E1710

2013 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 2013 dry bean grower survey is the 24th 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 2004-2012 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 percent (e.g. 99.1 or 100.1 percent) when the presented values are added. Other instances where percent values do not total 100 percent 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.

Production

Table 1. Number of Northarvest dry bean growers responding, acres planted by respondents and total state acres in 2013.

Growers	No. of respondents	Respondents' acres	Total acres[a]	Acres surveyed (% of total)
Minnesota	67	23,092	125,000	18.5
North Dakota	112	59,250	440,000	13.5
Northarvest	179	82,342	565,000	14.6

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

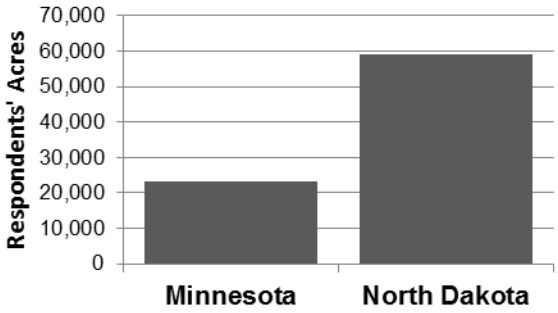


Figure 1. Northarvest dry bean acres planted by state in 2013 (respondents' acres only).

Table 2. Dry bean production by county in 2013.

Minnesota	No. of respon-dents[a]	Acres[b]	North Dakota	No. of respon-dents[a]	Acres[b]
Polk	13	6,039	Grand Forks	23	11,103
Hubbard	2	2,620	Walsh	27	9,436
Marshall	4	1,682	Pembina	15	8,161
Renville	9	1,494	Wells	10	6,980
Stevens	7	1,350	Benson	8	4,275
Pope	2	1,338	Traill	9	3,367
Otter Tail	3	1,210	Ramsey	8	3,313
Stearns	1	960	Nelson	4	2,355
Wadena	3	898	Steele	4	1,628
Kandiyohi	6	836	McLean	2	1,580
Grant	2	770	Griggs	3	1,190
Mahnomen	1	480	Cass	2	900
Chippewa	4	467	Cavalier	2	880
Swift	4	418	McHenry	2	700
Douglas	3	390	Pierce	2	680
Beltrami	2	336	Eddy	1	520
Big Stone	1	300	Stutsman	1	450
Traverse	1	300	Ward	1	350
Meeker	1	270	Mercer	1	307
Morrison	2	190	Burleigh	1	300
Pennington	1	150	Ransom	2	263
Crow Wing	1	135	Richland	1	250
Sibley	1	120	Barnes	1	202
Todd	1	100	Foster	1	60
Sherburne	1	86	**Total**		**59,250**
McLeod	1	79			
Clay	1	74			
Total		**23,092**			

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

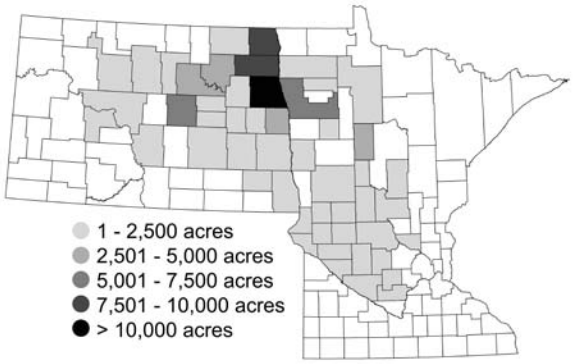


Figure 2. Northarvest dry bean production by county in 2013 (respondents' acres only).

Table 3. Dry bean acres harvested, irrigated, on tile-drained ground, and damaged by hail, frost and water in 2013.

	Acres reported (no.)[a]	Acres reported (%)[a]
Minnesota		
Harvested	22,869	99
Irrigated	7,619	33
Tile-drained	4,707	20.4
Hail-damaged	2,288	9.9
Water-damaged	1,547	6.7
Frost-damaged	235	1
North Dakota		
Harvested	58,401	98.6
Water-damaged	4,091	6.9
Hail-damaged	3,140	5.3
Irrigated	511	0.9
Tile-drained	260	0.4
Frost-damaged	225	0.4
Northarvest		
Harvested	81,270	98.7
Irrigated	8,130	9.9
Water-damaged	5,638	6.8
Hail-damaged	5,428	6.6
Tile-drained	4,967	6
Frost-damaged	460	0.6

[a]Respondents' acres only.

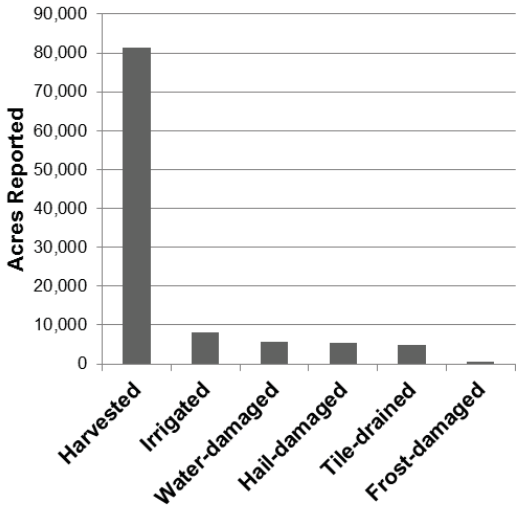


Figure 3. Northarvest respondents' reported acres from Table 3.

Table 4. Dry bean market classes grown in 2013.

Market class	Acres reported (no.)[a]	Acres reported (%)[a]
Minnesota		
Kidney	10,809	46.8
Navy	8,131	35.2
Pinto	1,741	7.5
Pink	1,718	7.4
Black	693	3
Great Northern	0	0
Red	0	0
Total	**23,092**	**100**
North Dakota		
Pinto	42,579	71.9
Navy	9,346	15.8
Black	2,765	4.7
Great Northern	2,541	4.3
Pink	1,482	2.5
Red	482	0.8
Kidney	55	0.1
Total	**59,250**	**100**
Northarvest		
Pinto	44,320	53.8
Navy	17,477	21.2
Kidney	10,864	13.2
Black	3,458	4.2
Pink	3,200	3.9
Great Northern	2,541	3.1
Red	482	0.6
Total	**82,342**	**100**

[a]Respondents' acres only.

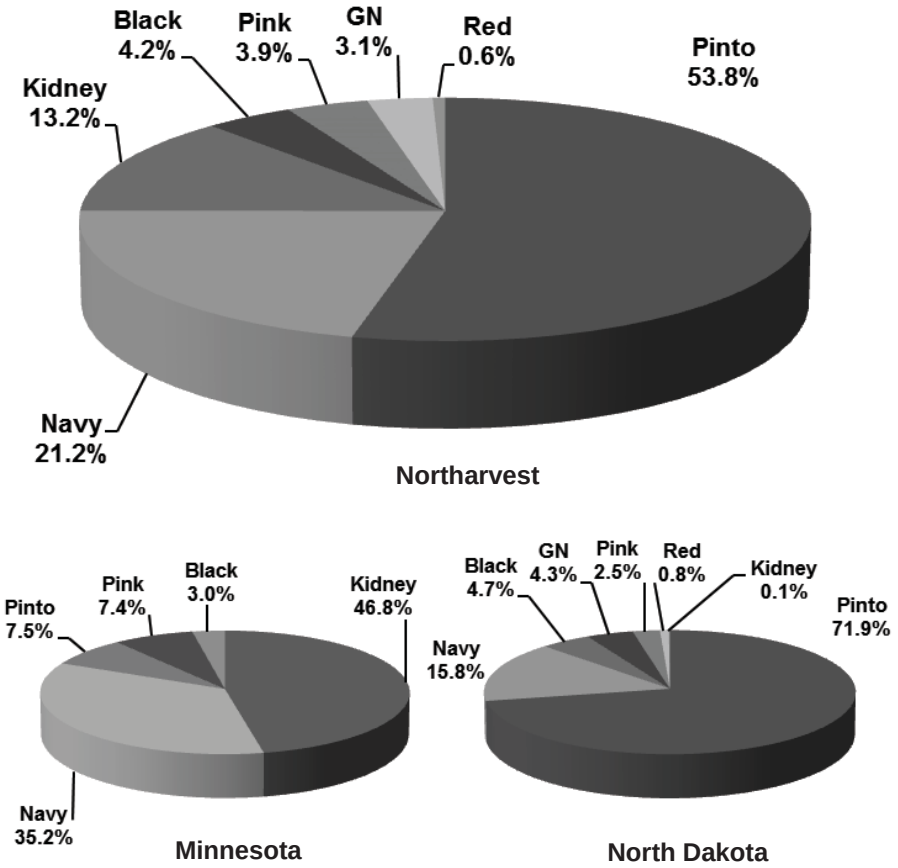
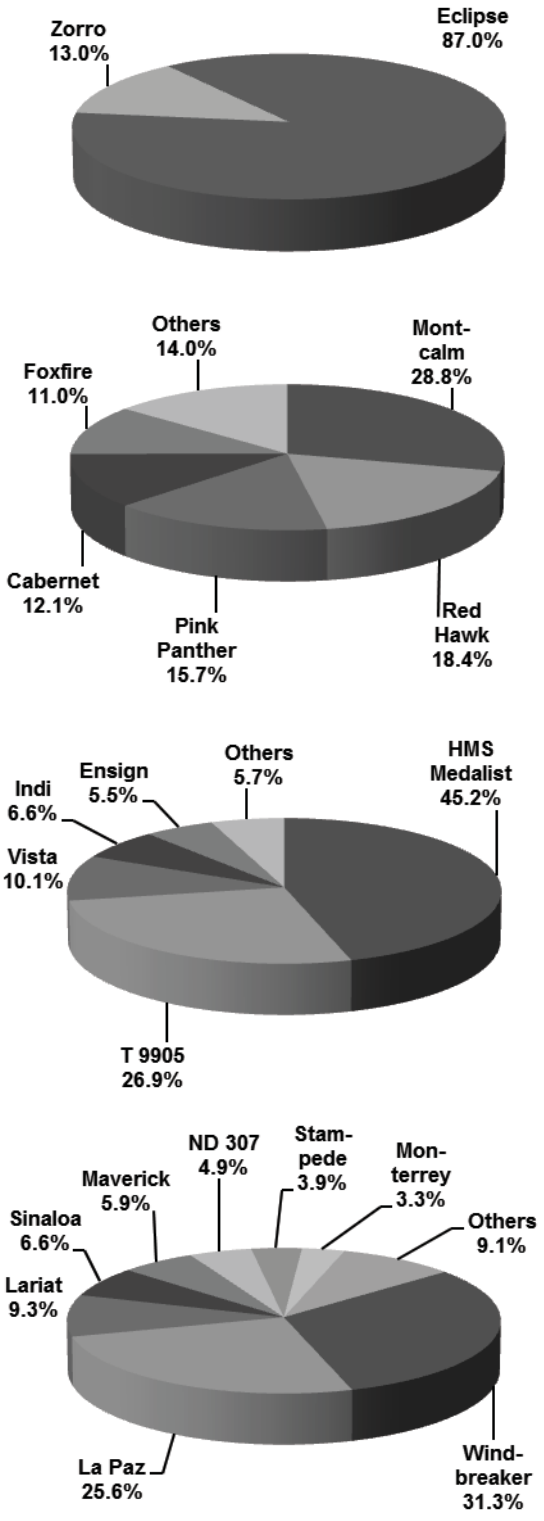


Figure 4. Northarvest dry bean market classes grown in 2013.

Table 5. Dry bean varieties grown in 2013.

		Acres planted[a]					
Variety	**Class**	**Minnesota**	**%[b]**	**North Dakota**	**%[b]**	**Northarvest**	**%[b]**
Eclipse	Black	545	2.4	2,465	4.2	3,010	3.7
Zorro	Black	148	0.6	300	0.5	448	0.5
Total Black	**Black**	**693**	**3**	**2,765**	**4.7**	**3,458**	**4.2**
Orion	GN[c]	0	0	1,791	3	1,791	2.2
Not specified	GN[c]	0	0	750	1.3	750	0.9
Total GN	**GN[c]**	**0**	**0**	**2,541**	**4.3**	**2,541**	**3.1**
Montcalm	Kidney	3,133	13.6	0	0	3,133	3.8
Red Hawk	Kidney	1,995	8.6	0	0	1,995	2.4
Pink Panther	Kidney	1,703	7.4	0	0	1,703	2.1
Cabernet	Kidney	1,311	5.7	0	0	1,311	1.6
Foxfire	Kidney	1,196	5.2	0	0	1,196	1.5
CELRK	Kidney	560	2.4	0	0	560	0.7
Beluga	Kidney	445	1.9	0	0	445	0.5
Red Rover	Kidney	370	1.6	55	0.1	425	0.5
GTS 401	Kidney	96	0.4	0	0	96	0.1
Total Kidney	**Kidney**	**10,809**	**46.8**	**55**	**0.1**	**10,864**	**13.2**
HMS Medalist	Navy	2,426	10.5	5,480	9.2	7,906	9.6
T9905	Navy	2,712	11.7	1,982	3.3	4,694	5.7
Vista	Navy	1,757	7.6	0	0	1,757	2.1
Indi	Navy	0	0	1,156	2	1,156	1.4
Ensign	Navy	460	2	504	0.9	964	1.2
Vigilant	Navy	280	1.2	80	0.1	360	0.4
Norstar	Navy	135	0.6	144	0.2	279	0.3
Avalanche	Navy	240	1	0	0	240	0.3
Navigator	Navy	61	0.3	0	0	61	0.1
Not specified	Navy	60	0.3	0	0	60	0.1
Total Navy	**Navy**	**8,131**	**35.2**	**9,346**	**15.8**	**17,477**	**21.2**
Floyd	Pink	436	1.9	1,082	1.8	1,518	1.8
Sedona	Pink	840	3.6	400	0.7	1,240	1.5
ISB 473	Pink	292	1.3	0	0	292	0.4
ISB 537	Pink	150	0.6	0	0	150	0.2
Total Pink	**Pink**	**1,718**	**7.4**	**1,482**	**2.5**	**3,200**	**3.9**
Windbreaker	Pinto	733	3.2	13,117	22.1	13,850	16.8
La Paz	Pinto	40	0.2	11,300	19.1	11,340	13.8
Lariat	Pinto	200	0.9	3,909	6.6	4,109	5
Sinaloa	Pinto	0	0	2,946	5	2,946	3.6
Maverick	Pinto	250	1.1	2,368	4	2,618	3.2
ND 307	Pinto	20	0.1	2,160	3.6	2,180	2.6
Stampede	Pinto	0	0	1,745	2.9	1,745	2.1
Monterrey	Pinto	68	0.3	1,410	2.4	1,478	1.8
Buster	Pinto	340	1.5	720	1.2	1,060	1.3
Sonora	Pinto	0	0	600	1	600	0.7
Medicine Hat	Pinto	0	0	589	1	589	0.7
Not specified	Pinto	0	0	450	0.8	450	0.5
Sequoia	Pinto	0	0	360	0.6	360	0.4
Santa Cruz	Pinto	0	0	305	0.5	305	0.4
GTS 904	Pinto	0	0	200	0.3	200	0.2
Baja	Pinto	0	0	160	0.3	160	0.2
Topaz	Pinto	0	0	150	0.3	150	0.2
Galena	Pinto	90	0.4	0	0	90	0.1
GTS 907	Pinto	0	0	90	0.2	90	0.1
Total Pinto	**Pinto**	**1,741**	**7.5**	**42,579**	**71.9**	**44,320**	**53.8**
Small Red	Red	0	0	342	0.6	342	0.4
Merlot	Red	0	0	140	0.2	140	0.2
Total Red	**Red**	**0**	**0**	**482**	**0.8**	**482**	**0.6**
Grand Total	**All Classes**	**23,092**	**100**	**59,250**	**100**	**82,342**	**100**

[a]Respondents' acres only.
[b]Percent of respondents' total dry bean acreage.
[c]GN = Great Northern.



Figures 5 to 8 (from top to bottom): major black, kidney, navy and pinto varieties grown by Northarvest survey respondents (% acreage for class).

Table 6. Dry bean production problems reported in 2013.

Worst production problem	Respondents (no.)	Respondents (%)	Acres reported (no.)[a]	Acres reported (%)[a]
Minnesota				
Drought	29	43.3	7,254	31.4
Delayed planting	18	26.9	4,357	18.9
Excess water	33	49.3	3,299	14.3
Hail	14	20.9	2,088	9
Disease	8	11.9	2,069	9
None reported	10	14.9	2,066	8.9
Weeds	13	19.4	1,770	7.7
Emergence/stand	13	19.4	1,538	6.7
Soil salinity	4	6	465	2
Applied herbicide injury	2	3	420	1.8
Micronutrient deficiency	2	3	420	1.8
Frost	1	1.5	235	1
Herbicide drift	5	7.5	131	0.6
Insects	1	1.5	72	0.3
North Dakota				
Delayed planting	54	48.2	24,457	41.3
Excess water	59	52.7	8,023	13.5
Drought	27	24.1	7,656	12.9
Weeds	28	25	5,488	9.3
Disease	22	19.6	4,410	7.4
None reported	10	8.9	4,410	7.4
Emergence/stand	22	19.6	3,129	5.3
Hail	14	12.5	3,090	5.2
Soil salinity	26	23.2	1,458	2.5
Applied herbicide injury	6	5.4	1,066	1.8
Insects	1	0.9	700	1.2
Herbicide drift	4	3.6	303	0.5
Frost	5	4.5	220	0.4
Micronutrient deficiency	0	0	0	0
Northarvest				
Delayed planting	72	40.2	28,814	35
Drought	56	31.3	14,910	18.1
Excess water	92	51.4	11,322	13.7
Weeds	41	22.9	7,258	8.8
Disease	30	16.8	6,479	7.9
None reported	20	11.2	6,476	7.9
Hail	28	15.6	5,178	6.3
Emergence/stand	35	19.6	4,667	5.7
Soil salinity	30	16.8	1,923	2.3
Applied herbicide injury	8	4.5	1,486	1.8
Insects	2	1.1	772	0.9
Frost	6	3.4	455	0.6
Herbicide drift	9	5	434	0.5
Micronutrient deficiency	2	1.1	420	0.5

[a]Respondents' acres only.

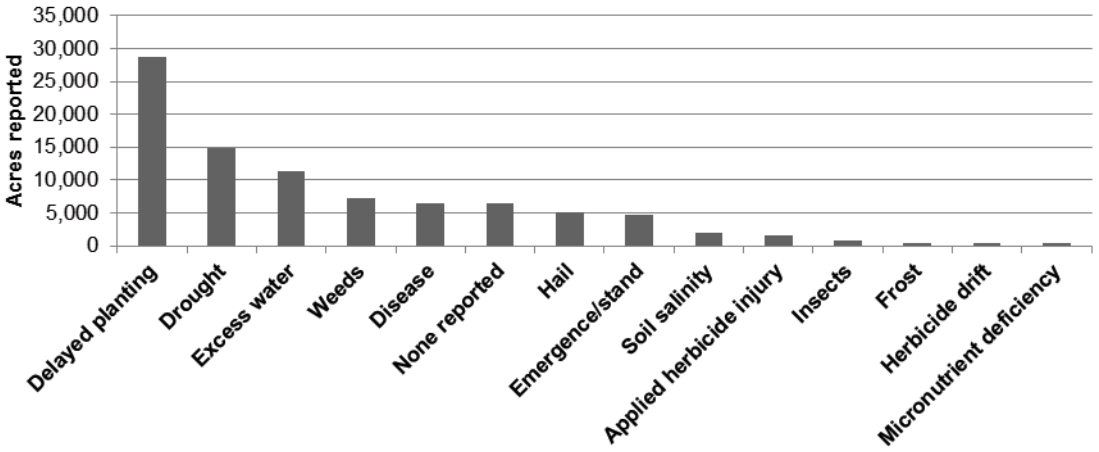


Figure 9. Northarvest respondents' reported acres for dry bean production problems in 2013.

Table 7. Row spacing by dry bean market class in 2013.

	Black[a]		Great Northern		Kidney		Navy[a]		Pink		Pinto[a]		Red	
Row spacing	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Minnesota														
< 11 inches	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 to 15 inches	1	16.7	0	0	0	0	2	5.7	0	0	0	0	0	0
16 to 20 inches	0	0	0	0	1	4.5	3	8.6	0	0	0	0	0	0
21 to 25 inches	4	66.7	0	0	9	40.9	25	71.4	4	80	4	66.7	0	0
26 to 30 inches	1	16.7	0	0	12	54.5	5	14.3	1	20	2	33.3	0	0
> 30 inches	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**6**	**100**	**0**	**0**	**22**	**100**	**35**	**100**	**5**	**100**	**6**	**100**	**0**	**0**
North Dakota														
< 11 inches	1	8.3	0	0	0	0	0	0	0	0	1	1.2	0	0
11 to 15 inches	3	25	0	0	0	0	0	0	0	0	6	7.1	0	0
16 to 20 inches	1	8.3	0	0	0	0	0	0	0	0	3	3.5	0	0
21 to 25 inches	5	41.7	1	25	0	0	15	60	3	75	32	37.6	1	50
26 to 30 inches	2	16.7	3	75	1	100	10	40	1	25	42	49.4	1	50
> 30 inches	0	0	0	0	0	0	0	0	0	0	1	1.2	0	0
Total	**12**	**100**	**4**	**100**	**1**	**100**	**25**	**100**	**4**	**100**	**85**	**100**	**2**	**100**
Northarvest														
< 11 inches	1	5.6	0	0	0	0	0	0	0	0	1	1.1	0	0
11 to 15 inches	4	22.2	0	0	0	0	2	3.3	0	0	6	6.6	0	0
16 to 20 inches	1	5.6	0	0	1	4.3	3	5	0	0	3	3.3	0	0
21 to 25 inches	9	50	1	25	9	39.1	40	66.7	7	77.8	36	39.6	1	50
26 to 30 inches	3	16.7	3	75	13	56.5	15	25	2	22.2	44	48.4	1	50
> 30 inches	0	0	0	0	0	0	0	0	0	0	1	1.1	0	0
Total	**18**	**100**	**4**	**100**	**23**	**100**	**60**	**100**	**9**	**100**	**91**	**100**	**2**	**100**

[a]Black, navy and pinto varieties are Type II (upright) varieties.

Table 8. Seeding rate by dry bean market class in 2013.

	Black[b]		Great Northern		Kidney		Navy[b]		Pink		Pinto[b]		Red	
Seeding rate[a]	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Minnesota														
< 70,000	0	0	0	0	1	4.8	0	0	0	0	0	0	0	0
70 to 79,000	0	0	0	0	7	33.3	0	0	2	50	3	60	0	0
80 to 89,000	0	0	0	0	12	57.1	0	0	2	50	1	20	0	0
90 to 99,000	0	0	0	0	1	4.8	1	2.9	0	0	0	0	0	0
100 to 109,000	1	50	0	0	0	0	12	35.3	0	0	1	20	0	0
110 to 119,000	0	0	0	0	0	0	7	20.6	0	0	0	0	0	0
120 to 129,000	0	0	0	0	0	0	13	38.2	0	0	0	0	0	0
> 129,000	1	50	0	0	0	0	1	2.9	0	0	0	0	0	0
Total	**2**	**100**	**0**	**0**	**21**	**100**	**34**	**100**	**4**	**100**	**5**	**100**	**0**	**0**
North Dakota														
< 70,000	0	0	0	0	0	0	0	0	0	0	13	17.1	0	0
70 to 79,000	1	9.1	4	100	1	100	0	0	3	75	36	47.4	1	50
80 to 89,000	0	0	0	0	0	0	0	0	1	25	20	26.3	1	50
90 to 99,000	3	27.3	0	0	0	0	7	31.8	0	0	5	6.6	0	0
100 to 109,000	3	27.3	0	0	0	0	5	22.7	0	0	2	2.6	0	0
110 to 119,000	2	18.2	0	0	0	0	2	9.1	0	0	0	0	0	0
120 to 129,000	1	9.1	0	0	0	0	7	31.8	0	0	0	0	0	0
> 129,000	1	9.1	0	0	0	0	1	4.5	0	0	0	0	0	0
Total	**11**	**100**	**4**	**100**	**1**	**100**	**22**	**100**	**4**	**100**	**76**	**100**	**2**	**100**
Northarvest														
< 70,000	0	0	0	0	1	4.5	0	0	0	0	13	16	0	0
70 to 79,000	1	7.7	4	100	8	36.4	0	0	5	62.5	39	48.1	1	50
80 to 89,000	0	0	0	0	12	54.5	0	0	3	37.5	21	25.9	1	50
90 to 99,000	3	23.1	0	0	1	4.5	8	14.3	0	0	5	6.2	0	0
100 to 109,000	4	30.8	0	0	0	0	17	30.4	0	0	3	3.7	0	0
110 to 119,000	2	15.4	0	0	0	0	9	16.1	0	0	0	0	0	0
120 to 129,000	1	7.7	0	0	0	0	20	35.7	0	0	0	0	0	0
> 129,000	2	15.4	0	0	0	0	2	3.6	0	0	0	0	0	0
Total	**13**	**100**	**4**	**100**	**22**	**100**	**56**	**100**	**8**	**100**	**81**	**100**	**2**	**100**

[a]Live seeds per acre.
[b]Black, navy and pinto varieties are Type II (upright) varieties.

Table 9. Percent of total dry bean acres harvested by direct combining in 2013.

Percent direct combined	Respondents (no.)	Respondents (%)	Acres reported[a]	Acres reported[a] (%)
Minnesota				
1-25%	2	3	811	3.6
26-50%	4	6.1	2,805	12.4
51-75%	0	0	0	0
76-100%	31	47	5,099	22.5
No direct harvest	29	43.9	13,929	61.5
Total	**66**	**100**	**22,644**	**100**
North Dakota				
1-25%	6	5.4	4,869	8.4
26-50%	5	4.5	4,187	7.2
51-75%	4	3.6	2,430	4.2
76-100%	54	48.6	23,611	40.6
No direct harvest	42	37.8	23,054	39.6
Total	**111**	**100**	**58,151**	**100**
Northarvest				
1-25%	8	4.5	5,680	7
26-50%	9	5.1	6,992	8.7
51-75%	4	2.3	2,430	3
76-100%	85	48	28,710	35.5
No direct harvest	71	40.1	36,983	45.8
Total	**177**	**100**	**80,795**	**100**

[a]Respondents' harvested acres only.

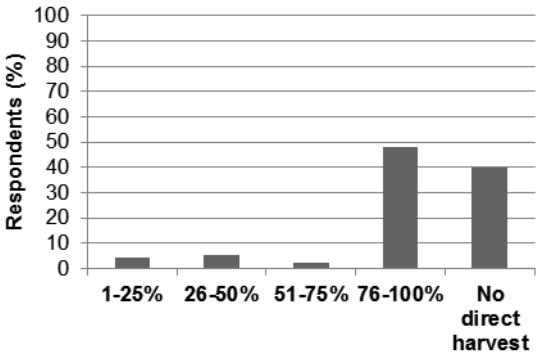


Figure 10. Northarvest percent of dry bean acres harvested by direct combining in 2013.

Table 10. Estimated yield loss in harvested dry beans in 2013.

	Direct Harvest		Conventional Harvest	
Estimated yield loss	Respondents (no.)	Respondents (%)	Respondents (no.)	Respondents (%)
Minnesota				
0%	1	2.7	5	11.1
1-5%	15	40.5	28	62.2
6-10%	12	32.4	8	17.8
11-15%	7	18.9	3	6.7
16-20%	2	5.4	1	2.2
Total	**37**	**100**	**45**	**100**
North Dakota				
0%	0	0	3	4.1
1-5%	25	36.2	55	74.3
6-10%	31	44.9	14	18.9
11-15%	10	14.5	1	1.4
16-20%	3	4.3	1	1.4
Total	**69**	**100**	**74**	**100**
Northarvest				
0%	1	0.9	8	6.7
1-5%	40	37.7	83	69.7
6-10%	43	40.6	22	18.5
11-15%	17	16	4	3.4
16-20%	5	4.7	2	1.7
Total	**106**	**100**	**119**	**100**

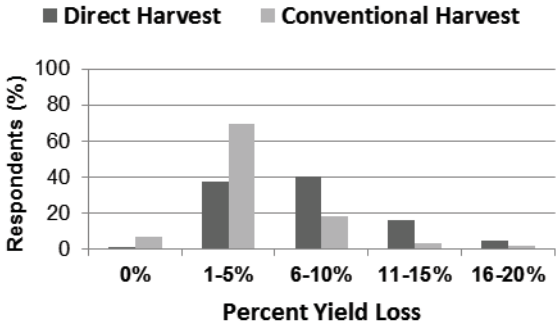


Figure 11. Northarvest estimated yield loss in harvested dry beans in 2013.

Table 11. Dry bean field tillage practices in 2013.

Tillage practice	Acres reported (no.)[a]	Acres reported (%)[a]
Minnesota		
Conventional	19,568	84.7
Minimum	3,164	13.7
Strip tillage	0	0
No-till	360	1.6
Total	**23,092**	**100**
North Dakota		
Conventional	41,007	71.1
Minimum	13,529	23.5
Strip tillage	1,900	3.3
No-till	1,205	2.1
Total	**57,641**	**100**
Northarvest		
Conventional	60,575	75
Minimum	16,693	20.7
Strip tillage	1,900	2.4
No-till	1,565	1.9
Total	**80,733**	**100**

[a]Respondents' acres only.

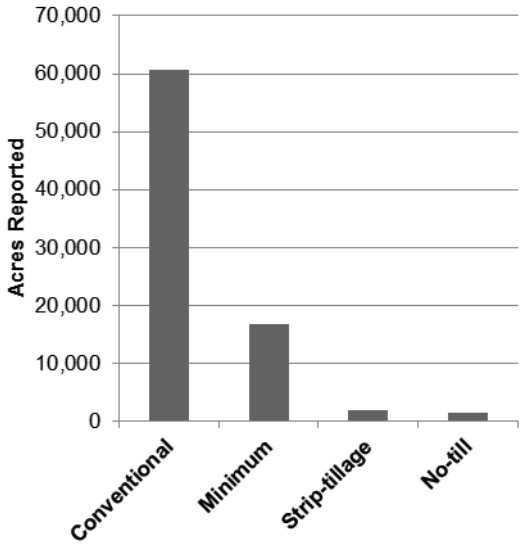


Figure 12. Northarvest dry bean field tillage practices in 2013.

Agronomy

Table 12. Use of fertilizers on dry bean fields in 2013.

Fertilizer	Respondents (no.)	Respondents (%)
Minnesota	**58**	
Nitrogen	55	94.8
Phosphorus	50	86.2
Potash	41	70.7
Zinc	38	65.5
Sulfur	22	37.9
North Dakota	**98**	
Nitrogen	81	82.7
Phosphorus	74	75.5
Potash	29	29.6
Zinc	63	64.3
Sulfur	25	25.5
Northarvest	**156**	
Nitrogen	136	87.2
Phosphorus	124	79.5
Potash	70	44.9
Zinc	101	64.7
Sulfur	47	30.1

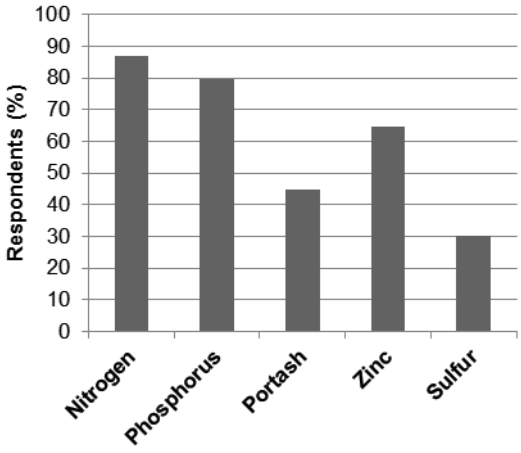


Figure 13. Northarvest use of fertilizers on dry bean fields in 2013.

Table 13. Use of soil test prior to fertilization of dry bean fields in 2013.

Soil test	Respondents (no.)	Respondents (%)
Minnesota		
Soil test used	47	71.2
Soil test not used	19	28.8
Total	**66**	**100**
North Dakota		
Soil test used	87	78.4
Soil test not used	24	21.6
Total	**111**	**100**
Northarvest		
Soil test used	134	75.7
Soil test not used	43	24.3
Total	**177**	**100**

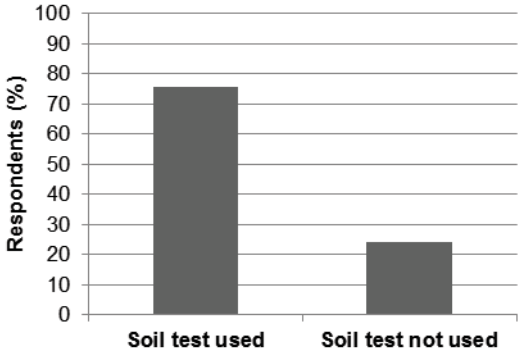


Figure 14. Northarvest use of soil test in 2013.

Table 14. Use of *Rhizobium* inoculants on dry bean fields in 2013.

Rhizobium use	Respondents (no.)	Respondents (%)
Minnesota		
Inoculant used	13	20.6
Inoculant not used	50	79.4
Total	**63**	**100**
North Dakota		
Inoculant used	17	15.6
Inoculant not used	92	84.4
Total	**109**	**100**
Northarvest		
Inoculant used	30	17.4
Inoculant not used	142	82.6
Total	**172**	**100**

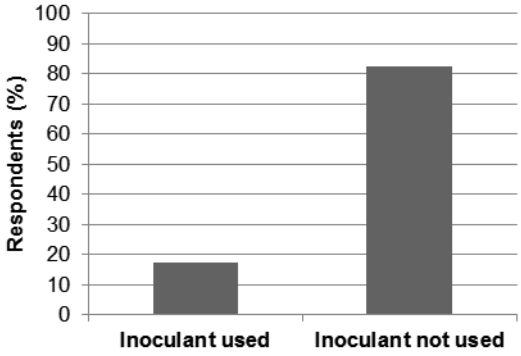


Figure 15. Northarvest use of inoculant in 2013.

Table 15. Use of site-specific nutrient management (SSNM) on dry bean fields in 2013.

Soil test	Respondents (no.)	Respondents (%)
Minnesota		
SSNM used	17	25.8
SSNM not used	49	74.2
Total	**66**	**100**
North Dakota		
SSNM used	19	17.3
SSNM not used	91	82.7
Total	**110**	**100**
Northarvest		
SSNM used	36	20.5
SSNM not used	140	79.5
Total	**176**	**100**

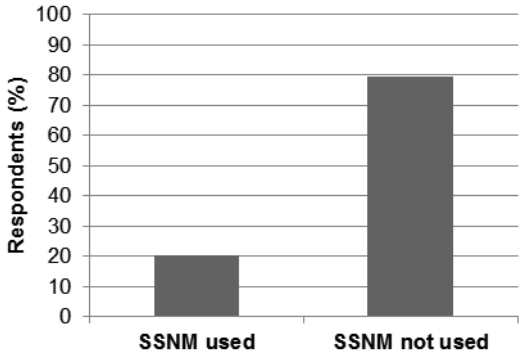


Figure 16. Northarvest use of site-specific nutrient management in 2013.

Table 16. Desiccants used on dry beans in 2013.

Dessicant	Respon-dents (no.)	Respon-dents (%)	Acres reported (no.)[a]	Acres reported (%)[a]
Minnesota				
Valor	40	59.7	11,803	51.1
No desiccant used	17	25.4	5,176	22.4
Glyphosate	11	16.4	2,377	10.3
Paraquat	9	13.4	1,802	7.8
Sharpen	3	4.5	835	3.6
Sodium chlorate	3	4.5	486	2.1
North Dakota				
Valor	50	45	21,263	35.9
Glyphosate	31	27.9	12,929	21.9
No desiccant used	28	25.2	12,808	21.7
Paraquat	17	15.3	8,577	14.5
Sharpen	15	13.5	8,302	14
Sodium chlorate	5	4.5	2,383	4
Northarvest				
Valor	90	50.6	33,066	40.2
No desiccant used	45	25.3	17,984	21.9
Glyphosate	42	23.6	15,306	18.6
Paraquat	26	14.6	10,379	12.6
Sharpen	18	10.1	9,137	11.1
Sodium chlorate	8	4.5	2,869	3.5

[a]Respondents' acres only.

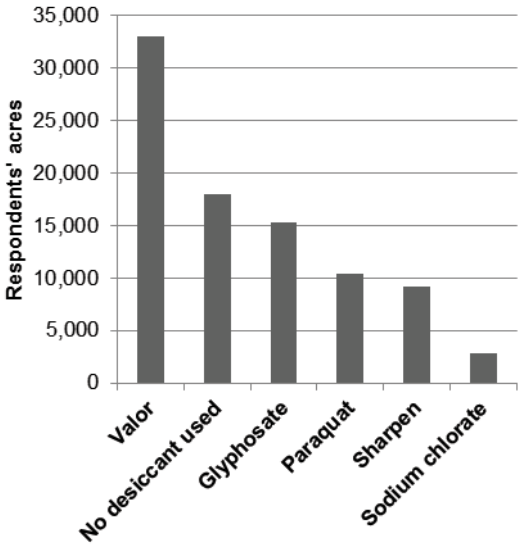


Figure 17. Northarvest desiccants used on dry beans in 2013.

Table 17. Frequency of crops in dry bean crop rotation program, 2009-2012.

	2012	2011	2010	2009	4-year average
Crop	Respon-dents (%)	Respon-dents (%)	Respon-dents (%)	Respon-dents (%)	Respon-dents (%)
Minnesota					
Alfalfa	0	1.5	1.5	1.5	1.1
Barley	0	6.1	0	1.5	1.9
Corn	54.5	36.4	45.5	27.3	40.9
Dry bean	6.1	12.1	24.2	27.3	17.4
Field pea	0	1.5	3	0	1.1
Hay	0	0	1.5	1.5	0.8
Oats	1.5	3	0	1.5	1.5
Potato	1.5	3	4.5	1.5	2.7
Soybean	0	31.8	27.3	21.2	20.1
Sugar beet	28.8	16.7	3	13.6	15.5
Spring wheat	27.3	15.2	19.7	9.1	17.8
No crop	0	1.5	0	0	0.4
North Dakota					
Barley	11	1.8	1.8	1.8	4.1
Canola	0.9	2.8	2.8	0.9	1.8
Corn	31.2	8.3	25.7	8.3	18.3
Dry bean	7.3	37.6	24.8	51.4	30.3
Field pea	0	0.9	0	0.9	0.5
Flax	0.9	0	0	0	0.2
Potato	5.5	7.3	3.7	3.7	5
Soybean	0	32.1	7.3	11.9	12.8
Sugarbeet	21.1	13.8	7.3	8.3	12.6
Sunflower	0	0.9	0	0	0.2
Wheat	67	34.9	55	25.7	45.7
No crop	0	2.8	0	0.9	0.9
Northarvest					
Alfalfa	0	0.6	0.6	0.6	0.4
Barley	6.9	3.4	1.1	1.7	3.3
Canola	0.6	1.7	1.7	0.6	1.1
Corn	40	18.9	33.1	15.4	26.9
Dry bean	6.9	28	24.6	42.3	25.4
Field pea	0	1.1	1.1	0.6	0.7
Flax	0.6	0	0	0	0.1
Hay	0	0	0.6	0.6	0.3
Oats	0.6	1.1	0	0.6	0.6
Potato	4	5.7	4	2.9	4.1
Soybean	0	32	14.9	15.4	15.6
Sugarbeet	24	14.9	5.7	10.3	13.7
Sunflower	0	0.6	0	0	0.1
Wheat	52	27.4	41.7	19.4	35.1
No crop	0	2.3	0	0.6	0.7

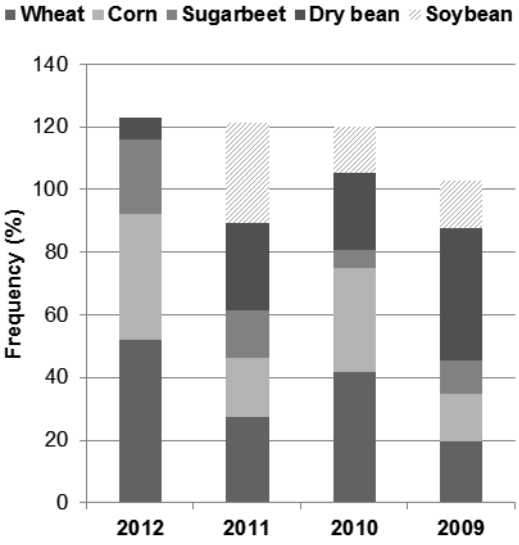


Figure 18. Northarvest frequency of major crops in dry bean crop rotation program, 2009-2012.

Table 18. Number of years dry beans are grown in dry bean crop rotation program.

Number of years	Respondents (no.)	Respondents (%)
Minnesota	**65**	
Every year	1	1.5
Every 2 years	11	16.9
Every 3 years	15	23.1
Every 4 years	12	18.5
Every 5 years	26	40
North Dakota	**109**	
Every year	4	3.7
Every 2 years	42	38.5
Every 3 years	24	22
Every 4 years	25	22.9
Every 5 years	14	12.8
Northarvest	**174**	
Every year	5	2.9
Every 2 years	53	30.5
Every 3 years	39	22.4
Every 4 years	37	21.3
Every 5 years	40	23

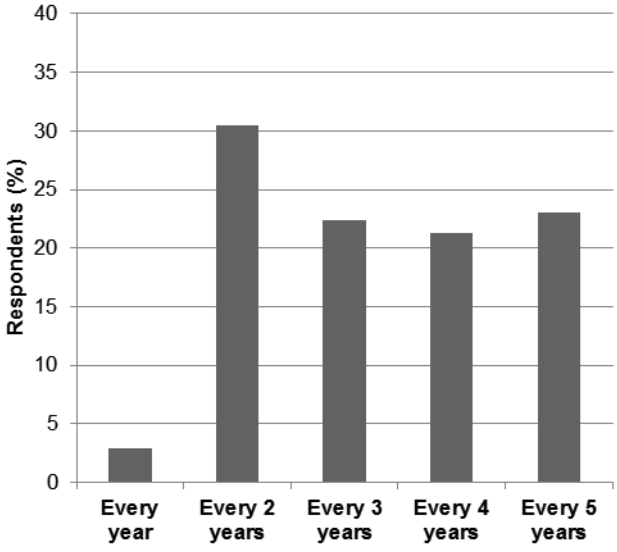


Figure 19. Northarvest number of years dry beans are grown in dry bean crop rotation program.

Table 19. Worst insect problem in dry beans in 2013.

Insect[a]	Respondents (no.)	Respondents (%)	Acres reported (no.)[b,c]	Acres reported (%)[b,c]
Minnesota				
Leafhoppers	31	46.3	11,234	48.6
None	24	35.8	6,287	27.2
Aphids	5	7.5	2,720	11.8
Bean leaf beetle	2	3	1,350	5.8
Grasshoppers	3	4.5	1,267	5.5
Armyworms	2	3	234	1
Total	**67**	**100**	**23,092**	**100**
North Dakota				
None	86	76.8	42,802	72.2
Grasshoppers	7	6.3	5,232	8.8
Wireworms	7	6.3	4,255	7.2
Leafhoppers	5	4.5	3,597	6.1
Cutworms	4	3.6	2,461	4.2
Foliage caterpillars	1	0.9	550	0.9
Aphids	1	0.9	200	0.3
Seed corn maggot	1	0.9	153	0.3
Total	**112**	**100**	**59,250**	**100**
Northarvest				
None	110	61.5	49,089	59.6
Leafhoppers	36	20.1	14,831	18
Grasshoppers	10	5.6	6,499	7.9
Wireworms	7	3.9	4,255	5.2
Aphids	6	3.4	2,920	3.5
Cutworms	4	2.2	2,461	3
Bean leaf beetle	2	1.1	1,350	1.6
Foliage caterpillars	1	0.6	550	0.7
Armyworms	2	1.1	234	0.3
Seed corn maggot	1	0.6	153	0.2
Total	**179**	**100**	**82,342**	**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.

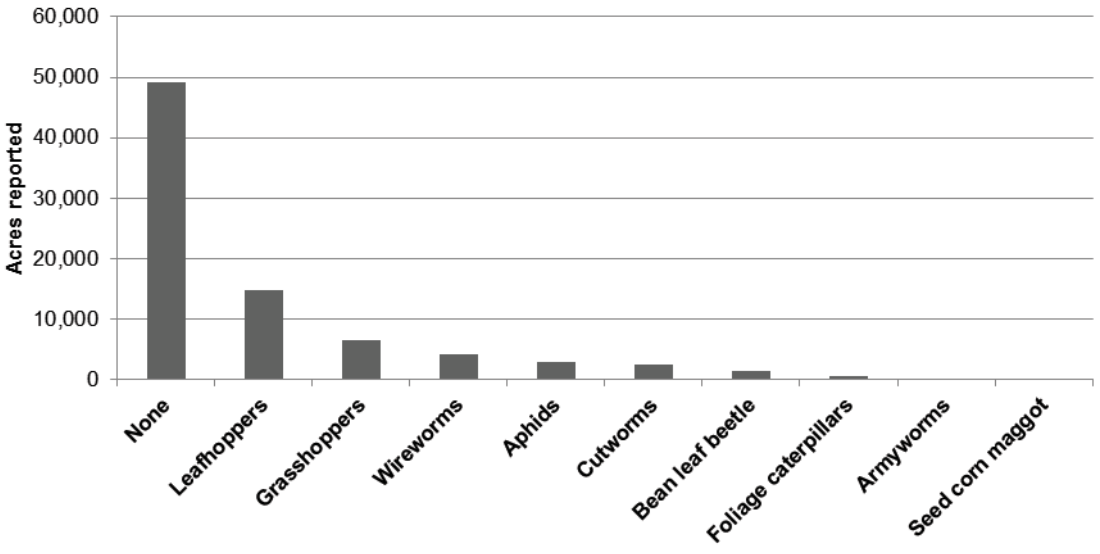


Figure 20. Northarvest worst insect problem in dry beans in 2013.

Table 20. Insects ranked as one of the three worst in dry beans in 2013.

Insect[a]	Respondents (no.)	Respondents (%)	Acres reported (no.)[b,c]	Acres reported (%)[b,c]
Minnesota				
Leafhoppers	35	52.2	12,922	56
None	24	35.8	6,287	27.2
Grasshoppers	11	16.4	4,390	19
Aphids	9	13.4	3,956	17.1
Bean leaf beetle	7	10.4	3,505	15.2
Spider mites	10	14.9	2,874	12.4
Wireworms	3	4.5	2,300	10
Seed corn maggot	3	4.5	1,800	7.8
Cutworms	4	6	1,389	6
Armyworms	3	4.5	714	3.1
North Dakota				
None	86	76.8	42,802	72.2
Grasshoppers	20	17.9	14,147	23.9
Wireworms	9	8	5,525	9.3
Cutworms	8	7.1	5,491	9.3
Leafhoppers	9	8	4,825	8.1
Aphids	6	5.4	4,239	7.2
Seed corn maggot	4	3.6	2,844	4.8
Bean leaf beetle	4	3.6	2,647	4.5
Spider mites	3	2.7	1,357	2.3
Foliage caterpillars	1	0.9	550	0.9
Northarvest				
None	110	61.5	49,089	59.6
Grasshoppers	31	17.3	18,537	22.5
Leafhoppers	44	24.6	17,747	21.6
Aphids	15	8.4	8,195	10
Wireworms	12	6.7	7,825	9.5
Cutworms	12	6.7	6,880	8.4
Bean leaf beetle	11	6.1	6,152	7.5
Seed corn maggot	7	3.9	4,644	5.6
Spider mites	13	7.3	4,231	5.1
Armyworms	3	1.7	714	0.9
Foliage caterpillars	1	0.6	550	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.

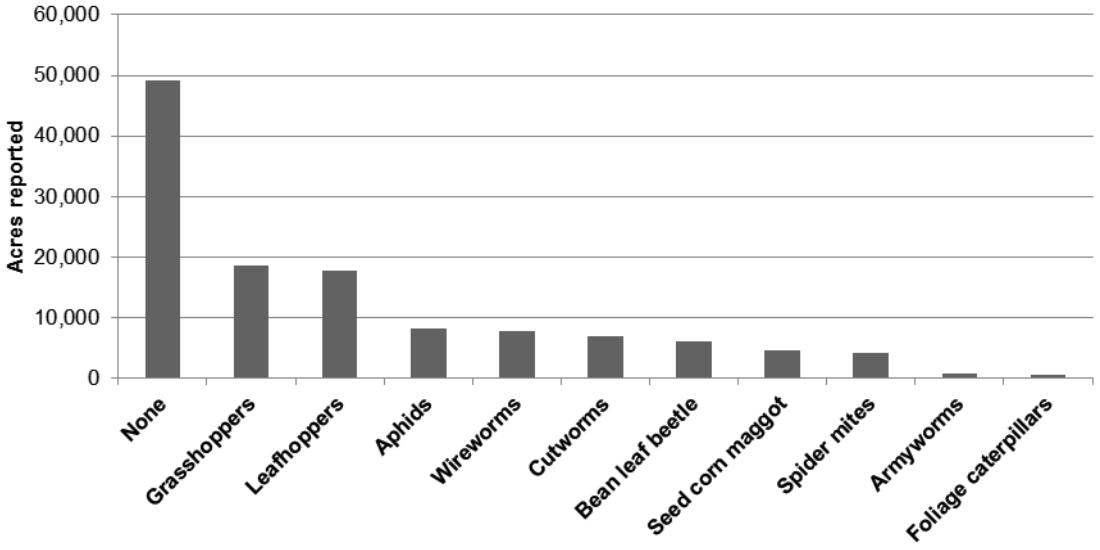


Figure 21. Northarvest insects ranked as one of the three worst in dry beans in 2013.

Table 21. Foliar insecticide use in dry beans in 2013.

Insecticide	Respondents (no.)	Respondents (%)	Acres reported (no.)[a,b]	Acres reported (%)[a,b]
Minnesota				
Asana XL	19	28.4	4,824	20.9
Hero	2	3	3,333	14.4
Warrior/generics	5	7.5	1,995	8.6
Dimethoate	2	3	560	2.4
Baythroid XL	1	1.5	475	2.1
None	39	58.2	12,460	54
Insecticide Total			**11,187**	**48.4**
North Dakota				
Warrior/generics	3	2.7	890	1.5
Asana XL	1	0.9	250	0.4
None	108	96.4	58,110	98.1
Insecticide Total			**1,140**	**1.9**
Northarvest				
Asana XL	20	11.2	5,074	6.2
Baythroid XL	2	1.1	3,333	4
Dimethoate	8	4.5	2,885	3.5
Hero	2	1.1	560	0.7
Warrior/generics	1	0.6	475	0.6
None	147	82.1	70,570	85.7
Insecticide Total			**12,327**	**15**

[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.

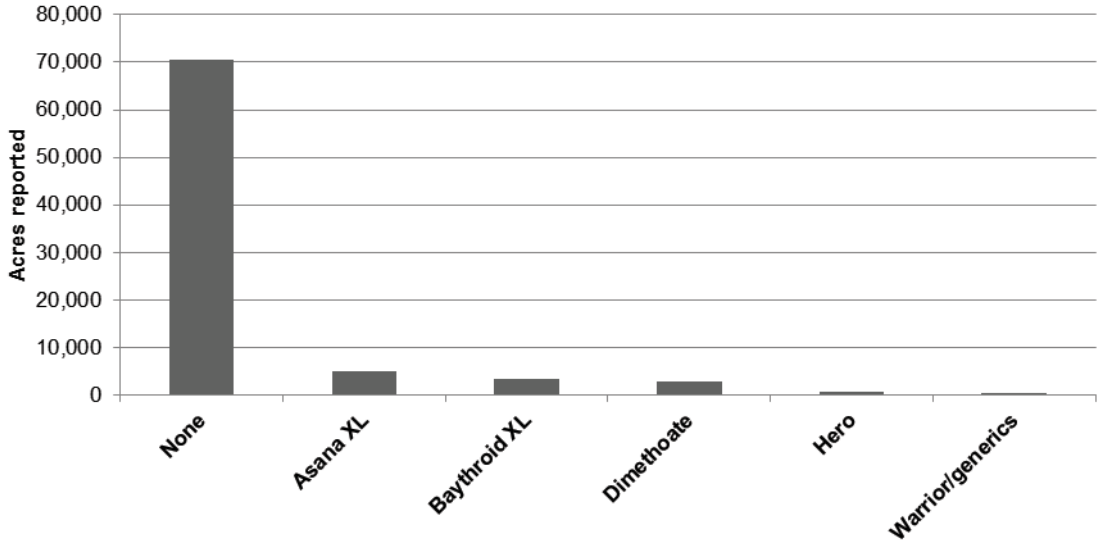


Figure 22. Northarvest foliar insecticide use in dry beans in 2013.

Table 22. Insecticide seed treatment use in dry beans in 2013.

Seed Treatment	Respondents (no.)	Respondents (%)	Acres reported (no.)[a,b]	Acres reported (%)[a,b]
Minnesota				
Cruiser/Cruiser Maxx	31	46.3	10,817	46.8
Lorsban	16	23.9	8,030	34.8
Gaucho/generics	5	7.5	2,055	8.9
Unknown	5	7.5	1,281	5.5
None	22	32.8	6,382	27.6
Seed Treatment Total			**22,183**	**96.1**
North Dakota				
Cruiser/Cruiser Maxx	36	32.1	19,187	32.4
Unknown	28	25	14,038	23.7
Lorsban	8	7.1	3,582	6
Gaucho/generics	4	3.6	2,624	4.4
None	43	38.4	22,559	38.1
Seed Treatment Total			**39,431**	**66.6**
Northarvest				
Cruiser/Cruiser Maxx	67	37.4	30,004	36.4
Unknown	33	18.4	15,319	18.6
Lorsban	24	13.4	11,612	14.1
Gaucho/generics	9	5	4,679	5.7
None	65	36.3	28,941	35.1
Seed Treatment Total			**61,614**	**74.8**

[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.

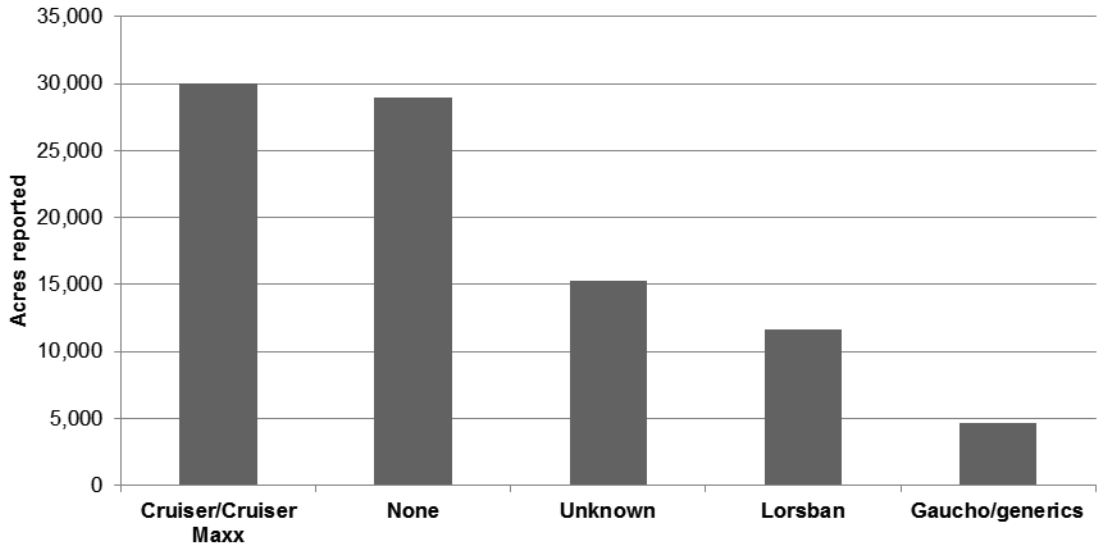


Figure 23. Northarvest insecticide seed treatment use in dry beans in 2013.

Table 23. Worst disease problem in dry beans in 2013.

Disease[a]	Respondents (no.)	Respondents (%)	Acres reported (no.)[b,c]	Acres reported (%)[b,c]
Minnesota				
White mold	25	37.3	10,453	45.3
Root rot	14	20.9	7,223	31.3
None	20	29.9	3,873	16.8
Bacterial blight	5	7.5	1,172	5.1
Rust	1	1.5	200	0.9
Bean common mosaic virus	1	1.5	138	0.6
Other viruses	1	1.5	33	0.1
Total	**67**	**100**	**23,092**	**100**
North Dakota				
White mold	69	61.6	40,948	69.1
None	29	25.9	10,785	18.2
Bacterial blight	7	6.3	3,272	5.5
Root rot	5	4.5	2,917	4.9
Anthracnose	1	0.9	820	1.4
Rust	1	0.9	508	0.9
Total	**112**	**100**	**59,250**	**100**
Northarvest				
White mold	94	52.5	51,401	62.4
None	49	27.4	14,658	17.8
Root rot	19	10.6	10,140	12.3
Bacterial blight	12	6.7	4,444	5.4
Anthracnose	1	0.6	820	1
Rust	2	1.1	708	0.9
Bean common mosaic virus	1	0.6	138	0.2
Other viruses	1	0.6	33	0.1
Total	**179**	**100**	**82,342**	**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.

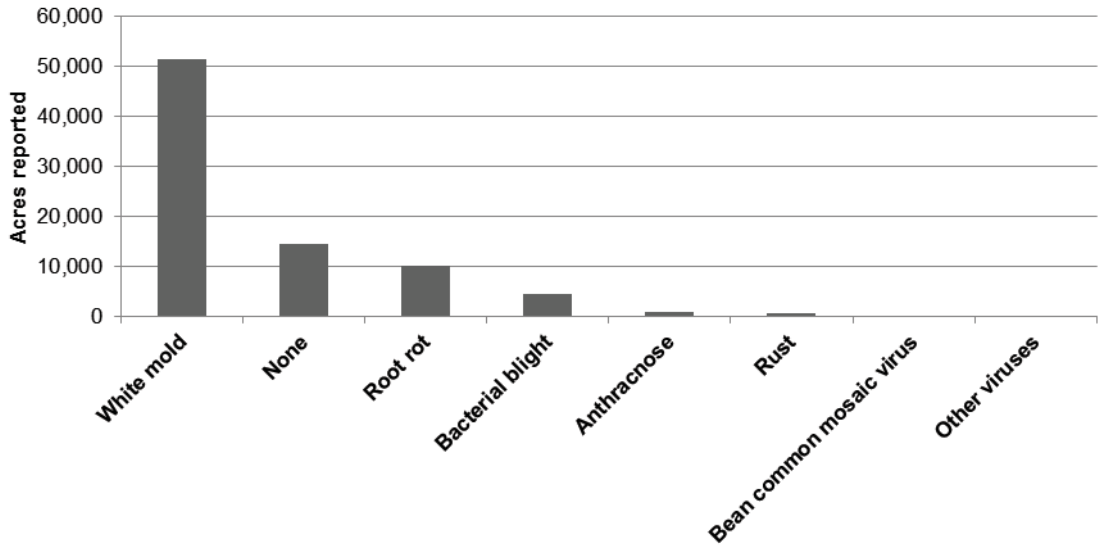


Figure 24. Northarvest worst disease problem in dry beans in 2013.

Table 24. Diseases ranked as one of the three worst in dry beans in 2013.

Disease[a]	Respondents (no.)	Respondents (%)	Acres reported (no.)[b,c]	Acres reported (%)[b,c]
Minnesota				
White mold	40	59.7	18,184	78.7
Root rot	28	41.8	13,414	58.1
Bacterial blight	23	34.3	12,980	56.2
None	20	29.9	3,873	16.8
Bacterial brown spot	4	6	1,793	7.8
Rust	6	9	1,748	7.6
Anthracnose	6	9	1,023	4.4
Other viruses	3	4.5	488	2.1
Bacterial wilt	1	1.5	242	1
Bean common mosaic virus	1	1.5	138	0.6
North Dakota				
White mold	80	71.4	46,957	79.3
Bacterial blight	40	35.7	21,693	36.6
Root rot	25	22.3	16,801	28.4
None	29	25.9	10,785	18.2
Rust	13	11.6	7,962	13.4
Bacterial brown spot	8	7.1	6,486	10.9
Anthracnose	10	8.9	5,172	8.7
Other viruses	6	5.4	1,560	2.6
Bacterial wilt	2	1.8	553	0.9
Bean common mosaic virus	1	0.9	153	0.3
Northarvest				
White mold	120	67	65,141	79.1
Bacterial blight	63	35.2	34,673	42.1
Root rot	53	29.6	30,215	36.7
None	49	27.4	14,658	17.8
Rust	19	10.6	9,710	11.8
Bacterial brown spot	12	6.7	8,279	10.1
Anthracnose	16	8.9	6,195	7.5
Other viruses	9	5	2,048	2.5
Bacterial wilt	3	1.7	795	1
Bean common mosaic virus	2	1.1	291	0.4

[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.

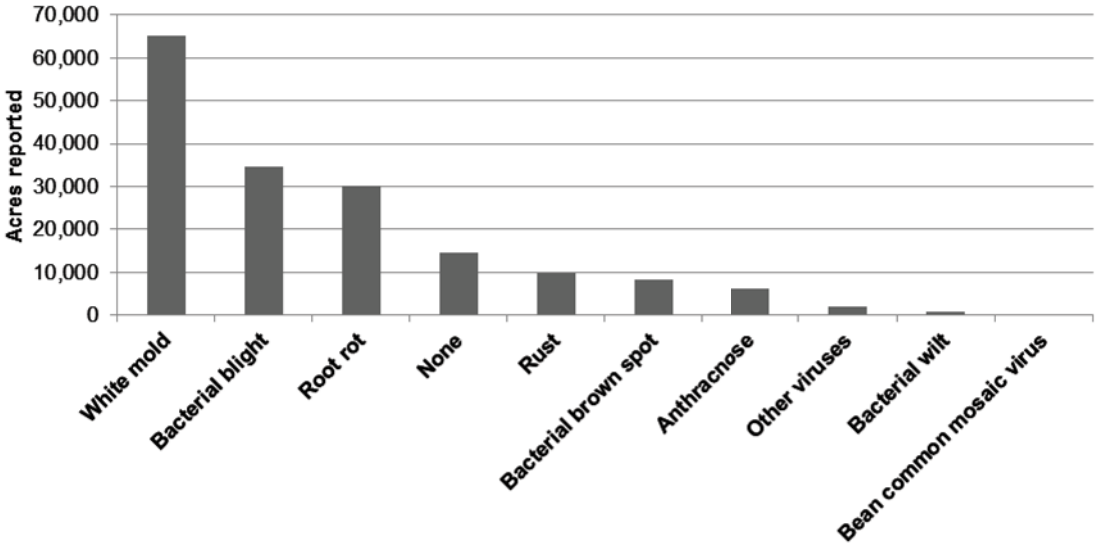


Figure 25. Northarvest diseases ranked as one of the three worst in dry beans in 2013.

Table 25. Foliar and banded fungicide use in dry beans in 2013.

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	25	37.3	12,911	55.9	8,055	24.5	4,856	14.8
Endura	8	11.9	5,766	25	5,214	15.9	552	1.7
Proline	11	16.4	5,401	23.4	4,719	14.4	682	2.1
Omega	2	3	4,683	20.3	4,683	14.3	0	0
Headline	5	7.5	3,000	13	1,400	4.3	1,600	4.9
Priaxor	1	1.5	591	2.6	591	1.8	0	0
Serenade	1	1.5	250	1.1	250	0.8	0	0
Incognito	1	1.5	155	0.7	155	0.5	0	0
ProPulse	1	1.5	50	0.2	50	0.2	0	0
Aproach	1	1.5	30	0.1	30	0.1	0	0
None	25	37.3	4,997	21.6	0	0	0	0
Fungicide Total			**32,837**		**25,147**	**76.6**	**7,690**	**23.4**
North Dakota								
Topsin broadcast	28	25	17,311	29.2	16,356	27.5	955	1.6
Endura	29	25.9	14,368	24.2	14,188	23.8	180	0.3
Incognito	8	7.1	5,917	10	5,537	9.3	380	0.6
Tebuconazole	8	7.1	5,504	9.3	4,544	7.6	960	1.6
Headline	9	8	4,891	8.3	4,596	7.7	295	0.5
Priaxor	5	4.5	3,441	5.8	3,441	5.8	0	0
Topsin banded	4	3.6	2,254	3.8	2,254	3.8	0	0
Proline	4	3.6	2,191	3.7	2,191	3.7	0	0
Aproach	3	2.7	1,420	2.4	1,420	2.4	0	0
ProPulse	4	3.6	1,236	2.1	1,161	2	75	0.1
Quadris Opti	1	0.9	346	0.6	0	0	346	0.6
Omega	3	2.7	325	0.5	325	0.5	0	0
Quadris	1	0.9	300	0.5	300	0.5	0	0
None	48	42.9	17,162	29	0	0	0	0
Fungicide Total			**59,504**		**56,313**	**94.6**	**3,191**	**5.4**
Northarvest								
Topsin broadcast	53	29.6	30,222	36.7	24,411	26.4	5,811	6.3
Endura	37	20.7	20,134	24.5	19,402	21	732	0.8
Headline	14	7.8	7,891	9.6	5,996	6.5	1,895	2.1
Proline	15	8.4	7,592	9.2	6,910	7.5	682	0.7
Incognito	9	5	6,072	7.4	5,692	6.2	380	0.4
Tebuconazole	8	4.5	5,504	6.7	4,544	4.9	960	1
Omega	5	2.8	5,008	6.1	5,008	5.4	0	0
Priaxor	6	3.4	4,032	4.9	4,032	4.4	0	0
Topsin banded	4	2.2	2,254	2.7	2,254	2.4	0	0
Aproach	4	2.2	1,450	1.8	1,450	1.6	0	0
ProPulse	5	2.8	1,286	1.6	1,211	1.3	75	0.1
Quadris Opti	1	0.6	346	0.4	0	0	346	0.4
Quadris	1	0.6	300	0.4	300	0.3	0	0
Serenade	1	0.6	250	0.3	250	0.3	0	0
None	73	40.8	22,159	26.9	0	0	0	0
Fungicide Total			**92,341**		**81,460**	**88.2**	**10,881**	**11.8**

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

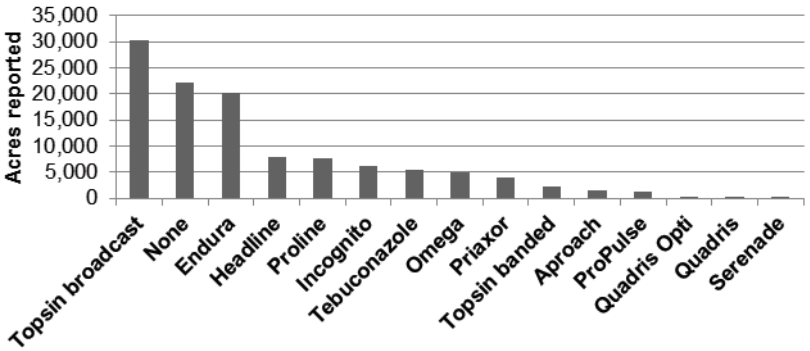


Figure 26. Northarvest foliar and banded fungicide use in dry beans in 2013.

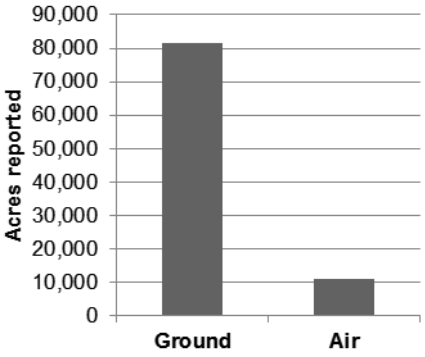


Figure 27. Northarvest fungicide application method in dry beans in 2013.

Table 26. Fungicide seed treatment use in dry beans in 2013.

Seed treatment	Respondents (no.)	Respondents (%)[b]	Total acres treated (no.)[a]	Total acres treated (%)[a,b]
Minnesota				
Apron	41	61.2	16,953	73.4
Maxim	35	52.2	15,313	66.3
Kodiak	6	9	4,709	20.4
Dynasty	7	10.4	3,316	14.4
Rancona	6	9	3,230	14
Unknown	10	14.9	2,615	11.3
Stamina	1	1.5	480	2.1
Captan	1	1.5	300	1.3
None	25	37.3	4,997	21.6
Seed Treatment Total			**46,916**	
North Dakota				
Apron	55	49.1	29,604	50
Maxim	48	42.9	24,024	40.5
Unknown	30	26.8	15,181	25.6
Captan	9	8	6,191	10.4
Dynasty	12	10.7	5,961	10.1
Rancona	11	9.8	5,642	9.5
Stamina	4	3.6	1,590	2.7
Streptomycin	2	1.8	856	1.4
Kodiak	1	0.9	200	0.3
None	48	42.9	17,162	29
Seed Treatment Total			**89,249**	
Northarvest				
Apron	96	53.6	46,557	56.5
Maxim	83	46.4	39,337	47.8
Unknown	40	22.3	17,796	21.6
Dynasty	19	10.6	9,277	11.3
Rancona	17	9.5	8,872	10.8
Captan	10	5.6	6,491	7.9
Kodiak	7	3.9	4,909	6
Stamina	5	2.8	2,070	2.5
Streptomycin	2	1.1	856	1
None	73	40.8	22,159	26.9
Seed Treatment Total			**136,165**	

[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.

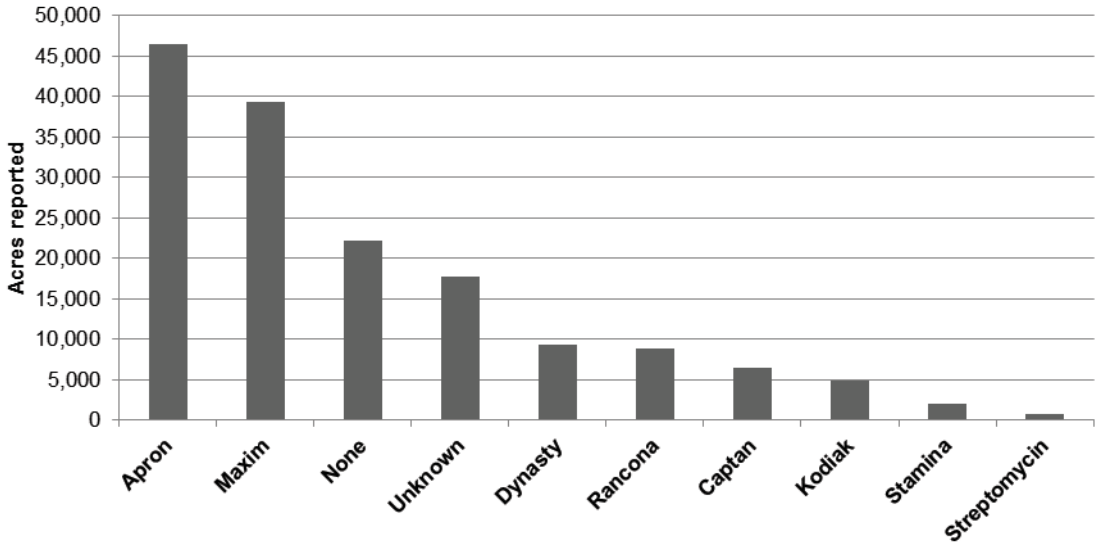


Figure 28. Northarvest fungicide seed treatment use in dry beans in 2013.

Table 27. Worst weed problem in dry beans in 2013.

Weed[a]	Respon-dents (no.)	Respon-dents (%)	Acres reported (no.)[b,c]	Acres reported (%)[b,c]
Minnesota				
Lambsquarters	22	33.3	8,304	36.1
Ragweed	15	22.7	6,847	29.8
Waterhemp	8	12.1	2,402	10.5
Kochia	3	4.5	1,422	6.2
Nightshade	4	6.1	1,153	5
Redroot pigweed	4	6.1	972	4.2
Wild mustard	1	1.5	816	3.6
Sunflower	4	6.1	594	2.6
Canada thistle	1	1.5	155	0.7
Foxtail	2	3	104	0.5
None	2	3	203	0.9
Total	**66**	**100**	**22,972**	**100**
North Dakota				
Kochia	22	20.2	13,648	23.1
Redroot pigweed	15	13.8	8,774	14.9
Biennial wormwood	12	11	6,315	10.7
Lambsquarters	10	9.2	6,268	10.6
Nightshade	13	11.9	5,882	10
Ragweed	8	7.3	4,397	7.5
Wild mustard	8	7.3	3,444	5.8
Wild buckwheat	4	3.7	2,909	4.9
Canada thistle	4	3.7	1,853	3.1
Volunteer grain	2	1.8	1,024	1.7
Sunflower	1	0.9	975	1.7
Cocklebur	2	1.8	920	1.6
Black medic	1	0.9	740	1.3
False chamomile	1	0.9	460	0.8
Foxtail barley	1	0.9	245	0.4
Waterhemp	1	0.9	190	0.3
None	4	3.7	956	1.6
Total	**109**	**100**	**59,000**	**100**
Northharvest				
Kochia	25	14.3	15,070	18.4
Lambsquarters	32	18.3	14,572	17.8
Ragweed	23	13.1	11,244	13.7
Redroot pigweed	19	10.9	9,746	11.9
Nightshade	17	9.7	7,035	8.6
Biennial wormwood	12	6.9	6,315	7.7
Wild mustard	9	5.1	4,260	5.2
Wild buckwheat	4	2.3	2,909	3.5
Waterhemp	9	5.1	2,592	3.2
Canada thistle	5	2.9	2,008	2.4
Sunflower	5	2.9	1,569	1.9
Volunteer grain	2	1.1	1,024	1.2
Cocklebur	2	1.1	920	1.1
Black medic	1	0.6	740	0.9
False chamomile	1	0.6	460	0.6
Foxtail barley	1	0.6	245	0.3
Foxtail	2	1.1	104	0.1
None	6	3.4	1,159	1.4
Total	**175**	**100**	**81,972**	**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.

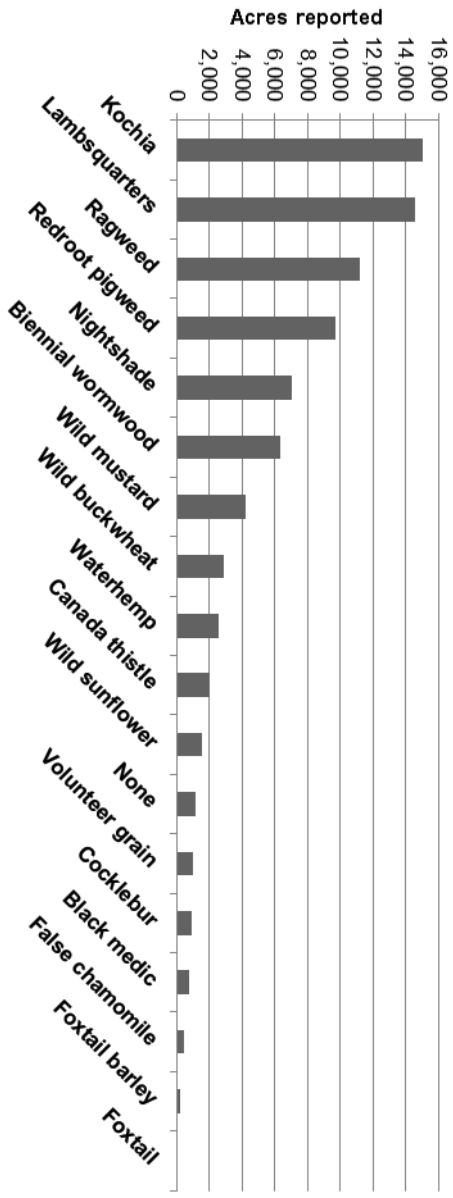


Figure 29. Northarvest worst weed problem in dry beans in 2013.

Table 28. Weeds ranked as one of the three worst in dry beans in 2013.

Weed[a]	Respondents (no.)	Respondents (%)	Acres reported (no.)[b]	Acres reported (%)[b]
Minnesota				
Lambsquarters	48	72.7	17,763	77.3
Ragweed	29	43.9	12,416	54
Redroot pigweed	26	39.4	8,582	37.4
Waterhemp	24	36.4	5,692	24.8
Nightshade	12	18.2	4,568	19.9
Kochia	7	10.6	4,297	18.7
Wild buckwheat	3	4.5	3,138	13.7
Biennial wormwood	5	7.6	2,865	12.5
Canada thistle	8	12.1	2,212	9.6
Wild mustard	3	4.5	1,196	5.2
Volunteer grain	2	3	1,020	4.4
Cocklebur	5	7.6	937	4.1
Foxtail	6	9.1	744	3.2
Sunflower	4	6.1	594	2.6
Proso millet	1	1.5	350	1.5
None	2	3	203	0.9
Velvetleaf	1	1.5	79	0.3
North Dakota				
Kochia	50	45.9	25,779	43.7
Lambsquarters	41	37.6	25,198	42.7
Redroot pigweed	39	35.8	22,401	38
Nightshade	27	24.8	16,873	28.6
Biennial wormwood	31	28.4	15,981	27.1
Wild mustard	24	22	13,659	23.2
Canada thistle	18	16.5	8,357	14.2
Cocklebur	15	13.8	8,317	14.1
Wild buckwheat	13	11.9	7,986	13.5
Ragweed	15	13.8	7,822	13.3
Volunteer grain	9	8.3	4,697	8
Foxtail	4	3.7	2,540	4.3
Curly dock	1	0.9	1,693	2.9
Waterhemp	4	3.7	1,378	2.3
False chamomile	2	1.8	1,160	2
Lanceleaf sage	2	1.8	1,002	1.7
Mallow	2	1.8	996	1.7
Sunflower	1	0.9	975	1.7
None	4	3.7	956	1.6
Black medic	1	0.9	740	1.3
Proso millet	1	0.9	250	0.4
Foxtail barley	1	0.9	245	0.4
Northarvest				
Lambsquarters	89	50.9	42,961	52.4
Redroot pigweed	65	37.1	30,983	37.8
Kochia	57	32.6	30,076	36.7
Nightshade	39	22.3	21,441	26.2
Ragweed	44	25.1	20,238	24.7
Biennial wormwood	36	20.6	18,846	23
Wild mustard	27	15.4	14,855	18.1
Wild buckwheat	16	9.1	11,124	13.6
Canada thistle	26	14.9	10,569	12.9
Cocklebur	20	11.4	9,254	11.3
Waterhemp	28	16	7,070	8.6
Volunteer grain	11	6.3	5,717	7
Foxtail	10	5.7	3,284	4
Curly dock	1	0.6	1,693	2.1
Sunflower	5	2.9	1,569	1.9
False chamomile	2	1.1	1,160	1.4
None	6	3.4	1,159	1.4
Lanceleaf sage	2	1.1	1,002	1.2
Mallow	2	1.1	996	1.2
Black medic	1	0.6	740	0.9
Proso millet	2	1.1	600	0.7
Foxtail barley	1	0.6	245	0.3
Velvetleaf	1	0.6	79	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.

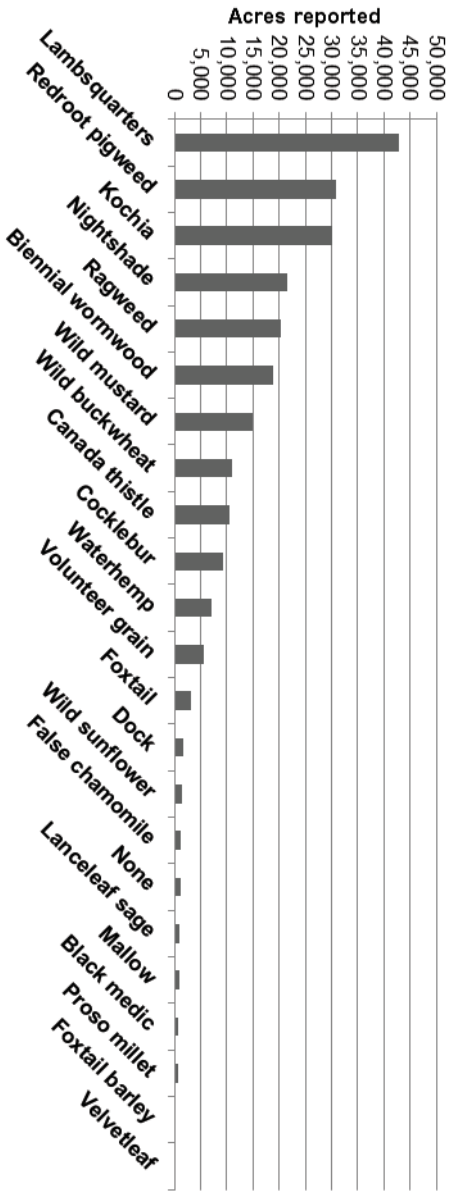


Figure 30. Northarvest weeds ranked as one of the three worst in dry beans in 2013.

Table 29. Weed control practices used in dry beans in 2013.

Herbicide or other practice	Acres reported (no.)[a]	Acres reported (%)[b]
Minnesota		
Raptor	18,000	78.4
Rezult	17,633	76.8
Cultivation	14,364	62.5
Reflex	9,606	41.8
Sonalan (spring)	8,127	35.4
Select	7,023	30.6
Basagran	6,765	29.4
Outlook	5,894	25.7
Prowl	5,879	25.6
Trifluralin (spring)	4,096	17.8
Dual	3,250	14.1
Eptam (spring)	2,488	10.8
Manual labor	2,104	9.2
Glyphosate (preplant)	1,900	8.3
Rotary hoe	1,360	5.9
Sonalan (fall)	720	3.1
Permit	610	2.7
Assure II	565	2.5
IntRRo	482	2.1
BroadAxe	290	1.3
Poast	227	1
Pursuit	194	0.8
Spartan	73	0.3
Herbicide Total[c]	**93,822**	
North Dakota		
Raptor	46,176	78.3
Rezult	42,370	71.8
Cultivation	27,796	47.1
Reflex	24,368	41.3
Select	18,835	31.9
Basagran	18,238	30.9
Sonalan (spring)	16,062	27.2
Spartan	12,493	21.2
Glyphosate (preplant)	8,637	14.6
Trifluralin (spring)	6,985	11.8
Prowl	6,325	10.7
BroadAxe	6,047	10.2
Pursuit	5,941	10.1
Permit	5,726	9.7
Assure II	5,380	9.1
Rotary hoe	4,557	7.7
Outlook	3,467	5.9
Manual labor	2,921	5
Poast	2,300	3.9
Sonalan (fall)	2,068	3.5
Eptam (spring)	1,000	1.7
Trifluralin (fall)	700	1.2
IntRRo	350	0.6
Fusilade	190	0.3
Dual	158	0.3
Herbicide Total[c]	**233,816**	
Northarvest		
Raptor	64,176	78.3
Rezult	60,003	73.2
Cultivation	42,160	51.4
Reflex	33,974	41.4
Select	25,858	31.5
Basagran	25,003	30.5
Sonalan (spring)	24,189	29.5
Spartan	12,566	15.3
Prowl	12,204	14.9
Trifluralin (spring)	11,081	13.5
Glyphosate (preplant)	10,537	12.9
Outlook	9,361	11.4
BroadAxe	6,337	7.7
Permit	6,336	7.7
Pursuit	6,135	7.5
Assure II	5,945	7.3
Rotary hoe	5,917	7.2
Manual labor	5,025	6.1
Eptam (spring)	3,488	4.3
Dual	3,408	4.2
Sonalan (fall)	2,788	3.4
Poast	2,527	3.1
IntRRo	832	1
Trifluralin (fall)	700	0.9
Fusilade	190	0.2
Herbicide Total[c]	**327,638**	

[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.

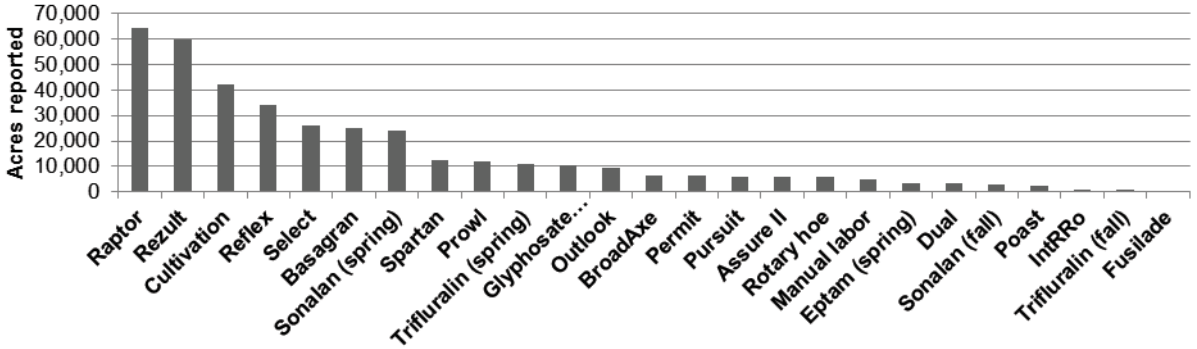


Figure 31. Northarvest weed control practices used in dry beans in 2013.

Table 30. Weed control practices used by dry bean market class in 2013.

Herbicide or other practice	Black	Great Northern	Kidney	Navy	Pink	Pinto	Red
			% Acres Treated[a,b]				
Minnesota							
Assure II	0	0	3.9	1.7	0	0	0
Basagran	49.6	0	32.5	29.1	33.9	0	0
BroadAxe	0	0	0	0	16.9	0	0
Dual	0	0	22.2	3.7	32	0	0
Eptam (spring)	0	0	9.4	18.4	0	0	0
Glyphosate (preplant)	5.8	0	8.9	1.5	0	44.8	0
IntRRo	0	0	0	6	0	0	0
Outlook	0	0	51.3	4.4	0	0	0
Permit	0	0	5.1	0.7	0	0	0
Poast	0	0	0	2.8	0	0	0
Prowl	10.5	0	47.7	6.8	5.9	0	0
Pursuit	0	0	0.9	0	5.9	0	0
Raptor	78.6	0	89.9	73.2	57.7	50.9	0
Reflex	34.1	0	33.5	57.1	16.9	50.6	0
Rezult	16.6	0	79.5	71	94.4	92.9	0
Select	10.8	0	22.7	27.7	88.3	43.7	0
Sonalan (fall)	0	0	0	9	0	0	0
Sonalan (spring)	77.3	0	18.8	52.9	25.4	50.8	0
Spartan	10.5	0	0	0	0	0	0
Trifluralin (spring)	0	0	10.8	17.6	43.1	44.6	0
Cultivation	43.3	0	84.7	25.2	50.8	115.5	0
Rotary hoe	0	0	5.2	0	0	46	0
Manual labor	25.3	0	10.5	9.2	0	2.9	0
North Dakota							
Assure II	14.5	29.5	0	7.3	0	8.4	0
Basagran	13.4	0	0	52.2	0	29	141.9
BroadAxe	11.4	0	0	2.2	0	12.7	29
Dual	0	0	0	0	0	0.4	0
Eptam (spring)	0	0	0	0	0	2.4	0
Fusilade	0	0	0	0	0	0.4	0
Glyphosate (preplant)	22.7	0	0	3.4	0	18.2	0
IntRRo	0	0	0	0	0	0.8	0
Outlook	0	29.5	0	4.3	0	5.4	0
Permit	7.6	76.4	100	2.1	27	6.9	0
Poast	0	0	0	13.7	0	2.4	0
Prowl	6.7	0	100	12.9	14.3	10.7	0
Pursuit	10.7	76.4	0	3.3	0	8	29
Raptor	58.9	62.6	100	94	48.1	77.7	0
Reflex	30.1	7.9	0	70.2	62.4	36.6	100
Rezult	86.6	92.1	100	61.7	20.3	74.1	71
Select	17.1	46.9	0	26.8	0	34.6	29
Sonalan (fall)	0	0	0	11.1	0	2.4	0
Sonalan (spring)	28.6	29.5	0	30.8	65.9	24.4	0
Spartan	33.3	46.9	0	18.5	27	19.5	71
Trifluralin (fall)	0	0	0	0	0	1.6	0
Trifluralin (spring)	15.2	7.9	0	17.2	0	11.2	0
Cultivation	34.5	7.9	100	43.1	123.3	47.8	0
Rotary hoe	0	0	0	6.6	0	9.3	100
Manual labor	23.5	7.9	0	0	10.1	4.6	0
Northarvest							
Assure II	11.5	29.5	3.9	4.7	0	8.1	0
Basagran	21	0	32.3	41.5	18.2	27.9	141.9
BroadAxe	9	0	0	1.2	9.1	12.2	29
Dual	0	0	22.1	1.7	17.2	0.4	0
Eptam (fall)	0	0	0	0	0	0	0
Eptam (spring)	0	0	9.3	8.5	0	2.3	0
Fusilade	0	0	0	0	0	0.4	0
Glyphosate (preplant)	19.1	0	8.8	2.5	0	19.2	0
IntRRo	0	0	0	2.8	0	0.8	0
Outlook	0	29.5	51	4.4	0	5.2	0
Permit	6	76.4	5.6	1.5	12.5	6.6	0
Poast	0	0	0	8.7	0	2.3	0
Prowl	7.5	0	48	10.1	9.8	10.3	29
Pursuit	8.4	76.4	0.8	1.8	3.2	7.7	0
Raptor	63	62.6	89.9	84.4	53.3	76.6	100
Reflex	30.9	7.9	33.3	64.2	38	37.2	71
Rezult	71.9	92.1	79.6	66	60.1	74.9	29
Select	15.8	46.9	22.6	27.2	47.4	34.9	0
Sonalan (fall)	0	0	0	10.1	0	2.3	0
Sonalan (spring)	38.8	29.5	18.7	41	44.1	25.4	71
Spartan	28.6	46.9	0	9.9	12.5	18.8	0

Herbicide or other practice	Black	Great Northern	Kidney	Navy	Pink	Pinto	Red
Trifluralin (fall)	0	0	0	0	0	1.6	0
Trifluralin (spring)	12.1	7.9	10.8	17.4	23.1	12.6	0
Cultivation	36.3	7.9	84.8	34.8	84.3	50.5	100
Rotary hoe	0	0	5.2	3.5	0	10.7	0
Manual labor	23.8	7.9	10.5	4.3	4.7	4.5	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.

Scouting and Threshold Practices

Table 31. Scouting practices in dry beans in 2013.

	Insects		Diseases		Weeds	
Minnesota	**Respondents (no.)**	**Respondents (%)**	**Respondents (no.)**	**Respondents (%)**	**Respondents (no.)**	**Respondents (%)**
Grower	32	48.5	30	45.5	31	47
Crop consultant	25	37.9	26	39.4	23	34.8
Both	9	13.6	9	13.6	12	18.2
Don't scout	0	0	1	1.5	0	0
Total	**66**	**100**	**66**	**100**	**66**	**100**
North Dakota						
Grower	55	50	57	51.8	56	50.9
Crop consultant	46	41.8	47	42.7	49	44.5
Both	6	5.5	5	4.5	5	4.5
Don't scout	3	2.7	1	0.9	0	0
Total	**110**	**100**	**110**	**100**	**110**	**100**
Northarvest						
Grower	87	49.4	87	49.4	87	49.4
Crop consultant	71	40.3	73	41.5	72	40.9
Both	15	8.5	14	8	17	9.7
Don't scout	3	1.7	2	1.1	0	0
Total	**176**	**100**	**176**	**100**	**176**	**100**

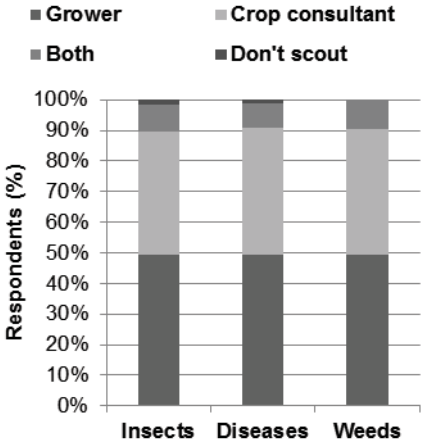


Figure 32. Northarvest scouting practices in dry beans in 2013.

Table 32. Use of economic thresholds for insects in dry beans in 2013.

	Respondents (no.)	Respondents (%)
Minnesota		
Economic thresholds used	63	95.5
Economic thresholds not used	3	4.5
Total	**66**	**100**
North Dakota		
Economic thresholds used	100	90.9
Economic thresholds not used	10	9.1
Total	**110**	**100**
Northarvest		
Economic thresholds used	163	92.6
Economic thresholds not used	13	7.4
Total	**176**	**100**

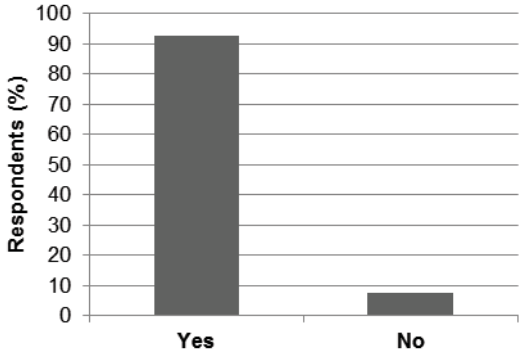


Figure 33. Northarvest use of economic thresholds for insects in dry beans in 2013.

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APPENDIX I.

Please complete all requested information on practices, pest problems and pesticide use for your 2013 dry bean crop.

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

Dry Bean Production in 2013	Acres
Total dry bean acres planted in 2013	
Total dry bean acres harvested	
Total irrigated acres	
Total dry bean acres on tile-drained ground	
Dry bean acres with hail damage	
Dry bean acres with frost damage	
Dry bean acres with water damage	

Dry Bean Production Problems in 2013 (please complete the table)		
Problem	**Acres Affected**	**Bean Class**
1. Applied herbicide injury		
*List herbicide in no. 1		
2. Herbicide drift injury		
3. Delayed planting		
4. Emergence/stand		
5. Harvest		
6. Disease		
7. Insects		
8. Weeds		
9. Micronutrient deficiency		
10. Excess water		
11. Hail damage		
12. Frost damage		
13. Drought		
14. Soil salinity		
15. Other (specify)		

Dry Beans Grown in 2013		
Bean Class	**Variety**	**Acres**
Black	Bandit	
	Condor	
	Eclipse	
	Jaguar	
	Loreto	
	Shania	
	T39	
	Zorro	
	Other (specify)	
Great Northern	Beryl	
	Orion	
	Other (specify)	
Kidney	Beluga	
	Cabernet	
	Cal Early LRK	
	Chinook 2000	
	Clouseau	
	Foxfire	
	Montcalm	
	Pink Panther	
	Red Hawk	
	Red Rover	
	Other (specify)	
Navy	Avalanche	
	Ensign	
	HMS Medalist	
	Indi	
	Merlin	
	Navigator	
	Norstar	
	T9905	
	Vista	
	Other (specify)	
Pink	Sedona	
	Floyd	
	ISB 473	
	Viva	
	Other (specify)	
Pinto	Buster	
	GTS 904	
	GTS 907	
	La Paz	
	Lariat	
	Mariah	
	Maverick	
	Medicine Hat	
	ND 307	
	Othello	
	Pintoba	
	Sequoia	
	Sinaloa	
	Sonora	
	Stampede	
	Topaz	
	Windbreaker	
	Other (specify)	
Red	Merlot	
	Ryder	
	Other (specify)	
Other	Other (specify)	

Agronomy

Please list row spacing and plants per acre for each bean class that you planted in 2013.		
Class	**Row Spacing (inches)**	**Plants Per Acre**

Please list crops in your dry bean crop rotation program for up to three fields planted to dry bean in 2013.			
Year	**Field 1**	**Field 2**	**Field 3**
2012			
2011			
2010			
2009			

Please list acreage for each tillage type listed below for your dry bean fields in 2013..	
Tillage Type	**Acreage**
Conventional	
Minimum	
Strip-till	
No-till	

Fertilizer Program for Dry Beans in 2013. Please indicate pounds per acre for fertilizer components, and answer the questions.

Nitrogen	Phosphate	Potash	Zinc	Sulfur

Did you inoculate with Rhizobium?	**Yes**	**No**
Soil test prior to fertilizer application?	**Yes**	**No**
Did you use site-specific nutrient management for any fertilizers?	**Yes**	**No**

Harvest. Please circle one answer for each question.

What percentage of your dry bean crop was harvested using direct combining in 2013?

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

Your estimated yield loss using direct combining?

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

Your estimated yield loss using conventional combining?

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

Insecticides and Insect Pests

Foliar Insecticides Used on Dry Beans in 2013. 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 Sprays**

Foliar Insecticide Products

1. Adjourn
2. Asana XL
3. Baythroid XL
4. Brigade 2 EC
5. Dimethoate
6. Grizzly Z
7. Hero
8. Lambda-Cy
9. Mustang Max
10. Silencer
11. Tombstone Helios
12. Warrior II
13. Other (please specify)
14. None used

Seed Treatment Insecticides Used on Dry Beans in 2013. 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
2. Cruiser 5FS
3. Cruiser Maxx
4. Dyna-Shield Imidacloprid 5
5. Gaucho
6. Lorsban
7. Senator 600
8. None used
9. Other (please specify)
10. Don't know

Worst Insect/Mite Problem in 2013. Please rank 1-3, with 1 = worst. Please mark ONLY three.	
Insect/Mite Pest	**Rank**
Armyworms	
Aphids	
Cutworms	
Bean Leaf Beetle	
Foliage Caterpillars	
Grasshoppers	
Leafhoppers	
Seed corn maggots	
Spider mites	
Wireworms	
None	

Fungicides and Disease Problems

Foliar Fungicides Used on Dry Beans in 2013. If you did not use a foliar fungicides, please write "0" for acres treated.

Foliar Fungicide (write in name or number from the list below)	Acres Treated	No. of Sprays	Application Method (circle one)	
			air	ground
			air	ground
			air	ground
			air	ground
			air	ground
			air	ground
			air	ground

Foliar Fungicide Products

1. Cannonball
2. Champion
3. Contans
4. Endura
5. Headline
6. Incognito
7. Microthiol
8. Omega
9. Priaxor
10. Proline
11. Proline (band)
12. Proline (broad)
13. ProPulse
14. Quadris/Amstar
15. Quadris Opti
16. Serenade
17. Tebuconazole/generics
18. Topsin (banded)
19. Topsin (broadcast)
20. Other (please specify)
21. None used

Seed Treatment Fungicides Used on Dry Beans in 2013. 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. Apron
2. Maxim
3. Dynasty
4. Headline
5. Kodiak
6. Rancona
7. Captan
8. None used
9. Other (please specify)
10. Don't know

Worst Disease Problem. Please rank 1-3, with 1 = worst. Please mark ONLY three.

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

Herbicides and Weed Problems

Weed Control Practices Used on Dry Beans in 2013. 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
2. Basagran/generics
3. BroadAxe
4. Dual/generics
5. Eptam (fall)
6. Eptam (spring)
7. Fusilade DX
8. Glyphosate (preplant)
9. Glyphosate (preharvest)
10. Glyphosate (postharvest)
11. Intro/generics
12. Outlook
13. Permit
14. Poast
15. Prowl
16. Pursuit
17. Raptor
18. Reflex
19. Rezult
20. Select/generics
21. Sonalan (fall)
22. Sonalan (spring)
23. Spartan/Charge
24. Trifluralin (fall)
25. Trifluralin (spring)
26. Cultivation
27. Rotary hoe
28. Manual labor
29. Other
30. None used

Worst Weed Problem. Please rank 1-3, with 1 = worst. Please mark ONLY three.

Weed	Rank	Weed	Rank
Biennial wormwood		Sandbur	
Canada thistle		Velvetleaf	
Cocklebur		Venice mallow	
False chamomile		Volunteer canola	
Foxtail		Volunteer grain	
Kochia		Waterhemp	
Lambsquarters		Wild buckwheat	
Lanceleaf sage		Wild mustard	
Nightshade		Wild oat	
Proso millet		Wild sunflower	
Ragweed		Other	
Redroot pigweed		None	

Dessicants Used on Dry Beans in 2013. Count double applications as double acres.		
Dessicant Used (write in name or number from the list below)	**Bean Class**	**Acres Treated**

Dessicant Products

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

Field Scouting

Field Scouting in Dry Beans in 2013. For each question, please circle the best answer that applies to your operation.		
How do you scout your dry bean fields for insects?		
Myself	Crop Consultant	Don't scout
How do you scout your dry bean fields for diseases?		
Myself	Crop Consultant	Don't scout
How do you scout your dry bean fields for weeds?		
Myself	Crop Consultant	Don't scout
Do you follow recommended economic thresholds when making insect control decisions?		
Yes		No

Thank you for completing the 2013 Dry Bean Grower Survey!

Acknowledgments

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Cover photos by J.J. Knodel, S.G. Markell and J.M. Osorno

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