry bean crop.

Total dry bean acres planted in 2012
Total irrigated acres
Total dry bean acres on tile-drained ground
Total dry bean acres harvested
Dry bean acres with hail damage
Dry bean acres with frost damage
Dry bean acres with water damage

State	County	Acres
Minnesota		
North Dakota		
South Dakota		

Dry Beans Grown		
Class	**Variety**	**Acres**
Pinto	1. Buster	
	2. GTS 904	
	3. GTS 907	
	4. Maverick	
	5. Mariah	
	6. Medicine Hat	
	7. Santa Fe	
	8. LaPaz	
	9. Windbreaker	
	10. Lariat	
	11. Sonora	
	12. Stampede	
	13. ND-307	
	14. Other pinto (specify)	
Navy	21. HMS Medalist	
	22. Mayflower	
	23. Navigator	
	24. Norstar	
	25. Vista	
	26. Ensign	
	27. T9905	
	28. Avalanche	
	29. Other navy (specify)	
Kidney	41. Montcalm (DRK)	
	42. Red Hawk	
	43. Celrk	
	44. Chinook 2000	
	45. Foxfire	
	46. Pink Panther	
	47. Red Rover	
	48. Closeau	
	49. Other kidney (specify)	
Black	61. Zorro	
	62. Jaguar	
	63. T-39	
	64. Eclipse	
	65. Loreto	
	66. Bandit	
	67. Condor	
	68. Shania	
	69. Other black (specify)	
Pink	81. Sedona	
	82. Floyd	
	83. Viva	
	84. Other pink (specify)	
Other	91. (specify class and variety)	

Crop Rotation (field with dry beans in 2012) (write in crops grown in previous years)		
	Field 1 - dry beans '12	**Field 2 - dry beans '12**
2011		
2010		
2009		
2008		

Agronomy	
What is your row spacing in inches for prostrate varieties?	
What is your row spacing in inches for upright (type II) varieties?	
What is your plant population (plants per acre)?	

What TILLAGE practice(s) do you use? (estimate acreage for each type)

Tillage	Acreage
Conventional tillage	
Strip-tillage	
No-till	

Biggest Production Problem in Dry Beans (circle one and complete table)		
	Acres Affected	Bean Class
1. Applied herbicide injury*		
2. *List herbicide in No. 1		
3. Herbicide drift injury		
4. Delayed planting		
5 .Emergence/stand		
6 .Harvest		
7. Disease		
8. Insects		
9. Micronutrient deficiency		
10. Weeds		
11. Excess water		
12. Other (specify)		
13. None		

Insecticides Used on Dry Beans		
Foliar Insecticide (write in name or number from list below)	**No. Acres Treated**	**No. of Sprays**
Dry Bean Insecticides	1. Acephate (Orthene, Address) 2. Adjourn 3. Agri-Mek 0.15EC 4. Asana XL 5. Baythroid XL 6. Brigade 2EC 7. Capture 8. Capture LFR 9. Carbaryl (Sevin) 10. Dimethoate 11. Dipel 12. Di-Syston G 13. Fanfare 2EC 14. Grizzly Z 15. Hero 16. Kasio 17. Lambda-Cy 18. Leverage 360	19. Lannate LV 20. Malathion 21. Mustang Max 22. Penncap-M 23. Spintor 24. Proaxis 25. Respect 26. Nuprid 27. Sevin 28. Silencer 29. Sniper 30. Thimet 20G 31. Tombstone / Tombstone Helios 32. Voliam Xpress 33. Warrior 34. Other (write in product name)

Was INSECTICIDE-TREATED SEED used?
If yes, please answer questions below.

Yes **No**

How many acres were planted using the following insecticide seed treatments?

Seed Treatment	Acreage
Enhance AW	
Cruiser 5FS or Cruiser MAXX Beans	
Lorsban	
Gaucho	
Attendant 600	
Senator 600	
Dyna-Shield Imidacloprid 5	

How many acres were planted using some other insecticide seed treatment? Please write acreage and product used.

Acreage = Product =

Worst Insect/Mite Problem (Rank 1-3; 1 = worst) mark ONLY 3	
Armyworms	
Aphids	
Cutworms	
Bean leaf beetle	
Foliage Feeding Caterpillars	
Grasshoppers	
Leafhoppers	
Spider mites	
Seedcorn maggot	
Wireworms	

Worst Weed Problems in Dry Beans (Rank 1-3; 1 = worst) mark ONLY 3			
Biennial wormwood		Nightshade	
Canada thistle		Ragweed	
Cocklebur		Redroot pigweed	
Foxtail		Volunteer grain	
Kochia		Wild oat	
Lambsquarters		Other	

Weed Control Practices Used on Dry Beans
Mark weed control used and indicate areas treated for each item. Count double application, double cultivation, etc., as double acres.

Weed Control Used (write in name or number)	Class of Bean	Acres Treated	Class of Bean (if additional)	Acres Treated	Class of Bean (if additional)	Acres Treated

Dry Bean Herbicide			
	1. Assure II/Targa 2. Basagran/generics 3. Dual/generics 4. Eptam (fall) 5. Eptam (spring) 6. Fusilade DX 7. Glyphosate (preharvest) 8. Intrro/generics 9. Outlook 10. Permit 11. Poast	12. Prowl 13. Pursuit 14. Raptor 15. Reflex 16. Glyphosate/generics 17. Rezult 18. Select/generics 19. Sonalan (fall) 20. Sonalan (spring) 21. Spartan / Charge	22. Trifluralin (fall) 23. Triflurallin (spring) 24. Trifluralin + Eptam (spring) 25. No Herbicide 26. Cultivation 27. Rotary hoe 28. Other

Desiccants	Class of Bean	Acres Treated	Class of Bean (if additional)	Acres Treated	Class of Bean (if additional)	Acres Treated
Sodium Chlorate (Leafex, Defol)						
Paraquat						
Aim						
Glyphosate						
Sharpen						
Valor						

Worst Disease Problems (Rank 1-3; 1 = worst) mark ONLY 3	Alternaria	Anthracnose	Bacterial Blight	Root Rot	Rust	White Mold	None
	Viruses - General	Bean Common Mosaic Virus	Bacterial Brown Spot				

Fungicides Used on Dry Beans				
Fungicide Used (write in name or number)	**No. Acres Treated**	**No. of Sprays**	**Application Method (circle one)**	
			air	ground
			air	ground
			air	ground
			air	ground
			air	ground
			air	ground
			air	ground

Dry Bean Fungicides		
	1. Bravo/Echo/generics 2. Champion/Champ 3. Endura 4. Folicur/generics 5. Headline 6. Intercept 7. Kocide 8. Omega 9. Proline 10. Maneb	11. Rorval 12. Serenade 13. Switch 14. Thiolux 15. Tilt 16. Topsin/generics (broadcast) 17. Topsin/generics (banded) 18. Quadris/Amistar 19. Quadris Opti 20. Other 21. Any tank mixes? List combination

Was fungicide-treated seed used?	Yes	No
If so, what product(s)?		

General Fertilizer Program for Dry Beans - pounds per acre applied				
Nitrogen	Phosphate	Potash	Zinc	Other

Inoculate with rhizobium bacteria?	Yes	No
Soil test prior to fertilization?	Yes	No
Did you use site-specific nutrient management for any of the fertilizers used in dry beans?	Yes	No

Direct Harvest	
	A type II bean is an upright bean with a short vine that is commonly used for direct harvest. If you used a upright (type II) bean, please answer the two questions below.
	1) What was your row spacing in inches that you used for upright (type II) beans? _____
	2) What was your seeding rate for upright (type II) beans in live seeds per acre? _____
	On your farm, what percentage of your total dry bean area is being harvested using direct combining? (circle one) 0% 1 - 25% 26 - 50% 51 - 75% 76 - 100%
	What is your estimated yield loss in your direct harvested field (percentage)? _____ **%**
	What is your estimated yield loss in your conventionally harvested field (percentage)? _____ **%**

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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