

2011

# DRY BEAN Grower Survey

---

*of Pest Problems  
and Pesticide Use*

*in Minnesota and North Dakota*



**J.J. Knodel, P.B. Beauzay, D.W. Franzen, H.J. Kandel,  
S.G. Markell, J.M. Osorno and R.K. Zollinger**

North Dakota State University

*In cooperation with the Northarvest Bean Growers Association*

**NDSU EXTENSION  
SERVICE**

February 2012

# Table of Contents

|  |    |
|--|----|
| <b>Introduction .....</b>  | 4  |
| <b>Production</b>  |    |
| Table 1. Number of Northarvest dry bean growers responding, acres planted by respondents and total state acres in 2011 ..... | 5  |
| Table 2. Dry bean production by county in 2011 .....   | 5  |
| Table 3. Dry bean acres harvested, irrigated, on tile-drained ground, and damaged by hail, frost and water in 2011 .....     | 6  |
| Table 4. Dry bean market classes grown in 2011.....  | 6  |
| Table 5. Dry bean varieties grown in 2011 .....  | 7  |
| Table 6. Worst dry bean production problem reported in 2011 .....  | 8  |
| Table 7. Row spacing by dry bean market class in 2011 .....  | 9  |
| Table 8. Seeding rate by dry bean market class in 2011.....  | 9  |
| Table 9. Percent of total dry bean acres harvested by direct combining in 2011 .....   | 10 |
| Table 10. Estimated yield loss in direct-harvested dry bean in 2011 .....  | 10 |
| Table 11. Estimated yield loss in conventionally harvested dry bean in 2011.....   | 11 |
| Table 12. Type II dry bean row spacing by dry bean market class in 2011 .....  | 11 |
| Table 13. Type II dry bean seeding rate by dry bean market class in 2011.....  | 12 |
| Table 14. Dry bean field tillage practices in 2011.....  | 12 |
| <b>Agronomy</b>  |    |
| Table 15. Use of fertilizers on dry bean fields in 2011.....   | 13 |
| Table 16. Use of soil test prior to fertilization of dry bean fields in 2011 .....   | 13 |
| Table 17. Use of Rhizobium inoculants on dry bean fields in 2011 .....   | 13 |
| Table 18. Dessicants used on dry bean in 2011 .....  | 14 |
| Table 19. Frequency of crops in dry bean crop rotation program, 2007-2010.....   | 15 |
| Table 20. Number of years dry bean is grown in dry bean crop rotation program.....   | 15 |
| <b>Insect Pests and Insecticide Use</b>  |    |
| Table 21. Worst insect problem in dry bean in 2011 .....   | 16 |
| Table 22. Insects ranked as one of the three worst in dry bean in 2011 .....   | 17 |
| Table 23. Foliar insecticide use in dry bean in 2011.....  | 18 |
| Table 24. Insecticide seed treatment use in dry bean in 2011 .....   | 18 |
| <b>Plant Diseases and Fungicide Use</b>  |    |
| Table 25. Worst disease problem in dry bean in 2011 .....  | 19 |
| Table 26. Diseases ranked as one of the three worst in dry bean in 2011.....   | 20 |
| Table 27. Foliar and banded fungicide use in dry bean in 2011 .....  | 21 |
| Table 28. Fungicide seed treatment use in dry bean in 2011.....  | 22 |
| <b>Weeds and Herbicide Use</b>   |    |
| Table 29. Worst weed problem in dry bean in 2011 .....   | 23 |
| Table 30. Weeds ranked as one of the three worst in dry bean in 2011.....  | 24 |
| Table 31. Weed control practices used in dry bean in 2011 .....  | 25 |
| Table 32. Weed control practices used by dry bean market class in 2011.....  | 26 |
| <b>References .....</b>  | 28 |
| <b>APPENDIX I. 2011 Northarvest Dry Bean Survey Form .....</b>   | 29 |
| <b>Acknowledgments.....</b>  | 32 |

## List of Figures

|            |  |    |
|------------|--|----|
| Figure 1.  | Northharvest dry bean acres planted by state in 2011 .....                                   | 5  |
| Figure 2.  | Northharvest dry bean production by county in 2011 .....                                     | 5  |
| Figure 3.  | Northharvest respondents' reported acres from Table 3.....                                   | 6  |
| Figure 4.  | Northharvest dry bean market classes grown in 2011 .....                                     | 6  |
| Figure 5.  | Black bean varieties grown by Northharvest respondents in 2011 .....                         | 7  |
| Figure 6.  | Kidney bean varieties grown by Northharvest respondents in 2011.....                         | 7  |
| Figure 7.  | Navy bean varieties grown by Northharvest respondents in 2011.....                           | 7  |
| Figure 8.  | Pinto bean varieties grown by Northharvest respondents in 2011 .....                         | 7  |
| Figure 9.  | Northharvest respondents' reported acres for worst dry bean production problem in 2011 ..... | 8  |
| Figure 10. | Northharvest percent acres harvested by direct combining in 2011.....                        | 10 |
| Figure 11. | Northharvest estimated yield loss in direct-harvested dry bean in 2011 .....                 | 10 |
| Figure 12. | Northharvest estimated yield loss in conventionally harvested dry bean in 2011 .....         | 11 |
| Figure 13. | Northharvest dry bean field tillage practices in 2011.....                                   | 13 |
| Figure 14. | Northharvest use of fertilizers on dry bean fields in 2011.....                              | 14 |
| Figure 15. | Northharvest use of soil test in 2011 .....  | 14 |
| Figure 16. | Northharvest use of inoculant in 2011 .....  | 14 |
| Figure 17. | Northharvest dessicants used on dry bean in 2011 .....                                       | 15 |
| Figure 18. | Northharvest frequency of major crops in dry bean crop rotation program, 2007-2010.....      | 15 |
| Figure 19. | Northharvest number of years dry bean is grown in dry bean crop rotation program.....        | 15 |
| Figure 20. | Northharvest worst insect problem in 2011 .....  | 16 |
| Figure 21. | Northharvest insects ranked as one of the three worst in dry bean in 2011.....               | 17 |
| Figure 22. | Northharvest foliar insecticide use in dry bean in 2011 .....                                | 18 |
| Figure 23. | Northharvest insecticide seed treatment use in dry bean in 2011.....                         | 18 |
| Figure 24. | Northharvest worst disease problem in dry bean in 2011 .....                                 | 19 |
| Figure 25. | Northharvest diseases ranked as one of the three worst in dry bean in 2011.....              | 20 |
| Figure 26. | Northharvest foliar and banded fungicide use in dry bean in 2011 .....                       | 21 |
| Figure 27. | Northharvest fungicide application method in dry bean in 2011.....                           | 21 |
| Figure 28. | Northharvest fungicide seed treatment use in dry bean in 2011 .....                          | 22 |
| Figure 29. | Northharvest worst weed problem in dry bean in 2011 .....                                    | 23 |
| Figure 30. | Northharvest weeds ranked as one of the three worst in dry bean in 2011.....                 | 24 |
| Figure 31. | Northharvest weed control practices used in dry bean in 2011 .....                           | 25 |

# Introduction

The 2011 dry bean grower survey is the 22nd annual survey of varieties grown, pest problems, pesticide use and grower practices of the Northharvest Bean Growers Association, an association of dry edible bean growers in Minnesota and North Dakota. Research and Extension faculty at North Dakota State University and the directors of the Northharvest Bean Growers Association developed the survey form (Appendix I). The survey was mailed to all Northharvest bean growers. All participants in the survey were anonymous.

Results of previous surveys dated 1987-1992, 1994-2000, 2002 and 2004-2010 have been published (see References). No surveys were conducted in 1993 and 2001. In 2003, the survey was completed by dry bean producers who attended the Northharvest Bean Day in Fargo during the winter. However, the lack of responses made processing and analyses of results unreliable, so no report was compiled. In 2011, about 30 percent of the surveys were returned with no data because dry bean producers were not able to plant due to wet soil conditions.

In this year's report, figures have been added to accompany the tables. Data reported in the figures represent totals for the entire Northharvest survey unless otherwise noted. Data reported in the tables are broken down by state and also are totaled for the entire Northharvest survey.

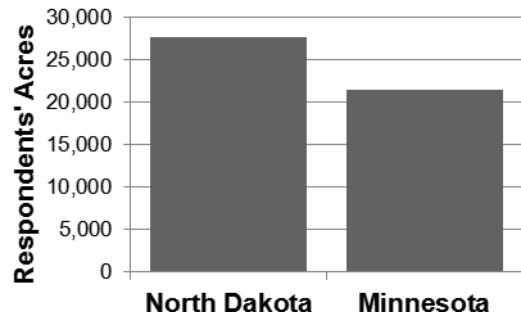
Throughout this report, trade names of chemicals often are used as an aid for clearer communication. Mention of trade names does not constitute endorsement or recommendation by North Dakota State University or the Northharvest Bean Growers Association.

# Production

**Table 1. Number of Northarvest dry bean growers responding, acres planted by respondents and total state acres in 2011.**

| Growers      | No. of respondents | Respondents' acres | Total acres <sup>a</sup> | Acres surveyed (% of total) |
|--------------|--------------------|--------------------|--------------------------|-----------------------------|
| North Dakota | 63                 | 27,663             | 410,000                  | 6.7                         |
| Minnesota    | 59                 | 21,502             | 140,000                  | 15.4                        |
| Northarvest  | 122                | 49,165             | 550,000                  | 8.9                         |

<sup>a</sup>Total of dry bean acres planted in Minnesota and North Dakota (source: USDA National Agricultural Statistics Service).



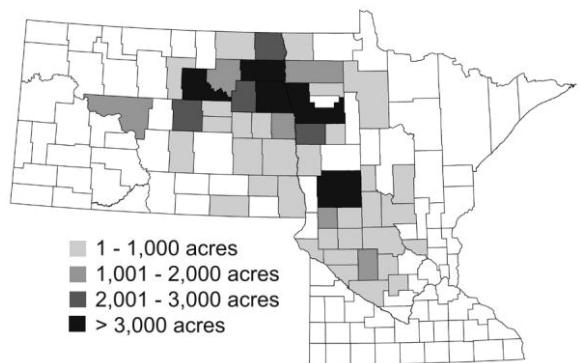
**Figure 1. Northarvest dry bean acres planted by state in 2011.**

**Table 2. Dry bean production by county in 2011.**

| Minnesota    | No. of respondents <sup>a</sup> | Acres <sup>b</sup> | North Dakota | No. of respondents <sup>a</sup> | Acres <sup>b</sup> |
|--------------|---------------------------------|--------------------|--------------|---------------------------------|--------------------|
| Polk         | 14                              | 4,679              | Benson       | 7                               | 4,464              |
| Otter Tail   | 7                               | 3,760              | Grand Forks  | 10                              | 3,755              |
| Norman       | 2                               | 2,500              | Walsh        | 12                              | 3,471              |
| Kandiyohi    | 5                               | 1,945              | Wells        | 3                               | 2,540              |
| Marshall     | 5                               | 1,455              | Pembina      | 7                               | 2,109              |
| Grant        | 3                               | 1,105              | Nelson       | 2                               | 2,000              |
| Swift        | 5                               | 889                | McLean       | 4                               | 1,910              |
| Mahnomen     | 3                               | 810                | Ramsey       | 4                               | 1,593              |
| Renville     | 5                               | 768                | Traill       | 4                               | 1,083              |
| Stevens      | 2                               | 572                | Eddy         | 2                               | 815                |
| Morrison     | 4                               | 500                | Griggs       | 2                               | 765                |
| Chippewa     | 2                               | 407                | Cass         | 2                               | 656                |
| Clay         | 2                               | 353                | Pierce       | 2                               | 635                |
| Beltrami     | 1                               | 260                | Barnes       | 2                               | 450                |
| Pope         | 2                               | 253                | Dickey       | 1                               | 370                |
| Crow Wing    | 1                               | 170                | Foster       | 1                               | 300                |
| McLeod       | 1                               | 160                | Richland     | 1                               | 275                |
| Stearns      | 1                               | 150                | Cavalier     | 1                               | 208                |
| Douglas      | 1                               | 140                | Kidder       | 1                               | 135                |
| Todd         | 1                               | 130                | Ransom       | 1                               | 65                 |
| Kitson       | 1                               | 115                | Steele       | 1                               | 64                 |
| Meeker       | 1                               | 108                | <b>Total</b> |                                 | <b>27,663</b>      |
| Sherburne    | 1                               | 105                |              |                                 |                    |
| Wadena       | 1                               | 63                 |              |                                 |                    |
| Pennington   | 1                               | 60                 |              |                                 |                    |
| Big Stone    | 1                               | 45                 |              |                                 |                    |
| <b>Total</b> |                                 | <b>21,502</b>      |              |                                 |                    |

<sup>a</sup>Some respondents had dry bean acreage in more than one county.

<sup>b</sup>Respondents' acres only.



**Figure 2. Northarvest dry bean production by county in 2011.**

**Table 3. Dry bean acres harvested, irrigated, on tile-drained ground, and damaged by hail, frost and water in 2011.**

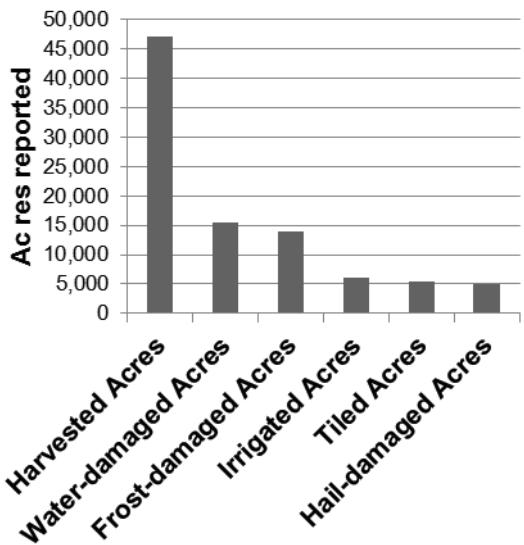
|                     | Acres reported<br>(no.) <sup>a</sup> | Acres reported<br>(%) <sup>a</sup> |
|---------------------|--------------------------------------|------------------------------------|
| <b>Minnesota</b>    |                                      |                                    |
| Harvested           | 21,026                               | 97.8                               |
| Frost-damaged       | 7,832                                | 36.4                               |
| Water-damaged       | 6,789                                | 31.6                               |
| Irrigated           | 5,901                                | 27.4                               |
| Tile-drained        | 5,250                                | 24.4                               |
| Hail-damaged        | 2,410                                | 11.2                               |
| <b>North Dakota</b> |                                      |                                    |
| Harvested           | 26,058                               | 94.2                               |
| Water-damaged       | 8,668                                | 31.3                               |
| Frost-damaged       | 6,123                                | 22.1                               |
| Hail-damaged        | 2,676                                | 9.7                                |
| Tile-drained        | 215                                  | 0.8                                |
| Irrigated           | 135                                  | 0.5                                |
| <b>Northarvest</b>  |                                      |                                    |
| Harvested           | 47,084                               | 95.8                               |
| Water-damaged       | 15,457                               | 31.4                               |
| Frost-damaged       | 13,955                               | 28.4                               |
| Irrigated           | 6,036                                | 12.3                               |
| Tile-drained        | 5,465                                | 11.1                               |
| Hail-damaged        | 5,086                                | 10.3                               |

<sup>a</sup> Respondents' acres only.

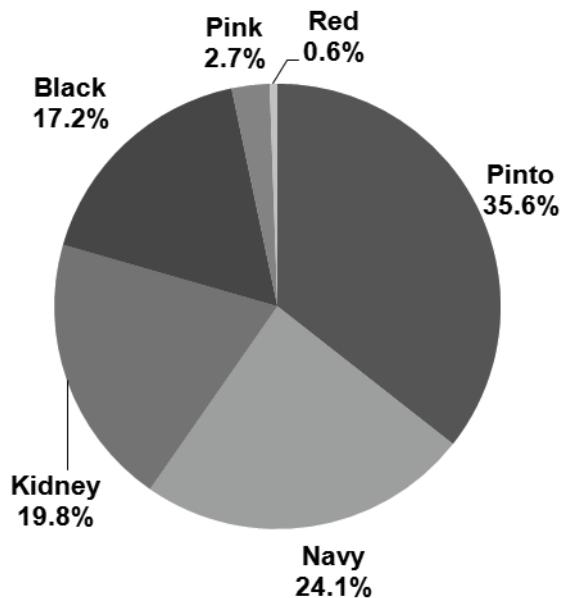
**Table 4. Dry bean market classes grown in 2011.**

| Market class        | Acres reported<br>(no.) <sup>a</sup> | Acres reported<br>(%) <sup>a</sup> |
|---------------------|--------------------------------------|------------------------------------|
| <b>Minnesota</b>    |                                      |                                    |
| Kidney              | 9,658                                | 44.9                               |
| Navy                | 7,404                                | 34.4                               |
| Pinto               | 1,956                                | 9.1                                |
| Black               | 1,484                                | 6.9                                |
| Pink                | 727                                  | 3.4                                |
| Red                 | 273                                  | 1.3                                |
| <b>Total</b>        | <b>21,502</b>                        | <b>100</b>                         |
| <b>North Dakota</b> |                                      |                                    |
| Pinto               | 15,549                               | 56.2                               |
| Black               | 6,991                                | 25.3                               |
| Navy                | 4,433                                | 16.0                               |
| Pink                | 625                                  | 2.3                                |
| Kidney              | 65                                   | 0.2                                |
| <b>Total</b>        | <b>27,663</b>                        | <b>100</b>                         |
| <b>Northarvest</b>  |                                      |                                    |
| Pinto               | 17,505                               | 35.6                               |
| Navy                | 11,837                               | 24.1                               |
| Kidney              | 9,723                                | 19.8                               |
| Black               | 8,475                                | 17.2                               |
| Pink                | 1,352                                | 2.7                                |
| Red                 | 273                                  | 0.6                                |
| <b>Total</b>        | <b>49,165</b>                        | <b>100</b>                         |

<sup>a</sup> Respondents' acres only.



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



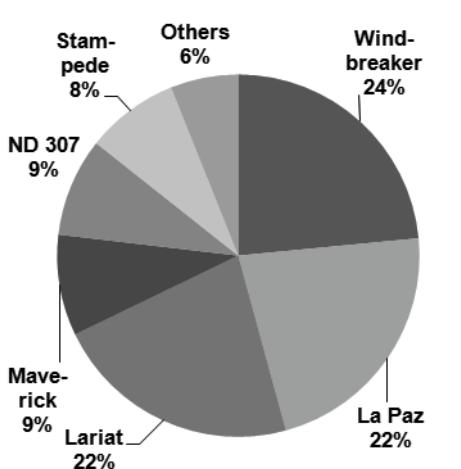
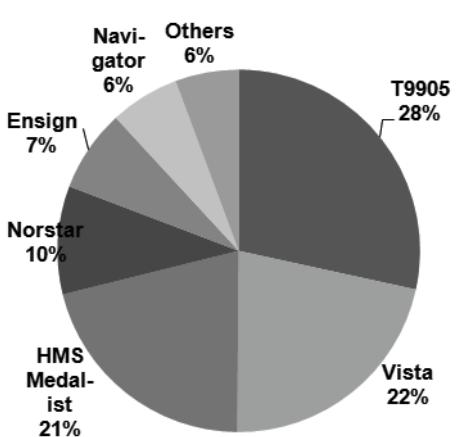
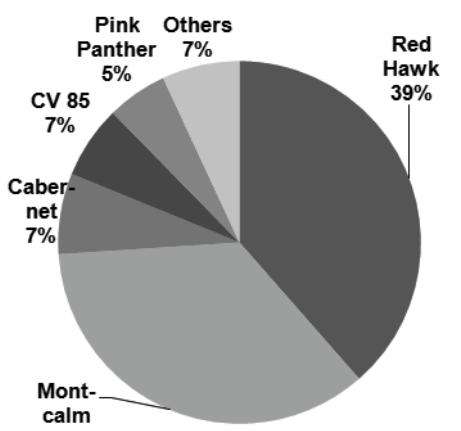
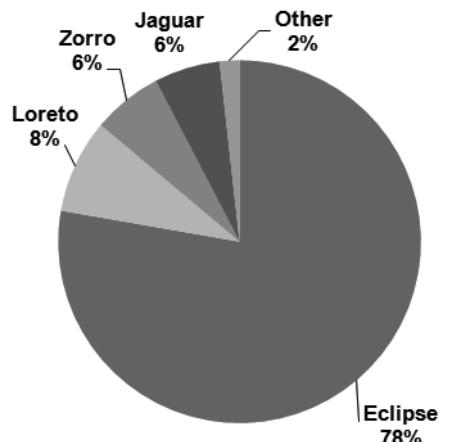
**Figure 4. Northarvest dry bean market classes grown in 2011.**

**Table 5. Dry bean varieties grown in 2011.**

| Variety             | Class              | Acres planted <sup>a</sup> |                |               |                |               |                |
|---------------------|--------------------|----------------------------|----------------|---------------|----------------|---------------|----------------|
|                     |                    | Minnesota                  | % <sup>b</sup> | North Dakota  | % <sup>b</sup> | Northarvest   | % <sup>b</sup> |
| Eclipse             | Black              | 757                        | 3.5            | 5,831         | 21.1           | 6,588         | 13.4           |
| Loreto              | Black              | 0                          | 0              | 710           | 2.6            | 710           | 1.4            |
| Zorro               | Black              | 230                        | 1.1            | 300           | 1.1            | 530           | 1.1            |
| Jaguar              | Black              | 497                        | 2.3            | 0             | 0              | 497           | 1.0            |
| Not Specified       | Black              | 0                          | 0              | 150           | 0.5            | 150           | 0.3            |
| <b>Total Black</b>  | <b>Black</b>       | <b>1,484</b>               | <b>6.9</b>     | <b>6,991</b>  | <b>25.3</b>    | <b>8,475</b>  | <b>17.2</b>    |
| Red Hawk            | Kidney             | 3,747                      | 17.4           | 0             | 0              | 3,747         | 7.6            |
| Montcalm            | Kidney             | 3,405                      | 15.8           | 40            | 0.1            | 3,445         | 7.0            |
| Cabernet            | Kidney             | 700                        | 3.3            | 0             | 0              | 700           | 1.4            |
| CV 85               | Kidney             | 633                        | 2.9            | 0             | 0              | 633           | 1.3            |
| Pink Panther        | Kidney             | 525                        | 2.4            | 0             | 0              | 525           | 1.1            |
| Foxfire             | Kidney             | 230                        | 1.1            | 0             | 0              | 230           | 0.5            |
| Red Rover           | Kidney             | 145                        | 0.7            | 25            | 0.1            | 170           | 0.3            |
| Drake               | Kidney             | 133                        | 0.6            | 0             | 0              | 133           | 0.3            |
| Cal Early LRK       | Kidney             | 50                         | 0.2            | 0             | 0              | 50            | 0.1            |
| Chinook 2000        | Kidney             | 50                         | 0.2            | 0             | 0              | 50            | 0.1            |
| Clouseau            | Kidney             | 40                         | 0.2            | 0             | 0              | 40            | 0.1            |
| <b>Total Kidney</b> | <b>Kidney</b>      | <b>9,658</b>               | <b>44.9</b>    | <b>65</b>     | <b>0.2</b>     | <b>9,723</b>  | <b>19.8</b>    |
| T9905               | Navy               | 2,278                      | 10.6           | 1,086         | 3.9            | 3,364         | 6.8            |
| Vista               | Navy               | 2,487                      | 11.6           | 83            | 0.3            | 2,570         | 5.2            |
| HMS Medalist        | Navy               | 731                        | 3.4            | 1,755         | 6.3            | 2,486         | 5.1            |
| Norstar             | Navy               | 955                        | 4.4            | 188           | 0.7            | 1,143         | 2.3            |
| Ensign              | Navy               | 410                        | 1.9            | 460           | 1.7            | 870           | 1.8            |
| Navigator           | Navy               | 183                        | 0.9            | 551           | 2.0            | 734           | 1.5            |
| Not specified       | Navy               | 160                        | 0.7            | 310           | 1.1            | 470           | 1.0            |
| Avalanche           | Navy               | 200                        | 0.9            | 0             | 0              | 200           | 0.4            |
| <b>Total Navy</b>   | <b>Navy</b>        | <b>7,404</b>               | <b>34.4</b>    | <b>4,433</b>  | <b>16.0</b>    | <b>11,837</b> | <b>23.8</b>    |
| Floyd               | Pink               | 203                        | 0.9            | 625           | 2.3            | 828           | 1.7            |
| Sedona              | Pink               | 264                        | 1.2            | 0             | 0              | 264           | 0.5            |
| ISB 473             | Pink               | 260                        | 1.2            | 0             | 0              | 260           | 0.5            |
| <b>Total Pink</b>   | <b>Pink</b>        | <b>727</b>                 | <b>3.4</b>     | <b>625</b>    | <b>2.3</b>     | <b>1,352</b>  | <b>2.7</b>     |
| Windbreaker         | Pinto              | 191                        | 0.9            | 3,916         | 14.2           | 4,107         | 8.4            |
| La Paz              | Pinto              | 888                        | 4.1            | 3,015         | 10.9           | 3,903         | 7.9            |
| Lariat              | Pinto              | 115                        | 0.5            | 3,750         | 13.6           | 3,865         | 7.9            |
| Maverick            | Pinto              | 532                        | 2.5            | 1,048         | 3.8            | 1,580         | 3.2            |
| ND 307              | Pinto              | 0                          | 0              | 1,540         | 5.6            | 1,540         | 3.1            |
| Stampede            | Pinto              | 0                          | 0              | 1,450         | 5.2            | 1,450         | 2.9            |
| Medicine Hat        | Pinto              | 0                          | 0              | 290           | 1.0            | 290           | 0.6            |
| V6023               | Pinto              | 0                          | 0              | 250           | 0.9            | 250           | 0.5            |
| Buster              | Pinto              | 230                        | 1.1            | 0             | 0              | 230           | 0.5            |
| Sonora              | Pinto              | 0                          | 0              | 150           | 0.5            | 150           | 0.3            |
| Durango             | Pinto              | 0                          | 0              | 60            | 0.2            | 60            | 0.1            |
| GTS 907             | Pinto              | 0                          | 0              | 40            | 0.1            | 40            | 0.1            |
| Santa Fe            | Pinto              | 0                          | 0              | 40            | 0.1            | 40            | 0.1            |
| <b>Total Pinto</b>  | <b>Pinto</b>       | <b>1,956</b>               | <b>9.1</b>     | <b>15,549</b> | <b>56.2</b>    | <b>17,505</b> | <b>35.6</b>    |
| Garnet              | Small Red          | 273                        | 1.3            | 0             | 0              | 273           | 0.6            |
| <b>Total Red</b>    | <b>Small Red</b>   | <b>273</b>                 | <b>1.3</b>     | <b>0</b>      | <b>0</b>       | <b>273</b>    | <b>0.6</b>     |
| <b>Grand Total</b>  | <b>All Classes</b> | <b>21,502</b>              | <b>100</b>     | <b>27,663</b> | <b>100</b>     | <b>49,165</b> | <b>100</b>     |

<sup>a</sup>Respondents' acres only.

<sup>b</sup>Percent of respondents' total dry bean acreage.



**Figures 5-8 (from top to bottom): major dry bean market classes grown by Northarvest survey respondents in 2011.**

Black varieties (% acreage for class)

Kidney varieties (% acreage for class)

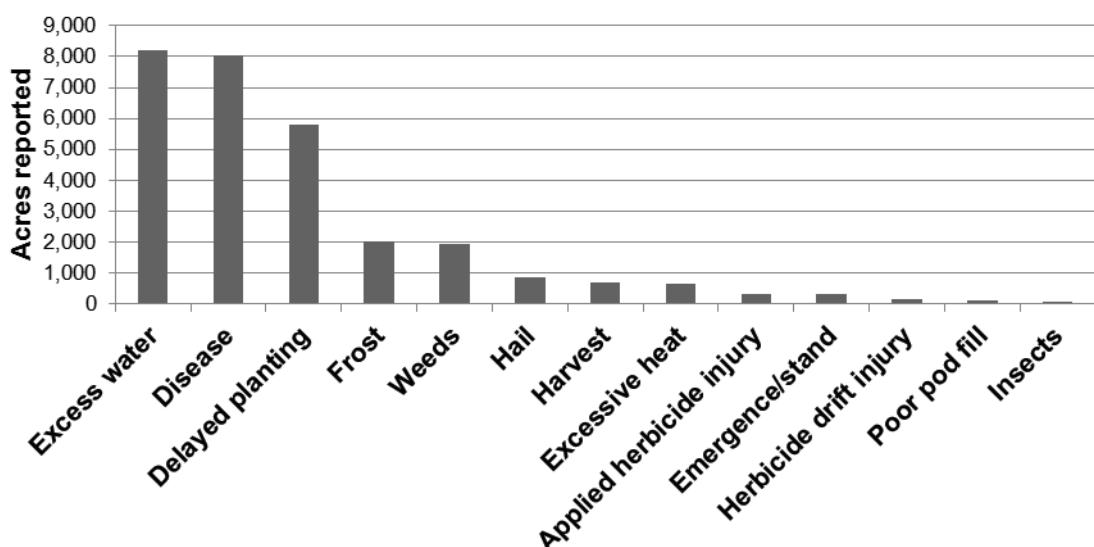
Navy varieties (% acreage for class)

Pinto varieties (% acreage for class)

**Table 6. Worst dry bean production problem reported in 2011.**

| Worst production problem | Respondents (no.) | Respondents (%) | Acres reported (no.) <sup>a</sup> | Acres reported (%) <sup>a</sup> |
|--------------------------|-------------------|-----------------|-----------------------------------|---------------------------------|
| <b>Minnesota</b>         |                   |                 |                                   |                                 |
| Excess water             | 20                | 34.5            | 3,429                             | 15.9                            |
| Disease                  | 14                | 24.1            | 3,389                             | 15.8                            |
| Delayed planting         | 6                 | 10.3            | 3,018                             | 14.0                            |
| Frost                    | 5                 | 8.6             | 1,440                             | 6.7                             |
| Excessive heat           | 1                 | 1.7             | 650                               | 3.0                             |
| Hail                     | 2                 | 3.4             | 565                               | 2.6                             |
| Weeds                    | 4                 | 6.9             | 302                               | 1.4                             |
| Harvest                  | 1                 | 1.7             | 200                               | 0.9                             |
| Applied herbicide injury | 2                 | 3.4             | 196                               | 0.9                             |
| Emergence/stand          | 1                 | 1.7             | 180                               | 0.8                             |
| Herbicide drift injury   | 1                 | 1.7             | 80                                | 0.4                             |
| Insects                  | 1                 | 1.7             | 61                                | 0.3                             |
| <b>Total</b>             | <b>58</b>         | <b>100</b>      | <b>13,510</b>                     | <b>62.8</b>                     |
| <b>North Dakota</b>      |                   |                 |                                   |                                 |
| Excess water             | 23                | 36.5            | 4,762                             | 17.2                            |
| Disease                  | 12                | 19.0            | 4,659                             | 16.8                            |
| Delayed planting         | 12                | 19.0            | 2,777                             | 10.0                            |
| Weeds                    | 6                 | 9.5             | 1,635                             | 5.9                             |
| Frost                    | 3                 | 4.8             | 590                               | 2.1                             |
| Harvest                  | 2                 | 3.2             | 485                               | 1.8                             |
| Hail                     | 1                 | 1.6             | 300                               | 1.1                             |
| Emergence/stand          | 1                 | 1.6             | 150                               | 0.5                             |
| Applied herbicide injury | 1                 | 1.6             | 135                               | 0.5                             |
| Poor pod fill            | 1                 | 1.6             | 120                               | 0.4                             |
| Herbicide drift injury   | 1                 | 1.6             | 60                                | 0.2                             |
| <b>Total</b>             | <b>63</b>         | <b>100</b>      | <b>15,673</b>                     | <b>56.7</b>                     |
| <b>Northharvest</b>      |                   |                 |                                   |                                 |
| Excess water             | 43                | 35.5            | 8,191                             | 16.7                            |
| Disease                  | 26                | 21.5            | 8,048                             | 16.4                            |
| Delayed planting         | 18                | 14.9            | 5,795                             | 11.8                            |
| Frost                    | 8                 | 6.6             | 2,030                             | 4.1                             |
| Weeds                    | 10                | 8.3             | 1,937                             | 3.9                             |
| Hail                     | 3                 | 2.5             | 865                               | 1.8                             |
| Harvest                  | 3                 | 2.5             | 685                               | 1.4                             |
| Excessive heat           | 1                 | 0.8             | 650                               | 1.3                             |
| Applied herbicide injury | 3                 | 2.5             | 331                               | 0.7                             |
| Emergence/stand          | 2                 | 1.7             | 330                               | 0.7                             |
| Herbicide drift injury   | 2                 | 1.7             | 140                               | 0.3                             |
| Poor pod fill            | 1                 | 0.8             | 120                               | 0.2                             |
| Insects                  | 1                 | 0.8             | 61                                | 0.1                             |
| <b>Total</b>             | <b>121</b>        | <b>100</b>      | <b>29,183</b>                     | <b>59.4</b>                     |

<sup>a</sup>Respondents' acres only.



**Figure 9. Northharvest respondents' reported acres for worst dry bean production problem in 2011.**

**Table 7. Row spacing by dry bean market class in 2011.**

| Row spacing         | Black     |            | Kidney    |            | Navy      |            | Pink     |            | Pinto     |            | Red      |            |
|---------------------|-----------|------------|-----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|
|                     | No.       | %          | No.       | %          | No.       | %          | No.      | %          | No.       | %          | No.      | %          |
| <b>Minnesota</b>    |           |            |           |            |           |            |          |            |           |            |          |            |
| < 11 inches         | 1         | 11.1       | 1         | 4.5        | 2         | 6.7        | 0        | 0          | 1         | 16.7       | 0        | 0          |
| 11 to 15 inches     | 5         | 55.6       | 0         | 0          | 2         | 6.7        | 0        | 0          | 0         | 0          | 0        | 0          |
| 16 to 20 inches     | 0         | 0          | 1         | 4.5        | 2         | 6.7        | 0        | 0          | 0         | 0          | 0        | 0          |
| 21 to 25 inches     | 0         | 0          | 6         | 27.3       | 21        | 70         | 2        | 40         | 1         | 16.7       | 1        | 100        |
| 26 to 30 inches     | 3         | 33.3       | 13        | 59.1       | 3         | 10         | 3        | 60         | 4         | 66.7       | 0        | 0          |
| > 30 inches         | 0         | 0          | 1         | 4.5        | 0         | 0          | 0        | 0          | 0         | 0          | 0        | 0          |
| <b>Total</b>        | <b>9</b>  | <b>100</b> | <b>22</b> | <b>100</b> | <b>30</b> | <b>100</b> | <b>5</b> | <b>100</b> | <b>6</b>  | <b>100</b> | <b>1</b> | <b>100</b> |
| <b>North Dakota</b> |           |            |           |            |           |            |          |            |           |            |          |            |
| < 11 inches         | 1         | 5.6        | 0         | 0          | 1         | 7.1        | 0        | 0          | 1         | 2.3        | 0        | 0          |
| 11 to 15 inches     | 3         | 16.7       | 0         | 0          | 0         | 0          | 0        | 0          | 7         | 16.3       | 0        | 0          |
| 16 to 20 inches     | 1         | 5.6        | 0         | 0          | 0         | 0          | 0        | 0          | 1         | 2.3        | 0        | 0          |
| 21 to 25 inches     | 6         | 33.3       | 0         | 0          | 7         | 50         | 0        | 0          | 9         | 20.9       | 0        | 0          |
| 26 to 30 inches     | 6         | 33.3       | 1         | 100        | 6         | 42.9       | 2        | 100        | 25        | 58.1       | 0        | 0          |
| > 30 inches         | 1         | 5.6        | 0         | 0          | 0         | 0          | 0        | 0          | 0         | 0          | 0        | 0          |
| <b>Total</b>        | <b>18</b> | <b>100</b> | <b>1</b>  | <b>100</b> | <b>14</b> | <b>100</b> | <b>2</b> | <b>100</b> | <b>43</b> | <b>100</b> | <b>0</b> | <b>0</b>   |
| <b>Northarvest</b>  |           |            |           |            |           |            |          |            |           |            |          |            |
| < 11 inches         | 2         | 7.4        | 1         | 4.3        | 3         | 6.8        | 0        | 0          | 2         | 4.1        | 0        | 0          |
| 11 to 15 inches     | 8         | 29.6       | 0         | 0          | 2         | 4.5        | 0        | 0          | 7         | 14.3       | 0        | 0          |
| 16 to 20 inches     | 1         | 3.7        | 1         | 4.3        | 2         | 4.5        | 0        | 0          | 1         | 2.0        | 0        | 0          |
| 21 to 25 inches     | 6         | 22.2       | 6         | 26.1       | 28        | 63.6       | 2        | 28.6       | 10        | 20.4       | 1        | 100        |
| 26 to 30 inches     | 9         | 33.3       | 14        | 60.9       | 9         | 20.5       | 5        | 71.4       | 29        | 59.2       | 0        | 0          |
| > 30 inches         | 1         | 3.7        | 1         | 4.3        | 0         | 0          | 0        | 0          | 0         | 0          | 0        | 0          |
| <b>Total</b>        | <b>27</b> | <b>100</b> | <b>23</b> | <b>100</b> | <b>44</b> | <b>100</b> | <b>7</b> | <b>100</b> | <b>49</b> | <b>100</b> | <b>1</b> | <b>100</b> |

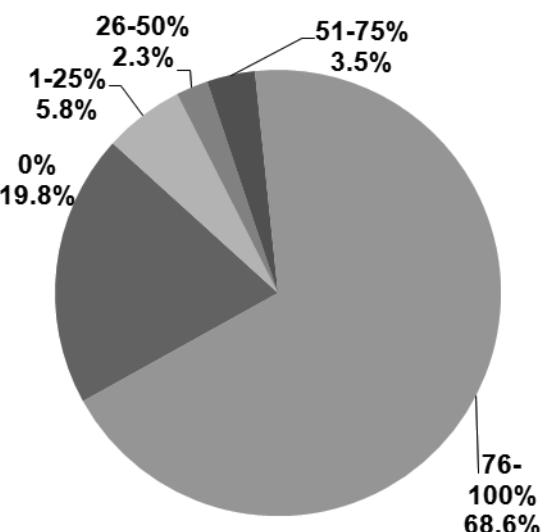
**Table 8. Seeding rate by dry bean market class in 2011.**

| Seeding rate <sup>a</sup> | Black     |            | Kidney    |            | Navy      |            | Pink     |            | Pinto     |            | Red      |            |
|---------------------------|-----------|------------|-----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|
|                           | No.       | %          | No.       | %          | No.       | %          | No.      | %          | No.       | %          | No.      | %          |
| <b>Minnesota</b>          |           |            |           |            |           |            |          |            |           |            |          |            |
| < 70,000                  | 1         | 11.1       | 2         | 9.1        | 1         | 3.3        | 1        | 20         | 2         | 33.3       | 0        | 0          |
| 70 to 79,000              | 0         | 0          | 11        | 50         | 1         | 3.3        | 2        | 40         | 2         | 33.3       | 0        | 0          |
| 80 to 89,000              | 0         | 0          | 7         | 31.8       | 0         | 0          | 1        | 20         | 1         | 16.7       | 1        | 100        |
| 90 to 99,000              | 1         | 11.1       | 2         | 9.1        | 4         | 13.3       | 1        | 20         | 1         | 16.7       | 0        | 0          |
| 100 to 109,000            | 3         | 33.3       | 0         | 0          | 8         | 26.7       | 0        | 0          | 0         | 0          | 0        | 0          |
| 110 to 119,000            | 1         | 11.1       | 0         | 0          | 9         | 30         | 0        | 0          | 0         | 0          | 0        | 0          |
| 120 to 129,000            | 2         | 22.2       | 0         | 0          | 4         | 13.3       | 0        | 0          | 0         | 0          | 0        | 0          |
| > 129,000                 | 1         | 11.1       | 0         | 0          | 3         | 10         | 0        | 0          | 0         | 0          | 0        | 0          |
| <b>Total</b>              | <b>9</b>  | <b>100</b> | <b>22</b> | <b>100</b> | <b>30</b> | <b>100</b> | <b>5</b> | <b>100</b> | <b>6</b>  | <b>100</b> | <b>1</b> | <b>100</b> |
| <b>North Dakota</b>       |           |            |           |            |           |            |          |            |           |            |          |            |
| < 70,000                  | 1         | 5.9        | 0         | 0          | 0         | 0          | 0        | 0          | 14        | 34.1       | 0        | 0          |
| 70 to 79,000              | 1         | 5.9        | 1         | 100        | 0         | 0          | 2        | 100        | 17        | 41.5       | 0        | 0          |
| 80 to 89,000              | 0         | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 7         | 17.1       | 0        | 0          |
| 90 to 99,000              | 4         | 23.5       | 0         | 0          | 2         | 15.4       | 0        | 0          | 3         | 7.3        | 0        | 0          |
| 100 to 109,000            | 8         | 47.1       | 0         | 0          | 4         | 30.8       | 0        | 0          | 0         | 0          | 0        | 0          |
| 110 to 119,000            | 2         | 11.8       | 0         | 0          | 2         | 15.4       | 0        | 0          | 0         | 0          | 0        | 0          |
| 120 to 129,000            | 0         | 0          | 0         | 0          | 3         | 23.1       | 0        | 0          | 0         | 0          | 0        | 0          |
| > 129,000                 | 1         | 5.9        | 0         | 0          | 2         | 15.4       | 0        | 0          | 0         | 0          | 0        | 0          |
| <b>Total</b>              | <b>17</b> | <b>100</b> | <b>1</b>  | <b>100</b> | <b>13</b> | <b>100</b> | <b>2</b> | <b>100</b> | <b>41</b> | <b>100</b> | <b>0</b> | <b>0</b>   |
| <b>Northarvest</b>        |           |            |           |            |           |            |          |            |           |            |          |            |
| < 70,000                  | 2         | 7.7        | 2         | 8.7        | 1         | 2.3        | 1        | 14.3       | 16        | 34.0       | 0        | 0          |
| 70 to 79,000              | 1         | 3.8        | 12        | 52.2       | 1         | 2.3        | 4        | 57.1       | 19        | 40.4       | 0        | 0          |
| 80 to 89,000              | 0         | 0          | 7         | 30.4       | 0         | 0          | 1        | 14.3       | 8         | 17.0       | 1        | 100        |
| 90 to 99,000              | 5         | 19.2       | 2         | 8.7        | 6         | 14.0       | 1        | 14.3       | 4         | 8.5        | 0        | 0          |
| 100 to 109,000            | 11        | 42.3       | 0         | 0          | 12        | 27.9       | 0        | 0          | 0         | 0          | 0        | 0          |
| 110 to 119,000            | 3         | 11.5       | 0         | 0          | 11        | 25.6       | 0        | 0          | 0         | 0          | 0        | 0          |
| 120 to 129,000            | 2         | 7.7        | 0         | 0          | 7         | 16.3       | 0        | 0          | 0         | 0          | 0        | 0          |
| > 129,000                 | 2         | 7.7        | 0         | 0          | 5         | 11.6       | 0        | 0          | 0         | 0          | 0        | 0          |
| <b>Total</b>              | <b>26</b> | <b>100</b> | <b>23</b> | <b>100</b> | <b>43</b> | <b>100</b> | <b>7</b> | <b>100</b> | <b>47</b> | <b>100</b> | <b>1</b> | <b>100</b> |

<sup>a</sup>Live seeds per acre.

**Table 9. Percent of total dry bean acres harvested by direct combining in 2011.**

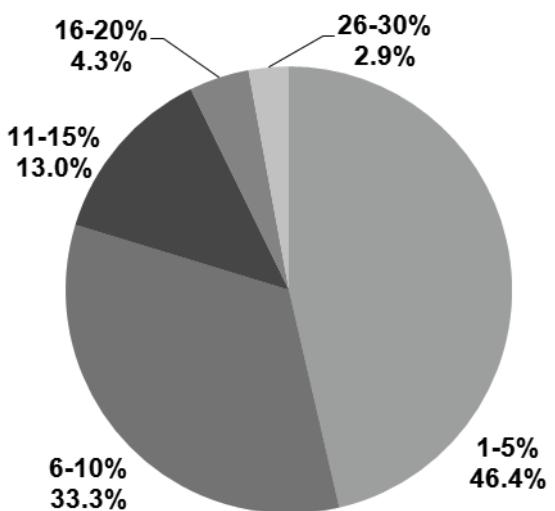
| Percent direct combined | Respondents (no.) | Respondents (%) |
|-------------------------|-------------------|-----------------|
| <b>Minnesota</b>        |                   |                 |
| 0%                      | 7                 | 18.9            |
| 1-25%                   | 2                 | 5.4             |
| 26-50%                  | 1                 | 2.7             |
| 51-75%                  | 3                 | 8.1             |
| 76-100%                 | 24                | 64.9            |
| <b>Total</b>            | <b>37</b>         | <b>100</b>      |
| <b>North Dakota</b>     |                   |                 |
| 0%                      | 10                | 20.4            |
| 1-25%                   | 3                 | 6.1             |
| 26-50%                  | 1                 | 2.0             |
| 51-75%                  | 0                 | 0               |
| 76-100%                 | 35                | 71.4            |
| <b>Total</b>            | <b>49</b>         | <b>100</b>      |
| <b>Northarvest</b>      |                   |                 |
| 0%                      | 17                | 19.8            |
| 1-25%                   | 5                 | 5.8             |
| 26-50%                  | 2                 | 2.3             |
| 51-75%                  | 3                 | 3.5             |
| 76-100%                 | 59                | 68.6            |
| <b>Total</b>            | <b>86</b>         | <b>100</b>      |



**Figure 10. Northarvest percent acres harvested by direct combining in 2011.**

**Table 10. Estimated yield loss in direct-harvested dry bean in 2011.**

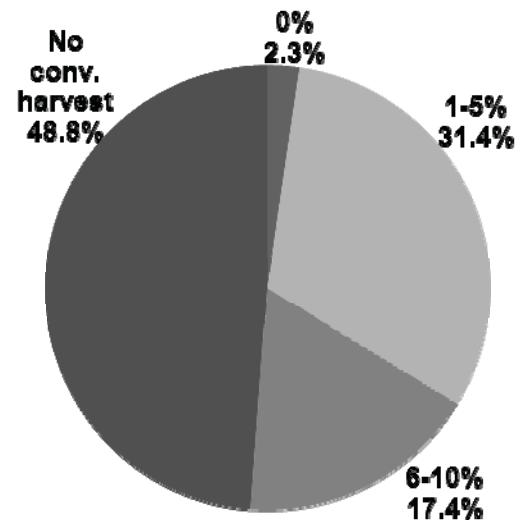
| Estimated yield loss | Respondents (no.) | Respondents (%) |
|----------------------|-------------------|-----------------|
| <b>Minnesota</b>     |                   |                 |
| 1-5%                 | 17                | 56.7            |
| 6-10%                | 9                 | 30              |
| 11-15%               | 2                 | 6.7             |
| 16-20%               | 1                 | 3.3             |
| 26-30%               | 1                 | 3.3             |
| <b>Total</b>         | <b>30</b>         | <b>100</b>      |
| <b>North Dakota</b>  |                   |                 |
| 1-5%                 | 15                | 38.5            |
| 6-10%                | 14                | 35.9            |
| 11-15%               | 7                 | 17.9            |
| 16-20%               | 2                 | 5.1             |
| 26-30%               | 1                 | 2.6             |
| <b>Total</b>         | <b>39</b>         | <b>100</b>      |
| <b>Northarvest</b>   |                   |                 |
| 1-5%                 | 32                | 46.4            |
| 6-10%                | 23                | 33.3            |
| 11-15%               | 9                 | 13.0            |
| 16-20%               | 3                 | 4.3             |
| 26-30%               | 2                 | 2.9             |
| <b>Total</b>         | <b>69</b>         | <b>100</b>      |



**Figure 11. Northarvest estimated yield loss in direct-harvested dry bean in 2011.**

**Table 11. Estimated yield loss in conventionally harvested dry bean in 2011.**

| Estimated yield loss | Respondents (no.) | Respondents (%) |
|----------------------|-------------------|-----------------|
| <b>Minnesota</b>     |                   |                 |
| 0%                   | 0                 | 0               |
| 1-5%                 | 13                | 35.1            |
| 6-10%                | 7                 | 18.9            |
| No conv. harvest     | 17                | 45.9            |
| <b>Total</b>         | <b>37</b>         | <b>100</b>      |
| <b>North Dakota</b>  |                   |                 |
| 0%                   | 2                 | 4.1             |
| 1-5%                 | 14                | 28.6            |
| 6-10%                | 8                 | 16.3            |
| No conv. harvest     | 25                | 51.0            |
| <b>Total</b>         | <b>49</b>         | <b>100</b>      |
| <b>Northarvest</b>   |                   |                 |
| 0%                   | 2                 | 2.3             |
| 1-5%                 | 27                | 31.4            |
| 6-10%                | 15                | 17.4            |
| No conv. harvest     | 42                | 48.8            |
| <b>Total</b>         | <b>86</b>         | <b>100</b>      |



**Figure 12. Northarvest estimated yield loss in conventionally-harvested dry bean in 2011.**

**Table 12. Type II dry bean row spacing by dry bean market class in 2011.**

| Row spacing         | Black             |                 | Navy              |                 | Pinto             |                 |
|---------------------|-------------------|-----------------|-------------------|-----------------|-------------------|-----------------|
|                     | Respondents (no.) | Respondents (%) | Respondents (no.) | Respondents (%) | Respondents (no.) | Respondents (%) |
| <b>Minnesota</b>    |                   |                 |                   |                 |                   |                 |
| < 11 inches         | 1                 | 11.1            | 2                 | 6.7             | 1                 | 16.7            |
| 11 to 15 inches     | 0                 | 0               | 2                 | 6.7             | 0                 | 0               |
| 16 to 20 inches     | 0                 | 0               | 2                 | 6.7             | 0                 | 0               |
| 21 to 25 inches     | 5                 | 55.6            | 21                | 70              | 1                 | 16.7            |
| 26 to 30 inches     | 3                 | 33.3            | 3                 | 10              | 4                 | 66.7            |
| > 30 inches         | 0                 | 0               | 0                 | 0               | 0                 | 0               |
| <b>Total</b>        | <b>9</b>          | <b>100</b>      | <b>30</b>         | <b>100</b>      | <b>6</b>          | <b>100</b>      |
| <b>North Dakota</b> |                   |                 |                   |                 |                   |                 |
| < 11 inches         | 1                 | 5.6             | 1                 | 7.1             | 1                 | 2.3             |
| 11 to 15 inches     | 3                 | 16.7            | 0                 | 0               | 7                 | 16.3            |
| 16 to 20 inches     | 1                 | 5.6             | 0                 | 0               | 1                 | 2.3             |
| 21 to 25 inches     | 6                 | 33.3            | 7                 | 50              | 9                 | 20.9            |
| 26 to 30 inches     | 6                 | 33.3            | 6                 | 42.9            | 25                | 58.1            |
| > 30 inches         | 1                 | 5.6             | 0                 | 0               | 0                 | 0               |
| <b>Total</b>        | <b>18</b>         | <b>100</b>      | <b>14</b>         | <b>100</b>      | <b>43</b>         | <b>100</b>      |
| <b>Northarvest</b>  |                   |                 |                   |                 |                   |                 |
| < 11 inches         | 2                 | 7.4             | 3                 | 6.8             | 2                 | 4.1             |
| 11 to 15 inches     | 3                 | 11.1            | 2                 | 4.5             | 7                 | 14.3            |
| 16 to 20 inches     | 1                 | 3.7             | 2                 | 4.5             | 1                 | 2.0             |
| 21 to 25 inches     | 11                | 40.7            | 28                | 63.6            | 10                | 20.4            |
| 26 to 30 inches     | 9                 | 33.3            | 9                 | 20.5            | 29                | 59.2            |
| > 30 inches         | 1                 | 3.7             | 0                 | 0               | 0                 | 0               |
| <b>Total</b>        | <b>27</b>         | <b>100</b>      | <b>44</b>         | <b>100</b>      | <b>49</b>         | <b>100</b>      |

**Table 13. Type II dry bean seeding rate by dry bean market class in 2011.**

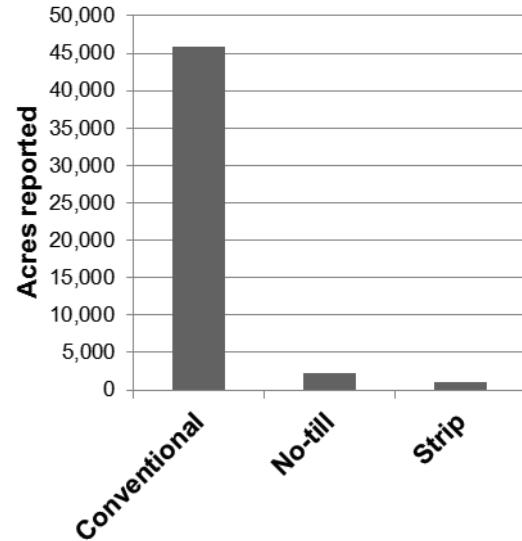
| Seeding rate <sup>a</sup> | Black                |                    | Navy                 |                    | Pinto                |                    |
|---------------------------|----------------------|--------------------|----------------------|--------------------|----------------------|--------------------|
|                           | Respondents<br>(no.) | Respondents<br>(%) | Respondents<br>(no.) | Respondents<br>(%) | Respondents<br>(no.) | Respondents<br>(%) |
| <b>Minnesota</b>          |                      |                    |                      |                    |                      |                    |
| < 70,000                  | 1                    | 11.1               | 1                    | 3.3                | 2                    | 33.3               |
| 70 to 79,000              | 0                    | 0                  | 1                    | 3.3                | 2                    | 33.3               |
| 80 to 89,000              | 0                    | 0                  | 0                    | 0                  | 1                    | 16.7               |
| 90 to 99,000              | 1                    | 11.1               | 4                    | 13.3               | 1                    | 16.7               |
| 100 to 109,000            | 3                    | 33.3               | 8                    | 26.7               | 0                    | 0                  |
| 110 to 119,000            | 1                    | 11.1               | 9                    | 30                 | 0                    | 0                  |
| 120 to 129,000            | 2                    | 22.2               | 4                    | 13.3               | 0                    | 0                  |
| > 129,000                 | 1                    | 11.1               | 3                    | 10                 | 0                    | 0                  |
| <b>Total</b>              | <b>9</b>             | <b>100</b>         | <b>30</b>            | <b>100</b>         | <b>6</b>             | <b>100</b>         |
| <b>North Dakota</b>       |                      |                    |                      |                    |                      |                    |
| < 70,000                  | 1                    | 5.9                | 0                    | 0                  | 4                    | 19.0               |
| 70 to 79,000              | 1                    | 5.9                | 0                    | 0                  | 7                    | 33.3               |
| 80 to 89,000              | 0                    | 0                  | 0                    | 0                  | 7                    | 33.3               |
| 90 to 99,000              | 4                    | 23.5               | 2                    | 15.4               | 3                    | 14.3               |
| 100 to 109,000            | 8                    | 47.1               | 4                    | 30.8               | 0                    | 0                  |
| 110 to 119,000            | 2                    | 11.8               | 2                    | 15.4               | 0                    | 0                  |
| 120 to 129,000            | 0                    | 0                  | 3                    | 23.1               | 0                    | 0                  |
| > 129,000                 | 1                    | 5.9                | 2                    | 15.4               | 0                    | 0                  |
| <b>Total</b>              | <b>17</b>            | <b>100</b>         | <b>13</b>            | <b>100</b>         | <b>21</b>            | <b>100</b>         |
| <b>NorthHarvest</b>       |                      |                    |                      |                    |                      |                    |
| < 70,000                  | 2                    | 7.7                | 1                    | 2.3                | 6                    | 22.2               |
| 70 to 79,000              | 1                    | 3.8                | 1                    | 2.3                | 9                    | 33.3               |
| 80 to 89,000              | 0                    | 0                  | 0                    | 0                  | 8                    | 29.6               |
| 90 to 99,000              | 5                    | 19.2               | 6                    | 14.0               | 4                    | 14.8               |
| 100 to 109,000            | 11                   | 42.3               | 12                   | 27.9               | 0                    | 0                  |
| 110 to 119,000            | 3                    | 11.5               | 11                   | 25.6               | 0                    | 0                  |
| 120 to 129,000            | 2                    | 7.7                | 7                    | 16.3               | 0                    | 0                  |
| > 129,000                 | 2                    | 7.7                | 5                    | 11.6               | 0                    | 0                  |
| <b>Total</b>              | <b>26</b>            | <b>100</b>         | <b>43</b>            | <b>100</b>         | <b>27</b>            | <b>100</b>         |

<sup>a</sup>Live seeds per acre.

**Table 14. Dry bean field tillage practices in 2011.**

| Tillage practice    | Acres reported<br>(no.) <sup>a</sup> | Acres reported<br>(%) <sup>a</sup> |
|---------------------|--------------------------------------|------------------------------------|
| <b>Minnesota</b>    |                                      |                                    |
| Conventional        | 21,211                               | 98.6                               |
| Strip tillage       | 291                                  | 1.4                                |
| No-till             | 0                                    | 0                                  |
| <b>Total</b>        | <b>21,502</b>                        | <b>100</b>                         |
| <b>North Dakota</b> |                                      |                                    |
| Conventional        | 24,583                               | 88.9                               |
| Strip tillage       | 800                                  | 2.9                                |
| No-till             | 2,280                                | 8.2                                |
| <b>Total</b>        | <b>27,663</b>                        | <b>100</b>                         |
| <b>NorthHarvest</b> |                                      |                                    |
| Conventional        | 45,794                               | 93.1                               |
| Strip tillage       | 1,091                                | 2.2                                |
| No-till             | 2,280                                | 4.6                                |
| <b>Total</b>        | <b>49,165</b>                        | <b>100</b>                         |

<sup>a</sup>Respondents' acres only.

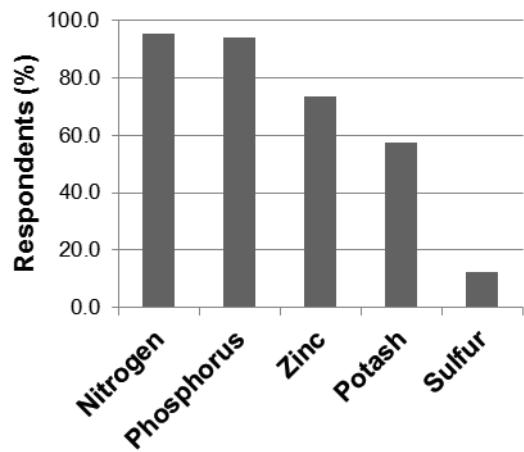


**Figure 13. NorthHarvest dry bean field tillage practices in 2011.**

# Agronomy

**Table 15. Use of fertilizers on dry bean fields in 2011.**

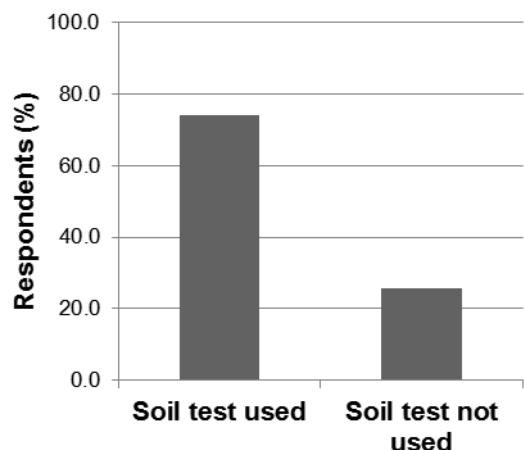
| Fertilizer          | Respondents<br>(no.) | Respondents<br>(%) |
|---------------------|----------------------|--------------------|
| <b>Minnesota</b>    |                      |                    |
| Nitrogen            | 51                   | 100                |
| Phosphorus          | 50                   | 98.0               |
| Potash              | 44                   | 86.3               |
| Zinc                | 39                   | 76.5               |
| Sulfur              | 8                    | 15.7               |
| <b>North Dakota</b> |                      |                    |
| Nitrogen            | 50                   | 90.9               |
| Phosphorus          | 50                   | 90.9               |
| Zinc                | 39                   | 70.9               |
| Potash              | 17                   | 30.9               |
| Sulfur              | 5                    | 9.1                |
| <b>Northarvest</b>  |                      |                    |
| Nitrogen            | 101                  | 95.3               |
| Phosphorus          | 100                  | 94.3               |
| Zinc                | 78                   | 73.6               |
| Potash              | 61                   | 57.5               |
| Sulfur              | 13                   | 12.3               |



**Figure 14. Northarvest use of fertilizers on dry bean fields in 2011.**

**Table 16. Use of soil test prior to fertilization of dry bean fields in 2011.**

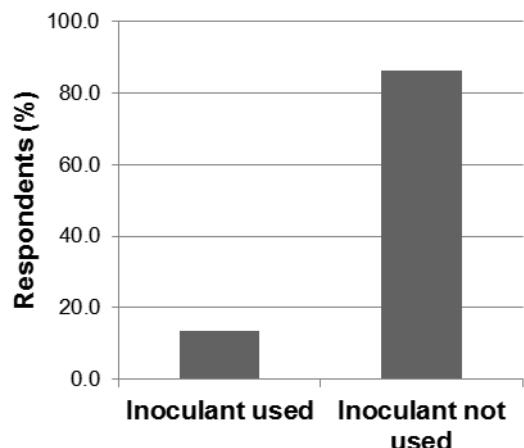
| Soil test           | Respondents<br>(no.) | Respondents<br>(%) |
|---------------------|----------------------|--------------------|
| <b>Minnesota</b>    |                      |                    |
| Soil test used      | 43                   | 81.1               |
| Soil test not used  | 10                   | 18.9               |
| <b>Total</b>        | <b>53</b>            | <b>100</b>         |
| <b>North Dakota</b> |                      |                    |
| Soil test used      | 38                   | 67.9               |
| Soil test not used  | 18                   | 32.1               |
| <b>Total</b>        | <b>56</b>            | <b>100</b>         |
| <b>Northarvest</b>  |                      |                    |
| Soil test used      | 81                   | 74.3               |
| Soil test not used  | 28                   | 25.7               |
| <b>Total</b>        | <b>109</b>           | <b>100</b>         |



**Figure 15. Northarvest use of soil test in 2011.**

**Table 17. Use of *Rhizobium* inoculants on dry bean fields in 2011.**

| <i>Rhizobium</i> use | Respondents<br>(no.) | Respondents<br>(%) |
|----------------------|----------------------|--------------------|
| <b>Minnesota</b>     |                      |                    |
| Inoculant used       | 5                    | 9                  |
| Inoculant not used   | 48                   | 91                 |
| <b>Total</b>         | <b>53</b>            | <b>10</b>          |
| <b>North Dakota</b>  |                      |                    |
| Inoculant used       | 10                   | 17.5               |
| Inoculant not used   | 47                   | 82.5               |
| <b>Total</b>         | <b>57</b>            | <b>100</b>         |
| <b>Northarvest</b>   |                      |                    |
| Inoculant used       | 15                   | 13.6               |
| Inoculant not used   | 95                   | 86.4               |
| <b>Total</b>         | <b>110</b>           | <b>100</b>         |

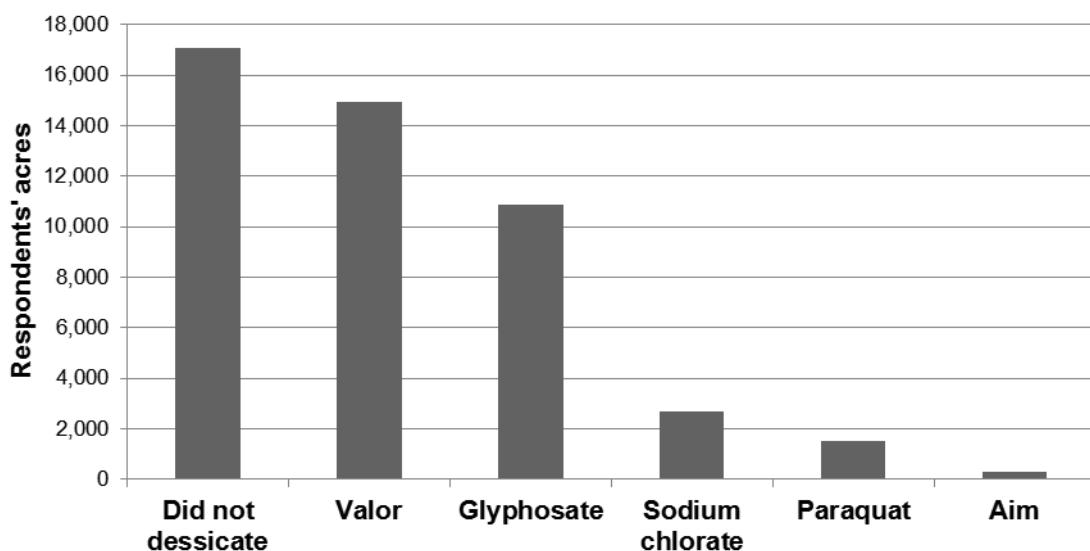


**Figure 16. Northarvest use of inoculant in 2011.**

**Table 18. Dessicants used on dry bean in 2011.**

| Dessicant           | Respondents<br>(no.) | Respondents<br>(%) | Acres reported<br>(no.) <sup>a</sup> | Acres reported<br>(%) <sup>a</sup> |
|---------------------|----------------------|--------------------|--------------------------------------|------------------------------------|
| <b>Minnesota</b>    |                      |                    |                                      |                                    |
| Valor               | 36                   | 47.4               | 7,692                                | 38.8                               |
| Did not dessicate   | 18                   | 23.7               | 7,081                                | 35.7                               |
| Glyphosate          | 13                   | 17.1               | 2,997                                | 15.1                               |
| Sodium chlorate     | 4                    | 5.3                | 1,114                                | 5.6                                |
| Paraquat            | 4                    | 5.3                | 635                                  | 3.2                                |
| Aim                 | 1                    | 1.3                | 300                                  | 1.5                                |
| <b>North Dakota</b> |                      |                    |                                      |                                    |
| Did not dessicate   | 23                   | 28.4               | 10,008                               | 36.3                               |
| Glyphosate          | 26                   | 32.1               | 7,872                                | 28.6                               |
| Valor               | 23                   | 28.4               | 7,228                                | 26.2                               |
| Sodium chlorate     | 5                    | 6.2                | 1,555                                | 5.6                                |
| Paraquat            | 4                    | 4.9                | 890                                  | 3.2                                |
| Aim                 | 0                    | 0                  | 0                                    | 0                                  |
| <b>Northharvest</b> |                      |                    |                                      |                                    |
| Did not dessicate   | 41                   | 26.1               | 17,089                               | 36.1                               |
| Valor               | 59                   | 37.6               | 14,920                               | 31.5                               |
| Glyphosate          | 39                   | 24.8               | 10,869                               | 22.9                               |
| Sodium chlorate     | 9                    | 5.7                | 2,669                                | 5.6                                |
| Paraquat            | 8                    | 5.1                | 1,525                                | 3.2                                |
| Aim                 | 1                    | 0.6                | 300                                  | 0.6                                |

<sup>a</sup>Respondents' acres only.



**Figure 17. Northharvest dessicants used on dry bean in 2011.**

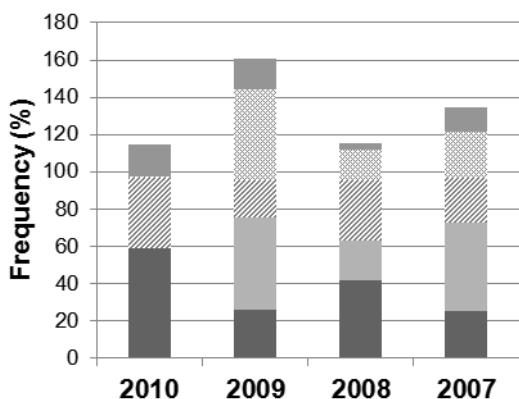
**Table 19. Frequency of crops in dry bean crop rotation program, 2007-2010.**

| Crop                | 2010<br>Respon-<br>dents<br>(%) | 2009<br>Respon-<br>dents<br>(%) | 2008<br>Respon-<br>dents<br>(%) | 2007<br>Respon-<br>dents<br>(%) | Average<br>Respon-<br>dents<br>(%) |
|---------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|------------------------------------|
| <b>Minnesota</b>    |                                 |                                 |                                 |                                 |                                    |
| Corn                | 50.9                            | 40.4                            | 43.1                            | 30.6                            | 41.3                               |
| Soybean             | 1.8                             | 59.6                            | 21.6                            | 26.5                            | 27.4                               |
| Wheat (spring)      | 35.1                            | 19.2                            | 21.6                            | 24.5                            | 25.1                               |
| Dry bean            | 0                               | 21.2                            | 25.5                            | 34.7                            | 20.4                               |
| Sugar beet          | 19.3                            | 21.2                            | 5.9                             | 14.3                            | 15.2                               |
| Potato              | 7.0                             | 5.8                             | 2.0                             | 6.1                             | 5.2                                |
| Hay                 | 1.8                             | 1.9                             | 2.0                             | 2.0                             | 1.9                                |
| Barley              | 3.5                             | 0                               | 2.0                             | 2.0                             | 1.9                                |
| Canola/rape         | 0                               | 1.9                             | 0                               | 0                               | 0.5                                |
| Field pea           | 0                               | 1.9                             | 0                               | 0                               | 0.5                                |
| Oats                | 0                               | 0                               | 0                               | 2.0                             | 0.5                                |
| <b>North Dakota</b> |                                 |                                 |                                 |                                 |                                    |
| Wheat (spring)      | 82.8                            | 32.7                            | 61.5                            | 26.0                            | 50.8                               |
| Dry bean            | 0                               | 76.4                            | 17.3                            | 60                              | 38.4                               |
| Soybean             | 0                               | 38.2                            | 11.5                            | 22.0                            | 17.9                               |
| Corn                | 24.1                            | 0                               | 21.2                            | 18.0                            | 15.8                               |
| Sugar beet          | 15.5                            | 12.7                            | 1.9                             | 12.0                            | 10.5                               |
| Barley              | 12.1                            | 5.5                             | 7.7                             | 0                               | 6.3                                |
| Potato              | 0                               | 7.3                             | 1.9                             | 0                               | 2.3                                |
| Sunflower           | 0                               | 5.5                             | 3.8                             | 0                               | 2.3                                |
| Canola/rape         | 1.7                             | 1.8                             | 0                               | 2.0                             | 1.4                                |
| Field pea           | 0                               | 1.8                             | 0                               | 0                               | 0.5                                |
| <b>Northharvest</b> |                                 |                                 |                                 |                                 |                                    |
| Wheat (spring)      | 59.1                            | 26.2                            | 41.7                            | 25.3                            | 38.1                               |
| Dry bean            | 0                               | 49.5                            | 21.4                            | 47.5                            | 29.6                               |
| Corn                | 37.4                            | 19.6                            | 32.0                            | 24.2                            | 28.3                               |
| Soybean             | 0.9                             | 48.6                            | 16.5                            | 24.2                            | 22.6                               |
| Sugar beet          | 17.4                            | 16.8                            | 3.9                             | 13.1                            | 12.8                               |
| Barley              | 7.8                             | 2.8                             | 4.9                             | 1.0                             | 4.1                                |
| Potato              | 3.5                             | 6.5                             | 1.9                             | 3.0                             | 3.7                                |
| Sunflower           | 0                               | 2.8                             | 1.9                             | 0                               | 1.2                                |
| Hay                 | 0.9                             | 0.9                             | 1.0                             | 1.0                             | 1.0                                |
| Canola/rape         | 0.9                             | 1.9                             | 0                               | 1.0                             | 1.0                                |
| Field pea           | 0                               | 1.9                             | 0                               | 0                               | 0.5                                |
| Oats                | 0                               | 0                               | 0                               | 1.0                             | 0.3                                |

■ Wheat (spring) ■ Dry bean

▨ Corn ▨ Soybean

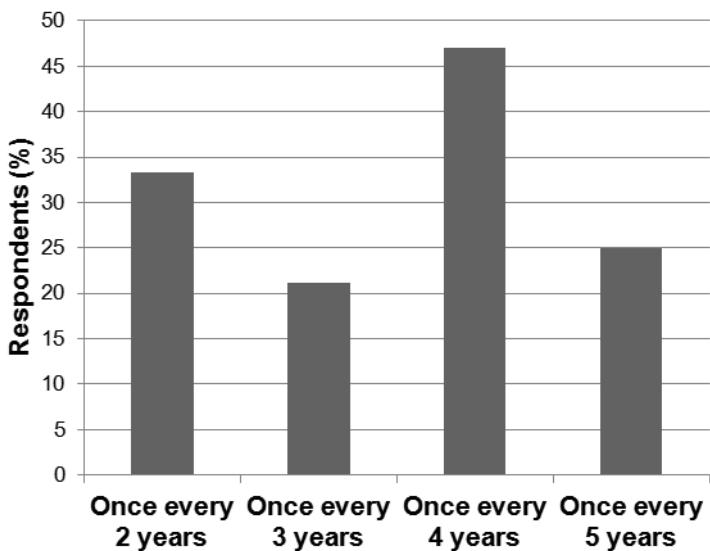
■ Sugar beet



**Figure 18. Northharvest frequency of major crops in dry bean crop rotation program, 2007-2010.**

**Table 20. Number of years dry bean is grown in dry bean crop rotation program.**

| Number of years     | Respondents<br>(%) |
|---------------------|--------------------|
| <b>Minnesota</b>    |                    |
| Once every 2 years  | 18.9               |
| Once every 3 years  | 25.0               |
| Once every 4 years  | 34.0               |
| Once every 5 years  | 36.0               |
| <b>North Dakota</b> |                    |
| Once every 2 years  | 47.3               |
| Once every 3 years  | 17.3               |
| Once every 4 years  | 60                 |
| Once every 5 years  | 14.0               |
| <b>Northharvest</b> |                    |
| Once every 2 years  | 33.3               |
| Once every 3 years  | 21.2               |
| Once every 4 years  | 47.0               |
| Once every 5 years  | 25.0               |



**Figure 19. Northharvest number of years dry bean is grown in dry bean crop rotation program.**

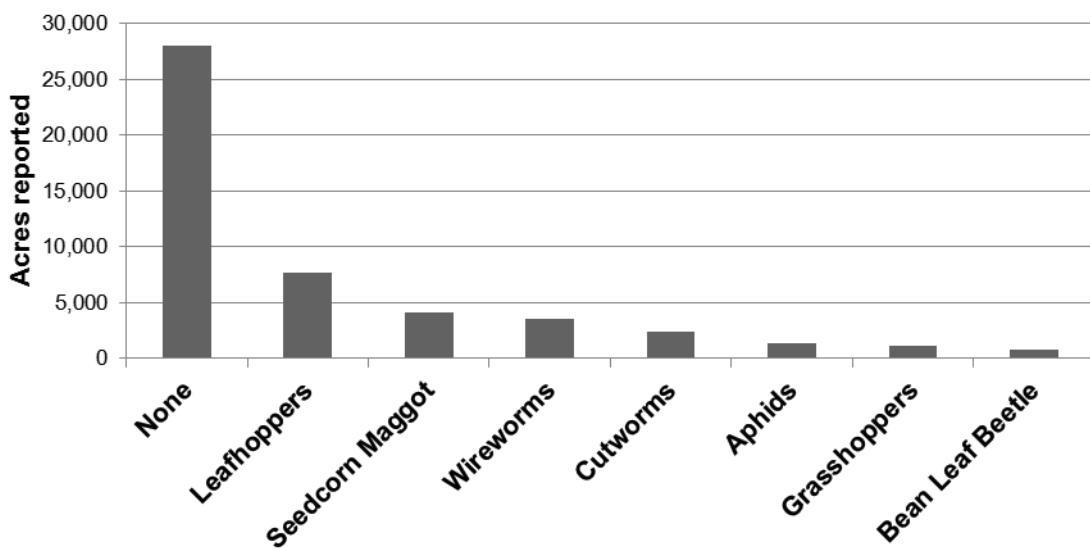
# Insect Pests and Insecticide Use

**Table 21. Worst insect problem in dry bean in 2011.**

| Insect <sup>a</sup> | Respondents<br>(no.) | Respondents<br>(%) | Acres reported<br>(no.) <sup>b</sup> | Acres reported<br>(%) <sup>b</sup> |
|---------------------|----------------------|--------------------|--------------------------------------|------------------------------------|
| <b>Minnesota</b>    |                      |                    |                                      |                                    |
| None                | 26                   | 44.1               | 9,770                                | 45.4                               |
| Leafhoppers         | 20                   | 33.9               | 6,712                                | 31.2                               |
| Seedcorn Maggot     | 4                    | 6.8                | 1,715                                | 8.0                                |
| Aphids              | 4                    | 6.8                | 1,028                                | 4.8                                |
| Bean Leaf Beetle    | 1                    | 1.7                | 800                                  | 3.7                                |
| Wireworms           | 1                    | 1.7                | 730                                  | 3.4                                |
| Grasshoppers        | 2                    | 3.4                | 700                                  | 3.3                                |
| Cutworms            | 1                    | 1.7                | 47                                   | 0.2                                |
| <b>Total</b>        | <b>59</b>            | <b>100</b>         | <b>21,502</b>                        | <b>100</b>                         |
| <b>North Dakota</b> |                      |                    |                                      |                                    |
| None                | 46                   | 73.0               | 18,315                               | 66.2                               |
| Wireworms           | 5                    | 7.9                | 2,833                                | 10.2                               |
| Seedcorn Maggot     | 2                    | 3.2                | 2,420                                | 8.7                                |
| Cutworms            | 4                    | 6.3                | 2,350                                | 8.5                                |
| Leafhoppers         | 3                    | 4.8                | 985                                  | 3.6                                |
| Grasshoppers        | 2                    | 3.2                | 390                                  | 1.4                                |
| Aphids              | 1                    | 1.6                | 370                                  | 1.3                                |
| Bean Leaf Beetle    | 0                    | 0                  | 0                                    | 0                                  |
| <b>Total</b>        | <b>63</b>            | <b>100</b>         | <b>27,663</b>                        | <b>100</b>                         |
| <b>Northharvest</b> |                      |                    |                                      |                                    |
| None                | 72                   | 59.0               | 28,085                               | 57.1                               |
| Leafhoppers         | 23                   | 18.9               | 7,697                                | 15.7                               |
| Seedcorn Maggot     | 6                    | 4.9                | 4,135                                | 8.4                                |
| Wireworms           | 6                    | 4.9                | 3,563                                | 7.2                                |
| Cutworms            | 5                    | 4.1                | 2,397                                | 4.9                                |
| Aphids              | 5                    | 4.1                | 1,398                                | 2.8                                |
| Grasshoppers        | 4                    | 3.3                | 1,090                                | 2.2                                |
| Bean Leaf Beetle    | 1                    | 0.8                | 800                                  | 1.6                                |
| <b>Total</b>        | <b>122</b>           | <b>100</b>         | <b>49,165</b>                        | <b>100</b>                         |

<sup>a</sup>Ranked as No. 1 insect problem by respondents.

<sup>b</sup>Respondents' acres only.



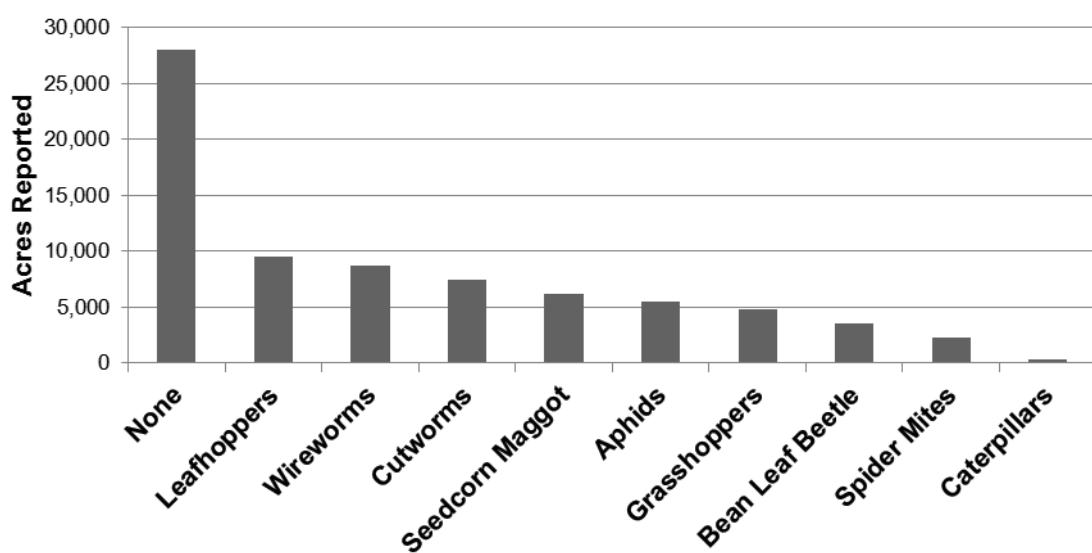
**Figure 20. Northharvest worst insect problem in dry bean in 2011.**

**Table 22. Insects ranked as one of the three worst in dry bean in 2011.**

| Insect <sup>a</sup> | Respondents<br>(no.) | Respondents<br>(%) | Acres reported<br>(no.) <sup>b</sup> | Acres reported<br>(%) <sup>b</sup> |
|---------------------|----------------------|--------------------|--------------------------------------|------------------------------------|
| <b>Minnesota</b>    |                      |                    |                                      |                                    |
| None                | 26                   | 44.1               | 9,770                                | 45.4                               |
| Leafhoppers         | 25                   | 42.4               | 8,494                                | 39.5                               |
| Aphids              | 10                   | 16.9               | 3,311                                | 15.4                               |
| Bean Leaf Beetle    | 6                    | 10.2               | 3,215                                | 15.0                               |
| Cutworms            | 8                    | 13.6               | 3,227                                | 15.0                               |
| Wireworms           | 6                    | 10.2               | 2,403                                | 11.2                               |
| Spider Mites        | 6                    | 10.2               | 2,145                                | 10                                 |
| Seedcorn Maggot     | 5                    | 8.5                | 1,855                                | 8.6                                |
| Grasshoppers        | 5                    | 8.5                | 1,420                                | 6.6                                |
| <b>North Dakota</b> |                      |                    |                                      |                                    |
| None                | 46                   | 73.0               | 18,315                               | 66.2                               |
| Wireworms           | 10                   | 15.9               | 6,283                                | 22.7                               |
| Seedcorn Maggot     | 5                    | 7.9                | 4,310                                | 15.6                               |
| Cutworms            | 9                    | 14.3               | 4,258                                | 15.4                               |
| Grasshoppers        | 6                    | 9.5                | 3,410                                | 12.3                               |
| Aphids              | 5                    | 7.9                | 2,148                                | 7.8                                |
| Leafhoppers         | 3                    | 4.8                | 985                                  | 3.6                                |
| Bean Leaf Beetle    | 1                    | 1.6                | 370                                  | 1.3                                |
| Caterpillars        | 1                    | 1.6                | 370                                  | 1.3                                |
| Spider Mites        | 1                    | 1.6                | 135                                  | 0.5                                |
| <b>Northarvest</b>  |                      |                    |                                      |                                    |
| None                | 72                   | 59.0               | 28,085                               | 57.1                               |
| Leafhoppers         | 28                   | 23.0               | 9,479                                | 19.3                               |
| Wireworms           | 16                   | 13.1               | 8,686                                | 17.7                               |
| Cutworms            | 17                   | 13.9               | 7,485                                | 15.2                               |
| Seedcorn Maggot     | 10                   | 8.2                | 6,165                                | 12.5                               |
| Aphids              | 15                   | 12.3               | 5,459                                | 11.1                               |
| Grasshoppers        | 11                   | 9.0                | 4,830                                | 9.8                                |
| Bean Leaf Beetle    | 7                    | 5.7                | 3,585                                | 7.3                                |
| Spider Mites        | 7                    | 5.7                | 2,280                                | 4.6                                |
| Caterpillars        | 1                    | 0.8                | 370                                  | 0.8                                |

<sup>a</sup>Ranked as No. 1, 2 or 3 insect problem by respondents.

<sup>b</sup>Respondents' acres only.



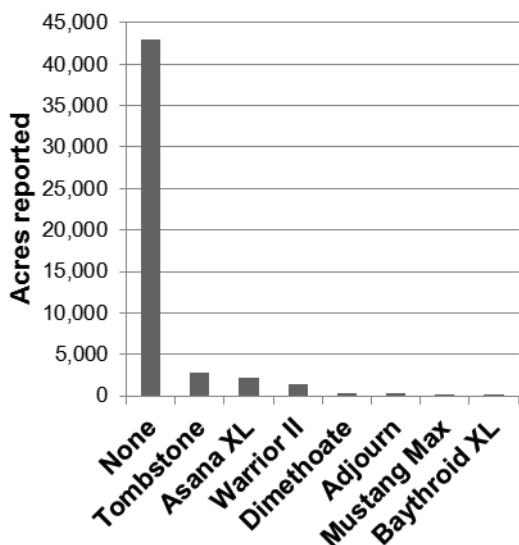
**Figure 21. Northarvest insects ranked as one of the three worst in dry bean in 2011.**

**Table 23. Foliar insecticide use in dry bean in 2011.**

| Insecticide              | Respondents (no.) | Respondents (%) | Acres reported (no.) <sup>a,b</sup> | Acres reported (%) <sup>a,b</sup> |
|--------------------------|-------------------|-----------------|-------------------------------------|-----------------------------------|
| <b>Minnesota</b>         |                   |                 |                                     |                                   |
| Tombstone                | 3                 | 5.1             | 2,854                               | 13.3                              |
| Asana XL                 | 7                 | 11.9            | 1,993                               | 9.3                               |
| Dimethoate               | 1                 | 1.7             | 320                                 | 1.5                               |
| Warrior II               | 1                 | 1.7             | 315                                 | 1.5                               |
| Adjourn                  | 1                 | 1.7             | 306                                 | 1.4                               |
| Mustang Max              | 1                 | 1.7             | 68                                  | 0.3                               |
| None                     | 45                | 76.3            | 16,633                              | 77.4                              |
| <b>Insecticide Total</b> | <b>14</b>         | <b>23.7</b>     | <b>5,856</b>                        | <b>27.2</b>                       |
| <b>North Dakota</b>      |                   |                 |                                     |                                   |
| Warrior II               | 2                 | 3.2             | 1,105                               | 4.0                               |
| Asana XL                 | 1                 | 1.6             | 250                                 | 0.9                               |
| Baythroid XL             | 1                 | 1.6             | 51                                  | 0.2                               |
| None                     | 59                | 93.7            | 26,403                              | 95.4                              |
| <b>Insecticide Total</b> | <b>4</b>          | <b>6.4</b>      | <b>1,406</b>                        | <b>5.1</b>                        |
| <b>Northharvest</b>      |                   |                 |                                     |                                   |
| Tombstone                | 3                 | 2.5             | 2,854                               | 5.8                               |
| Asana XL                 | 8                 | 6.6             | 2,243                               | 4.6                               |
| Warrior II               | 3                 | 2.5             | 1,420                               | 2.9                               |
| Dimethoate               | 1                 | 0.8             | 320                                 | 0.7                               |
| Adjourn                  | 1                 | 0.8             | 306                                 | 0.6                               |
| Mustang Max              | 1                 | 0.8             | 68                                  | 0.1                               |
| Baythroid XL             | 1                 | 0.8             | 51                                  | 0.1                               |
| None                     | 104               | 85.2            | 43,036                              | 87.5                              |
| <b>Insecticide Total</b> | <b>18</b>         | <b>14.8</b>     | <b>7,253</b>                        | <b>14.8</b>                       |

<sup>a</sup>Respondents' acres only.

<sup>b</sup>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.



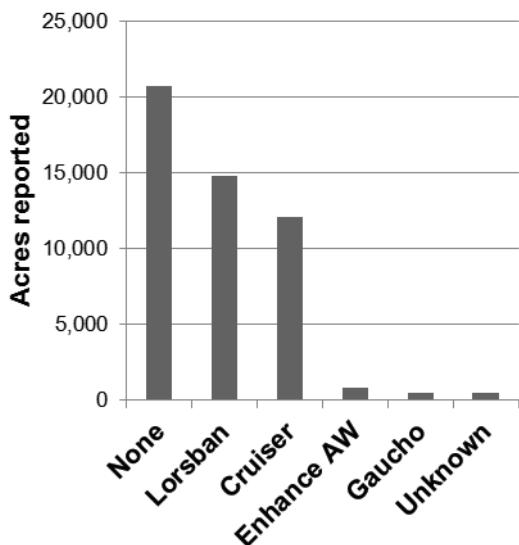
**Figure 22. Northharvest foliar insecticide use in dry bean in 2011.**

**Table 24. Insecticide seed treatment use in dry bean in 2011.**

| Seed Treatment              | Respondents (no.) | Respondents (%) | Acres reported (no.) <sup>a,b</sup> | Acres reported (%) <sup>a,b</sup> |
|-----------------------------|-------------------|-----------------|-------------------------------------|-----------------------------------|
| <b>Minnesota</b>            |                   |                 |                                     |                                   |
| Lorsban                     | 19                | 32.2            | 8,567                               | 39.8                              |
| Cruiser                     | 20                | 33.9            | 6,918                               | 32.2                              |
| Unknown                     | 1                 | 1.7             | 300                                 | 1.4                               |
| Gaucho                      | 2                 | 3.4             | 187                                 | 0.9                               |
| None                        | 19                | 32.2            | 6,959                               | 32.4                              |
| <b>Seed Treatment Total</b> |                   |                 | <b>15,972</b>                       | <b>74.2</b>                       |
| <b>North Dakota</b>         |                   |                 |                                     |                                   |
| Lorsban                     | 12                | 19.0            | 6,245                               | 22.6                              |
| Cruiser                     | 16                | 25.4            | 5,152                               | 18.6                              |
| Enhance AW                  | 1                 | 1.6             | 800                                 | 2.9                               |
| Gaucho                      | 2                 | 3.2             | 300                                 | 1.1                               |
| Unknown                     | 1                 | 1.6             | 142                                 | 0.5                               |
| None                        | 32                | 50.8            | 13,824                              | 50                                |
| <b>Seed Treatment Total</b> |                   |                 | <b>12,639</b>                       | <b>45.7</b>                       |
| <b>Northharvest</b>         |                   |                 |                                     |                                   |
| Lorsban                     | 31                | 25.4            | 14,812                              | 30.1                              |
| Cruiser                     | 36                | 29.5            | 12,070                              | 24.5                              |
| Enhance AW                  | 1                 | 0.8             | 800                                 | 1.6                               |
| Gaucho                      | 4                 | 3.3             | 487                                 | 1.0                               |
| Unknown                     | 2                 | 1.6             | 442                                 | 0.9                               |
| None                        | 51                | 41.8            | 20,783                              | 42.3                              |
| <b>Seed Treatment Total</b> |                   |                 | <b>28,611</b>                       | <b>58.2</b>                       |

<sup>a</sup>Respondents' acres only.

<sup>b</sup>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. Northharvest insecticide seed treatment use in dry bean in 2011.**

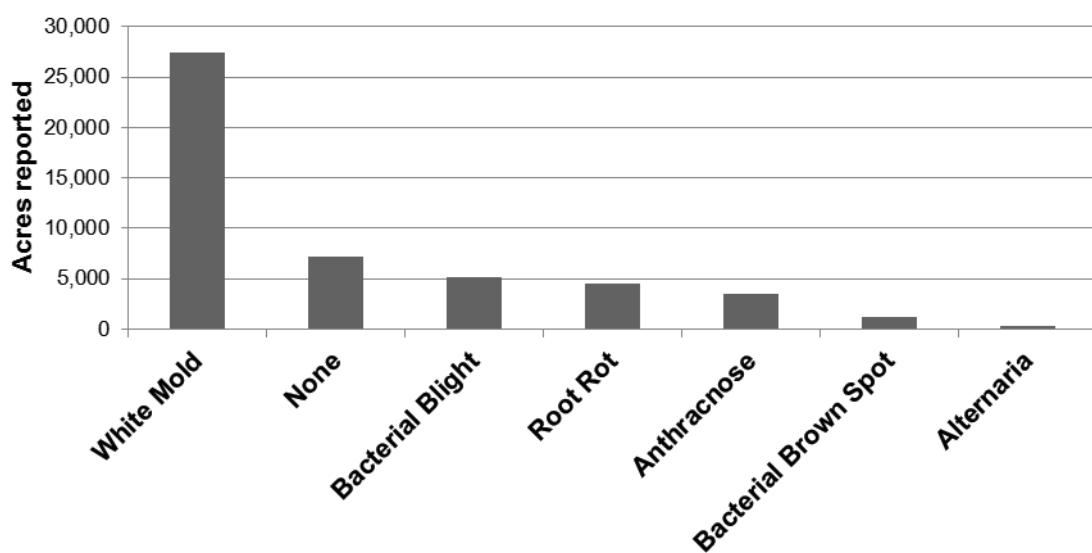
# Plant Diseases and Fungicide Use

**Table 25. Worst disease problem in dry bean in 2011.**

| Disease <sup>a</sup> | Respondents<br>(no.) | Respondents<br>(%) | Acres reported<br>(no.) <sup>b</sup> | Acres reported<br>(%) <sup>b</sup> |
|----------------------|----------------------|--------------------|--------------------------------------|------------------------------------|
| <b>Minnesota</b>     |                      |                    |                                      |                                    |
| White Mold           | 29                   | 49.2               | 10,763                               | 50.1                               |
| Bacterial Blight     | 7                    | 11.9               | 3,897                                | 18.1                               |
| None                 | 9                    | 15.3               | 2,837                                | 13.2                               |
| Root Rot             | 10                   | 16.9               | 2,625                                | 12.2                               |
| Anthracnose          | 2                    | 3.4                | 940                                  | 4.4                                |
| Bacterial Brown Spot | 2                    | 3.4                | 440                                  | 2.0                                |
| <b>Total</b>         | <b>59</b>            | <b>100</b>         | <b>21,502</b>                        | <b>100</b>                         |
| <b>North Dakota</b>  |                      |                    |                                      |                                    |
| White Mold           | 37                   | 58.7               | 16,721                               | 60.4                               |
| None                 | 14                   | 22.2               | 4,316                                | 15.6                               |
| Anthracnose          | 3                    | 4.8                | 2,520                                | 9.1                                |
| Root Rot             | 6                    | 9.5                | 1,926                                | 7.0                                |
| Bacterial Blight     | 1                    | 1.6                | 1,200                                | 4.3                                |
| Bacterial Brown Spot | 1                    | 1.6                | 730                                  | 2.6                                |
| Alternaria           | 1                    | 1.6                | 250                                  | 0.9                                |
| <b>Total</b>         | <b>63</b>            | <b>100</b>         | <b>27,663</b>                        | <b>100</b>                         |
| <b>Northharvest</b>  |                      |                    |                                      |                                    |
| White Mold           | 66                   | 54.1               | 27,484                               | 55.9                               |
| None                 | 23                   | 18.9               | 7,153                                | 14.5                               |
| Bacterial Blight     | 8                    | 6.6                | 5,097                                | 10.4                               |
| Root Rot             | 16                   | 13.1               | 4,551                                | 9.3                                |
| Anthracnose          | 5                    | 4.1                | 3,460                                | 7.0                                |
| Bacterial Brown Spot | 3                    | 2.5                | 1,170                                | 2.4                                |
| Alternaria           | 1                    | 0.8                | 250                                  | 0.5                                |
| <b>Total</b>         | <b>122</b>           | <b>100</b>         | <b>49,165</b>                        | <b>100</b>                         |

<sup>a</sup>Ranked as No. 1 disease problem by respondents.

<sup>b</sup>Respondents' acres only.



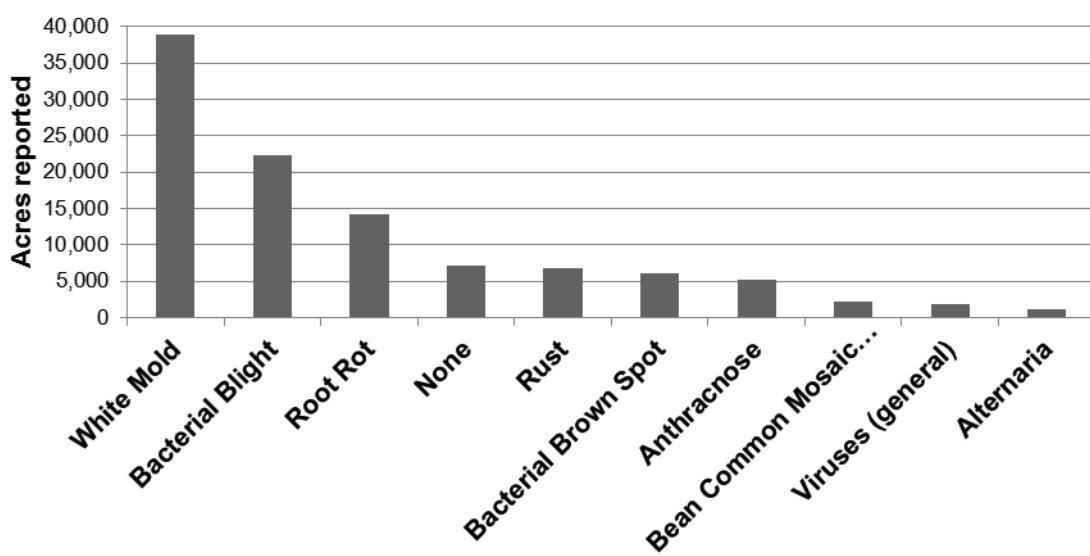
**Figure 24. Northharvest worst disease problem in dry bean in 2011.**

**Table 26. Diseases ranked as one of the three worst in dry bean in 2011.**

| Disease <sup>a</sup>     | Respondents<br>(no.) | Respondents<br>(%) | Acres reported<br>(no.) <sup>b</sup> | Acres reported<br>(%) <sup>b</sup> |
|--------------------------|----------------------|--------------------|--------------------------------------|------------------------------------|
| <b>Minnesota</b>         |                      |                    |                                      |                                    |
| White Mold               | 43                   | 72.9               | 15,820                               | 73.6                               |
| Root Rot                 | 27                   | 45.8               | 11,059                               | 51.4                               |
| Bacterial Blight         | 23                   | 39.0               | 10,712                               | 49.8                               |
| Bacterial Brown Spot     | 10                   | 16.9               | 2,885                                | 13.4                               |
| None                     | 9                    | 15.3               | 2,837                                | 13.2                               |
| Rust                     | 8                    | 13.6               | 2,632                                | 12.2                               |
| Viruses (general)        | 4                    | 6.8                | 1,778                                | 8.3                                |
| Anthracnose              | 4                    | 6.8                | 1,640                                | 7.6                                |
| Bean Common Mosaic Virus | 2                    | 3.4                | 353                                  | 1.6                                |
| <b>North Dakota</b>      |                      |                    |                                      |                                    |
| White Mold               | 47                   | 74.6               | 23,056                               | 83.3                               |
| Bacterial Blight         | 22                   | 34.9               | 11,582                               | 41.9                               |
| None                     | 14                   | 22.2               | 4,316                                | 15.6                               |
| Rust                     | 12                   | 19.0               | 4,223                                | 15.3                               |
| Anthracnose              | 5                    | 7.9                | 3,570                                | 12.9                               |
| Bacterial Brown Spot     | 7                    | 11.1               | 3,275                                | 11.8                               |
| Root Rot                 | 8                    | 12.7               | 3,180                                | 11.5                               |
| Bean Common Mosaic Virus | 2                    | 3.2                | 1,820                                | 6.6                                |
| Alternaria               | 2                    | 3.2                | 1,170                                | 4.2                                |
| <b>Northharvest</b>      |                      |                    |                                      |                                    |
| White Mold               | 90                   | 73.8               | 38,876                               | 79.1                               |
| Bacterial Blight         | 45                   | 36.9               | 22,294                               | 45.3                               |
| Root Rot                 | 35                   | 28.7               | 14,239                               | 29.0                               |
| None                     | 23                   | 18.9               | 7,153                                | 14.5                               |
| Rust                     | 20                   | 16.4               | 6,855                                | 13.9                               |
| Bacterial Brown Spot     | 17                   | 13.9               | 6,160                                | 12.5                               |
| Anthracnose              | 9                    | 7.4                | 5,210                                | 10.6                               |
| Bean Common Mosaic Virus | 4                    | 3.3                | 2,173                                | 4.4                                |
| Viruses (general)        | 4                    | 3.3                | 1,778                                | 3.6                                |
| Alternaria               | 2                    | 1.6                | 1,170                                | 2.4                                |

<sup>a</sup>Ranked as No. 1, 2 or 3 disease problem by respondents.

<sup>b</sup>Respondents' acres only.



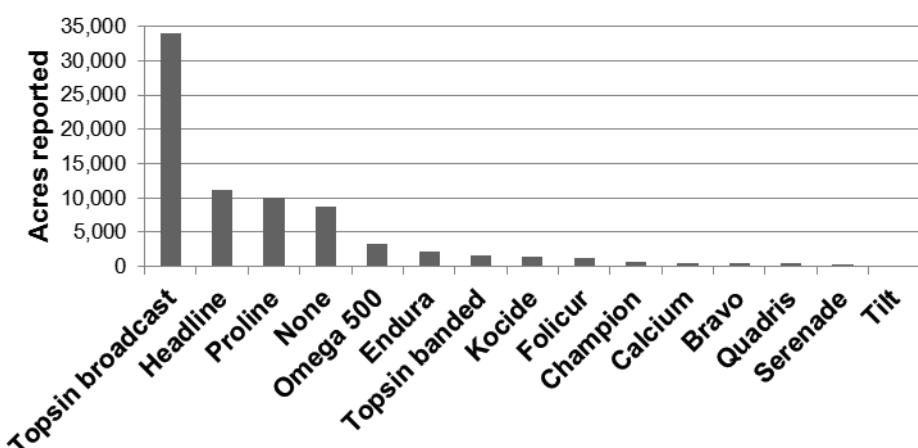
**Figure 25. Northharvest diseases ranked as one of the three worst in dry bean in 2011.**

**Table 27. Foliar and banded fungicide use in dry bean in 2011.**

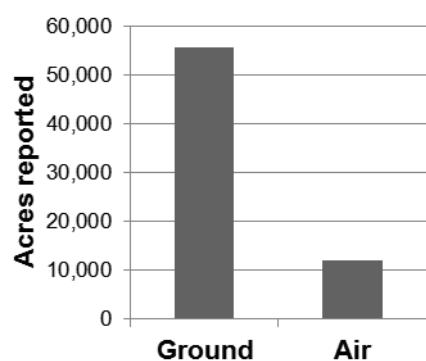
| Fungicide              | Resp.<br>(no.) | Resp.<br>(%) <sup>b</sup> | Total<br>acres<br>treated<br>(no.) <sup>a</sup> | Total<br>acres<br>treated<br>(%) <sup>a,b</sup> | Acres<br>treated by<br>ground<br>(no.) <sup>a</sup> | Acres<br>treated by<br>ground<br>(%) <sup>a,b</sup> | Acres<br>treated by<br>air<br>(no.) <sup>a</sup> | Acres<br>treated by<br>air<br>(%) <sup>a,b</sup> |
|------------------------|----------------|---------------------------|---|---|---|---|--|--|
| <b>Minnesota</b>       |                |                           |   |   |   |   |  |  |
| Topsin broadcast       | 29             | 49.2                      | 16,965  | 78.9  | 14,065  | 65.4  | 2,900  | 13.5   |
| Headline               | 10             | 16.9                      | 8,643   | 40.2  | 7,467   | 34.7  | 1,176  | 5.5  |
| Proline                | 19             | 32.2                      | 7,251   | 33.7  | 6,770   | 31.5  | 481  | 2.2  |
| Kocide                 | 3              | 5.1                       | 1,362   | 6.3   | 877   | 4.1   | 485  | 2.3  |
| Folicur                | 1              | 1.7                       | 1,040   | 4.8   | 1,040   | 4.8   | 0  | 0  |
| Topsin banded          | 1              | 1.7                       | 800   | 3.7   | 800   | 3.7   | 0  | 0  |
| Champion               | 3              | 5.1                       | 746   | 3.5   | 213   | 1.0   | 533  | 2.5  |
| Endura                 | 2              | 3.4                       | 627   | 2.9   | 160   | 0.7   | 467  | 2.2  |
| Calcium                | 1              | 1.7                       | 505   | 2.3   | 505   | 2.3   | 0  | 0  |
| Serenade               | 2              | 3.4                       | 313   | 1.5   | 313   | 1.5   | 0  | 0  |
| Omega 500              | 2              | 3.4                       | 215   | 1.0   | 215   | 1.0   | 0  | 0  |
| Tilt                   | 1              | 1.7                       | 200   | 0.9   | 200   | 0.9   | 0  | 0  |
| None                   | 8              | 13.6                      | 2,426   | 11.3  | 0   | 0   | 0  | 0  |
| <b>Fungicide Total</b> |                |                           | <b>39,477</b>                                   |   | <b>32,625</b>                                       |   | <b>6,402</b>                                     |  |
| <b>North Dakota</b>    |                |                           |   |   |   |   |  |  |
| Topsin broadcast       | 24             | 38.1                      | 17,033  | 61.6  | 13,351  | 48.3  | 3,682  | 13.3   |
| Omega 500              | 6              | 9.5                       | 3,166   | 11.4  | 3,016   | 10.9  | 150  | 0.5  |
| Proline                | 9              | 14.3                      | 2,848   | 10.3  | 2,163   | 7.8   | 685  | 2.5  |
| Headline               | 8              | 12.7                      | 2,577   | 9.3   | 1,277   | 4.6   | 1,300  | 4.7  |
| Endura                 | 2              | 3.2                       | 1,460   | 5.3   | 1,460   | 5.3   | 0  | 0  |
| Topsin banded          | 2              | 3.2                       | 820   | 3.0   | 820   | 3.0   | 0  | 0  |
| Bravo                  | 1              | 1.6                       | 400   | 1.4   | 400   | 1.4   | 0  | 0  |
| Quadris                | 1              | 1.6                       | 400   | 1.4   | 400   | 1.4   | 0  | 0  |
| Folicur                | 1              | 1.6                       | 250   | 0.9   | 125   | 0.5   | 125  | 0.5  |
| None                   | 21             | 33.3                      | 6,279   | 22.7  | 0   | 0   | 0  | 0  |
| <b>Fungicide Total</b> |                |                           | <b>56,617</b>                                   |   | <b>23,012</b>                                       |   | <b>5,942</b>                                     |  |
| <b>Northarvest</b>     |                |                           |   |   |   |   |  |  |
| Topsin broadcast       | 53             | 43.4                      | 33,998  | 69.2  | 27,416  | 55.8  | 6,582  | 13.4   |
| Headline               | 18             | 14.8                      | 11,220  | 22.8  | 8,744   | 17.8  | 2,476  | 5.0  |
| Proline                | 28             | 23.0                      | 10,099  | 20.5  | 8,933   | 18.2  | 1,166  | 2.4  |
| Omega 500              | 8              | 6.6                       | 3,381   | 6.9   | 3,231   | 6.6   | 150  | 0.3  |
| Endura                 | 4              | 3.3                       | 2,087   | 4.2   | 1,620   | 3.3   | 467  | 0.9  |
| Topsin banded          | 3              | 2.5                       | 1,620   | 3.3   | 1,620   | 3.3   | 0  | 0  |
| Kocide                 | 3              | 2.5                       | 1,362   | 2.8   | 877   | 1.8   | 485  | 1.0  |
| Folicur                | 2              | 1.6                       | 1,290   | 2.6   | 1,165   | 2.4   | 125  | 0.3  |
| Champion               | 3              | 2.5                       | 746   | 1.5   | 213   | 0.4   | 533  | 1.1  |
| Calcium                | 1              | 0.8                       | 505   | 1.0   | 505   | 1.0   | 0  | 0  |
| Bravo                  | 1              | 0.8                       | 400   | 0.8   | 400   | 0.8   | 0  | 0  |
| Quadris                | 1              | 0.8                       | 400   | 0.8   | 400   | 0.8   | 0  | 0  |
| Serenade               | 2              | 1.6                       | 313   | 0.6   | 313   | 0.6   | 0  | 0  |
| Tilt                   | 1              | 0.8                       | 200   | 0.4   | 200   | 0.4   | 0  | 0  |
| None                   | 29             | 23.8                      | 8,705   | 17.7  | 0   | 0   | 0  | 0  |
| <b>Fungicide Total</b> |                |                           | <b>67,621</b>                                   |   | <b>55,637</b>                                       |   | <b>11,984</b>                                    |  |

<sup>a</sup>Respondents' acres only. Includes acreage treated more than once with the same product.

<sup>b</sup>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 bean in 2011.**



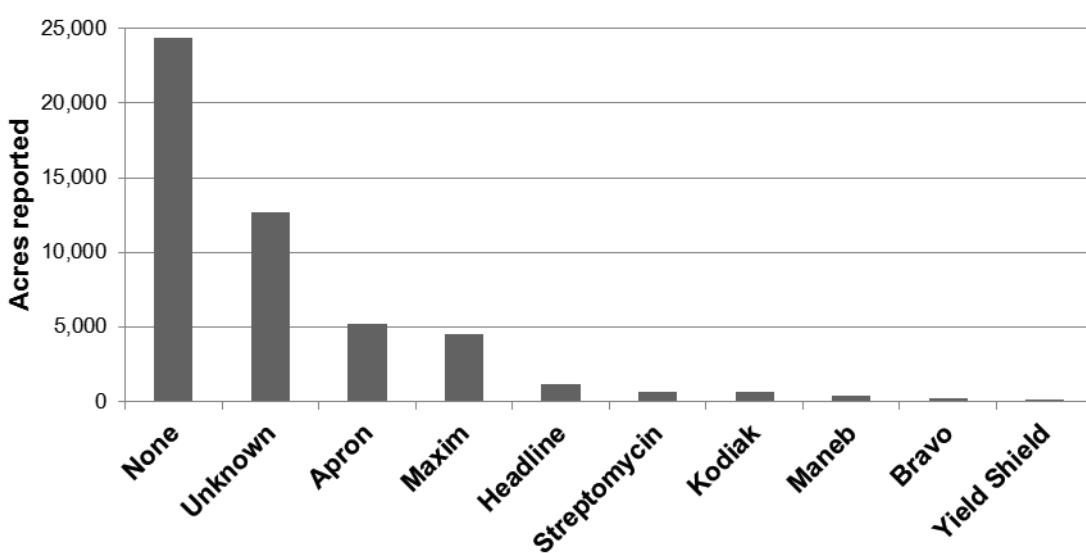
**Figure 27. Northarvest fungicide application method in dry bean in 2011.**

**Table 28. Fungicide seed treatment use in dry bean in 2011.**

| Seed treatment              | Respondents<br>(no.) | Respondents<br>(%) <sup>b</sup> | Total acres<br>treated (no.) <sup>a</sup> | Total acres<br>treated (%) <sup>a,b</sup> |
|-----------------------------|----------------------|---------------------------------|---|---|
| <b>Minnesota</b>            |                      |                                 |   |   |
| Apron                       | 5                    | 8.5                             | 2,137                                     | 9.9                                       |
| Maxim                       | 5                    | 8.5                             | 2,137                                     | 9.9                                       |
| Headline                    | 2                    | 3.4                             | 1,115                                     | 5.2                                       |
| Kodiak                      | 1                    | 1.7                             | 610                                       | 2.8                                       |
| Bravo                       | 1                    | 1.7                             | 235                                       | 1.1                                       |
| Yield Shield                | 1                    | 1.7                             | 125                                       | 0.6                                       |
| Not listed                  | 11                   | 18.6                            | 5,150                                     | 24.0                                      |
| None                        | 32                   | 54.2                            | 10,163                                    | 47.3                                      |
| <b>Seed Treatment Total</b> |                      |                                 | <b>11,509</b>                             | <b>53.5</b>                               |
| <b>North Dakota</b>         |                      |                                 |   |   |
| Apron                       | 7                    | 11.1                            | 3,048                                     | 11.0                                      |
| Maxim                       | 5                    | 7.9                             | 2,405                                     | 8.7                                       |
| Streptomycin                | 1                    | 1.6                             | 614                                       | 2.2                                       |
| Maneb                       | 1                    | 1.6                             | 400                                       | 1.4                                       |
| Not listed                  | 12                   | 19.0                            | 7,561                                     | 27.3                                      |
| None                        | 36                   | 57.1                            | 14,211                                    | 51.4                                      |
| <b>Seed Treatment Total</b> |                      |                                 | <b>14,028</b>                             | <b>50.7</b>                               |
| <b>Northharvest</b>         |                      |                                 |   |   |
| Apron                       | 12                   | 9.8                             | 5,185                                     | 10.5                                      |
| Maxim                       | 10                   | 8.2                             | 4,542                                     | 9.2                                       |
| Headline                    | 2                    | 1.6                             | 1,115                                     | 2.3                                       |
| Streptomycin                | 1                    | 0.8                             | 614                                       | 1.2                                       |
| Kodiak                      | 1                    | 0.8                             | 610                                       | 1.2                                       |
| Maneb                       | 1                    | 0.8                             | 400                                       | 0.8                                       |
| Bravo                       | 1                    | 0.8                             | 235                                       | 0.5                                       |
| Yield Shield                | 1                    | 0.8                             | 125                                       | 0.3                                       |
| Not listed                  | 23                   | 18.9                            | 12,711                                    | 25.9                                      |
| None                        | 68                   | 55.7                            | 24,374                                    | 49.6                                      |
| <b>Seed Treatment Total</b> |                      |                                 | <b>25,537</b>                             | <b>51.9</b>                               |

<sup>a</sup>Respondents' acres only.

<sup>b</sup>Percentages do not total 100 percent because some respondents treated the same acreage with more than one product.



**Figure 28. Northharvest fungicide seed treatment use in dry bean in 2011.**

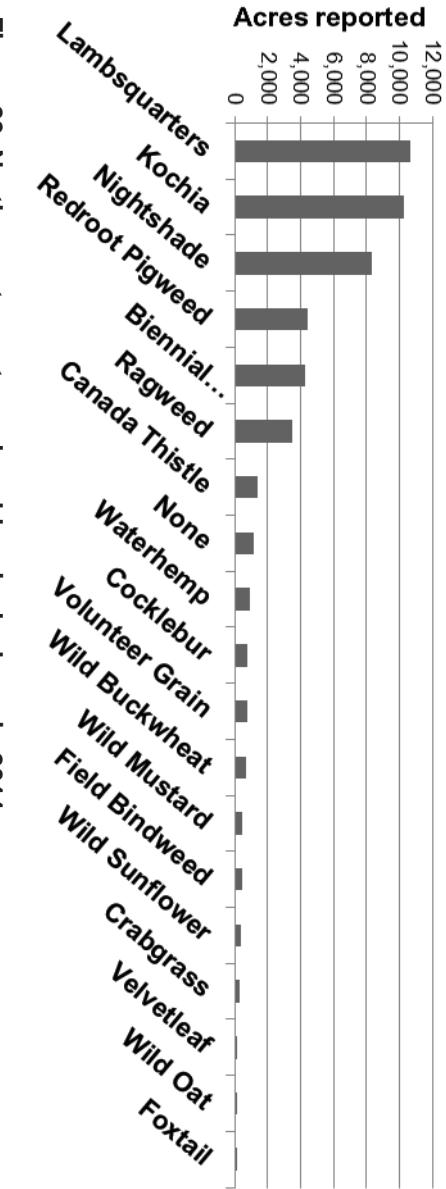
# Weeds and Herbicide Use

**Table 29. Worst weed problem in dry bean in 2011.**

| Weed <sup>a</sup>   | Respondents (no.) | Respondents (%) | Acres reported (no.) <sup>b</sup> | Acres reported (%) <sup>b</sup> |
|---------------------|-------------------|-----------------|-----------------------------------|---------------------------------|
| <b>Minnesota</b>    |                   |                 |                                   |                                 |
| Lambsquarters       | 20                | 33.9            | 7,785                             | 36.2                            |
| Nightshade          | 8                 | 13.6            | 3,678                             | 17.1                            |
| Kochia              | 5                 | 8.5             | 2,239                             | 10.4                            |
| Redroot Pigweed     | 4                 | 6.8             | 2,051                             | 9.5                             |
| Biennial Wormwood   | 5                 | 8.5             | 1,905                             | 8.9                             |
| Ragweed             | 6                 | 10.2            | 1,062                             | 4.9                             |
| Waterhemp           | 3                 | 5.1             | 943                               | 4.4                             |
| Wild Buckwheat      | 1                 | 1.7             | 511                               | 2.4                             |
| Crabgrass           | 1                 | 1.7             | 290                               | 1.3                             |
| Canada Thistle      | 1                 | 1.7             | 280                               | 1.3                             |
| Velvetleaf          | 1                 | 1.7             | 160                               | 0.7                             |
| Wild Oat            | 1                 | 1.7             | 160                               | 0.7                             |
| Wild Sunflower      | 1                 | 1.7             | 62                                | 0.3                             |
| Foxtail             | 1                 | 1.7             | 61                                | 0.3                             |
| None                | 1                 | 1.7             | 315                               | 1.5                             |
| <b>Total</b>        | <b>59</b>         | <b>100</b>      | <b>21,502</b>                     | <b>100</b>                      |
| <b>North Dakota</b> |                   |                 |                                   |                                 |
| Kochia              | 13                | 20.6            | 8,074                             | 29.2                            |
| Nightshade          | 9                 | 14.3            | 4,656                             | 16.8                            |
| Lambsquarters       | 6                 | 9.5             | 2,875                             | 10.4                            |
| Redroot Pigweed     | 7                 | 11.1            | 2,412                             | 8.7                             |
| Ragweed             | 5                 | 7.9             | 2,403                             | 8.7                             |
| Biennial Wormwood   | 10                | 15.9            | 2,390                             | 8.6                             |
| Canada Thistle      | 5                 | 7.9             | 1,080                             | 3.9                             |
| Cocklebur           | 1                 | 1.6             | 800                               | 2.9                             |
| Volunteer Grain     | 1                 | 1.6             | 730                               | 2.6                             |
| Wild Mustard        | 1                 | 1.6             | 454                               | 1.6                             |
| Field Bindweed      | 1                 | 1.6             | 450                               | 1.6                             |
| Wild Sunflower      | 1                 | 1.6             | 275                               | 1.0                             |
| Wild Buckwheat      | 1                 | 1.6             | 143                               | 0.5                             |
| Foxtail             | 1                 | 1.6             | 61                                | 0.2                             |
| None                | 1                 | 1.6             | 860                               | 3.1                             |
| <b>Total</b>        | <b>63</b>         | <b>100</b>      | <b>27,663</b>                     | <b>100</b>                      |
| <b>Northharvest</b> |                   |                 |                                   |                                 |
| Lambsquarters       | 26                | 21.3            | 10,660                            | 21.7                            |
| Kochia              | 18                | 14.8            | 10,313                            | 21.0                            |
| Nightshade          | 17                | 13.9            | 8,334                             | 17.0                            |
| Redroot Pigweed     | 11                | 9.0             | 4,463                             | 9.1                             |
| Biennial Wormwood   | 15                | 12.3            | 4,295                             | 8.7                             |
| Ragweed             | 11                | 9.0             | 3,465                             | 7.0                             |
| Canada Thistle      | 6                 | 4.9             | 1,360                             | 2.8                             |
| Waterhemp           | 3                 | 2.5             | 943                               | 1.9                             |
| Cocklebur           | 1                 | 0.8             | 800                               | 1.6                             |
| Volunteer Grain     | 1                 | 0.8             | 730                               | 1.5                             |
| Wild Buckwheat      | 2                 | 1.6             | 654                               | 1.3                             |
| Wild Mustard        | 1                 | 0.8             | 454                               | 0.9                             |
| Field Bindweed      | 1                 | 0.8             | 450                               | 0.9                             |
| Wild Sunflower      | 2                 | 1.6             | 337                               | 0.7                             |
| Crabgrass           | 1                 | 0.8             | 290                               | 0.6                             |
| Velvetleaf          | 1                 | 0.8             | 160                               | 0.3                             |
| Wild Oat            | 1                 | 0.8             | 160                               | 0.3                             |
| Foxtail             | 2                 | 1.6             | 122                               | 0.2                             |
| None                | 2                 | 1.6             | 1,175                             | 2.4                             |
| <b>Total</b>        | <b>122</b>        | <b>100</b>      | <b>49,165</b>                     | <b>100</b>                      |

<sup>a</sup>Ranked as No. 1 weed problem by respondents.

<sup>b</sup>Respondents' acres only.



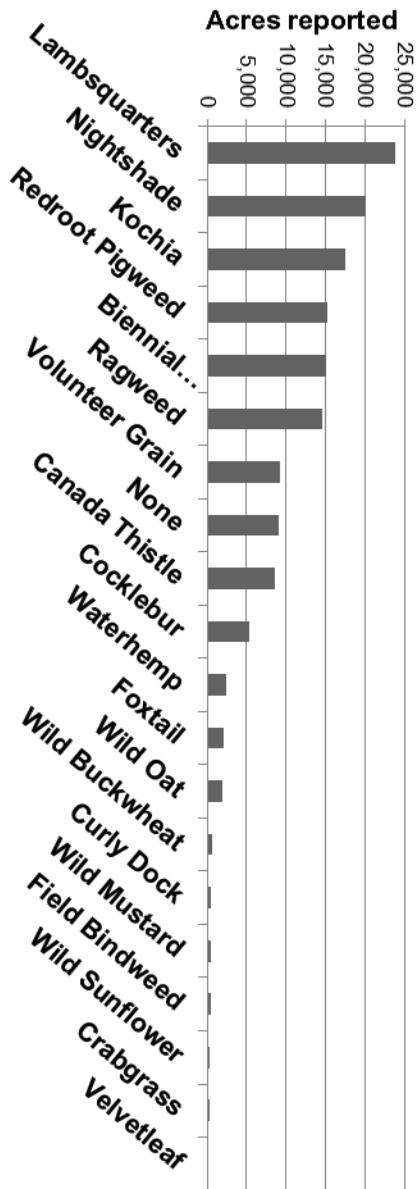
**Figure 29. Northharvest worst weed problem in dry bean in 2011.**

**Table 30. Weeds ranked as one of the three worst in dry bean in 2011.**

| Weed <sup>a</sup>   | Respondents (no.) | Respondents (%) | Acres reported (no.) <sup>b</sup> | Acres reported (%) <sup>b</sup> |
|---------------------|-------------------|-----------------|-----------------------------------|---------------------------------|
| <b>Minnesota</b>    |                   |                 |                                   |                                 |
| Lambsquarters       | 40                | 67.8            | 14,790                            | 68.8                            |
| Redroot Pigweed     | 18                | 30.5            | 8,295                             | 38.6                            |
| Ragweed             | 24                | 40.7            | 7,440                             | 34.6                            |
| Nightshade          | 22                | 37.3            | 7,300                             | 34.0                            |
| Biennial Wormwood   | 13                | 22.0            | 5,110                             | 23.8                            |
| Kochia              | 13                | 22.0            | 4,903                             | 22.8                            |
| Cocklebur           | 6                 | 10.2            | 3,346                             | 15.6                            |
| Waterhemp           | 9                 | 15.3            | 2,392                             | 11.1                            |
| Canada Thistle      | 5                 | 8.5             | 1,783                             | 8.3                             |
| Foxtail             | 6                 | 10.2            | 1,472                             | 6.8                             |
| Volunteer Grain     | 2                 | 3.4             | 724                               | 3.4                             |
| Wild Oat            | 2                 | 3.4             | 665                               | 3.1                             |
| Wild Buckwheat      | 1                 | 1.7             | 511                               | 2.4                             |
| Crabgrass           | 1                 | 1.7             | 290                               | 1.3                             |
| Velvetleaf          | 1                 | 1.7             | 160                               | 0.7                             |
| Wild Sunflower      | 1                 | 1.7             | 62                                | 0.3                             |
| None                | 1                 | 1.7             | 315                               | 1.5                             |
| <b>North Dakota</b> |                   |                 |                                   |                                 |
| Nightshade          | 28                | 44.4            | 12,747                            | 46.1                            |
| Kochia              | 26                | 41.3            | 12,622                            | 45.6                            |
| Biennial Wormwood   | 20                | 31.7            | 9,974                             | 36.1                            |
| Lambsquarters       | 21                | 33.3            | 9,122                             | 33.0                            |
| Volunteer Grain     | 16                | 25.4            | 8,483                             | 30.7                            |
| Ragweed             | 18                | 28.6            | 7,071                             | 25.6                            |
| Redroot Pigweed     | 18                | 28.6            | 6,874                             | 24.8                            |
| Canada Thistle      | 17                | 27.0            | 6,733                             | 24.3                            |
| Cocklebur           | 6                 | 9.5             | 1,918                             | 6.9                             |
| Wild Oat            | 2                 | 3.2             | 1,220                             | 4.4                             |
| Foxtail             | 4                 | 6.3             | 581                               | 2.1                             |
| Curly Dock          | 1                 | 1.6             | 480                               | 1.7                             |
| Wild Mustard        | 1                 | 1.6             | 454                               | 1.6                             |
| Field Bindweed      | 1                 | 1.6             | 450                               | 1.6                             |
| Wild Sunflower      | 1                 | 1.6             | 275                               | 1.0                             |
| Wild Buckwheat      | 1                 | 1.6             | 143                               | 0.5                             |
| None                | 1                 | 1.6             | 860                               | 3.1                             |
| <b>Northarvest</b>  |                   |                 |                                   |                                 |
| Lambsquarters       | 61                | 50              | 23,912                            | 48.6                            |
| Nightshade          | 50                | 41.0            | 20,047                            | 40.8                            |
| Kochia              | 39                | 32.0            | 17,525                            | 35.6                            |
| Redroot Pigweed     | 36                | 29.5            | 15,169                            | 30.9                            |
| Biennial Wormwood   | 33                | 27.0            | 15,084                            | 30.7                            |
| Ragweed             | 42                | 34.4            | 14,511                            | 29.5                            |
| Volunteer Grain     | 18                | 14.8            | 9,207                             | 18.7                            |
| Canada Thistle      | 22                | 18.0            | 8,516                             | 17.3                            |
| Cocklebur           | 12                | 9.8             | 5,264                             | 10.7                            |
| Waterhemp           | 9                 | 7.4             | 2,392                             | 4.9                             |
| Foxtail             | 10                | 8.2             | 2,053                             | 4.2                             |
| Wild Oat            | 4                 | 3.3             | 1,885                             | 3.8                             |
| Wild Buckwheat      | 2                 | 1.6             | 654                               | 1.3                             |
| Curly Dock          | 1                 | 0.8             | 480                               | 1.0                             |
| Wild Mustard        | 1                 | 0.8             | 454                               | 0.9                             |
| Field Bindweed      | 1                 | 0.8             | 450                               | 0.9                             |
| Wild Sunflower      | 2                 | 1.6             | 337                               | 0.7                             |
| Crabgrass           | 1                 | 0.8             | 290                               | 0.6                             |
| Velvetleaf          | 1                 | 0.8             | 160                               | 0.3                             |
| None                | 2                 | 1.6             | 1,175                             | 2.4                             |

<sup>a</sup>Ranked as No. 1, 2 or 3 weed by respondents.

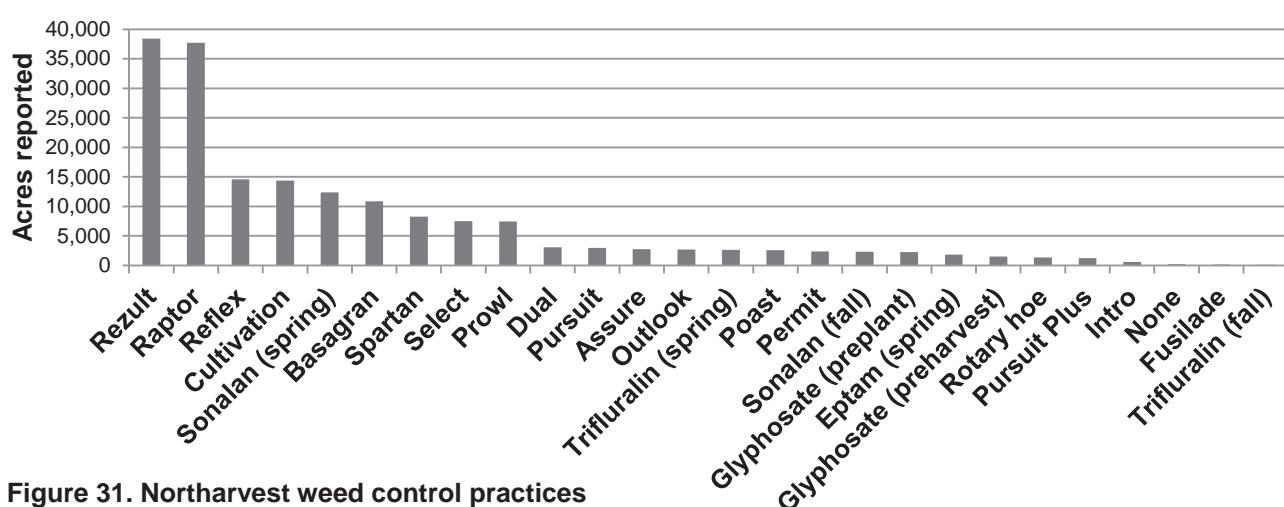
<sup>b</sup>Respondents' acres only.



**Figure 30. Northarvest weeds ranked as one of the three worst in dry bean in 2011.**

**Table 31. Weed control practices used in dry bean in 2011.**

| Herbicide or other practice        | Acres reported (no.) <sup>a</sup> | Acres reported (%) <sup>b</sup> | Herbicide or other practice   | Acres reported (no.) <sup>a</sup> | Acres reported (%) <sup>b</sup> |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
|------------------------------------|-----------------------------------|---------------------------------|---|-----------------------------------|---------------------------------|---|---------------|-----|------------------------------------|---------------|-------|------------------------------------|-----------------------|-------|------------------------------------|---|-------|------------------------------------|---------------|----------|------------------------------------|---------------|-----------------------|------------------------------------|----------------------|--|------------------------------------|----------------|--------|------------------------------------|-------------------------|------------|------------------------------------|---------------|----------------------|------------------------------------|---------------|----------------|------------------------------------|---------------|-------------------------|------------------------------------|---------------|---------|----------------------|--------------------|--------|----------------|------|--------------|-------------------------|------------------------------------|---------------|---------|-----|--------------------|--------|-----|------|--------------|-----|------------------------------------|---------------|-----|-----|--------------------|-----|-----|------|-----|-----|------------------------------------|---------------|--|
| <b>Minnesota</b>                   |                                   |                                 |   |                                   |                                 |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Raptor                             | 18,501                            | 86.0                            | Rezult  | 38,391                            | 78.1                            |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Rezult                             | 13,878                            | 64.5                            | Raptor  | 37,720                            | 76.7                            |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Reflex                             | 7,833                             | 36.4                            | Reflex  | 14,586                            | 29.3                            |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Basagran                           | 7,609                             | 35.4                            | Cultivation   | 14,378                            | 29.2                            |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Cultivation                        | 6,851                             | 31.9                            | Sonalan (spring)  | 12,391                            | 25.2                            |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Sonalan (spring)                   | 4,641                             | 21.6                            | Basagran  | 10,831                            | 22.0                            |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Prowl                              | 3,229                             | 15.0                            | Spartan   | 8,279                             | 16.8                            |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Dual                               | 3,095                             | 14.4                            | Select  | 7,479                             | 15.2                            |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Poast                              | 2,490                             | 11.6                            | Prowl   | 7,455                             | 15.2                            |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Select                             | 2,110                             | 9.8                             | Dual  | 3,095                             | 6.3                             |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Permit                             | 2,047                             | 9.5                             | Pursuit   | 2,980                             | 6.1                             |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Outlook                            | 2,044                             | 9.5                             | Assure  | 2,748                             | 5.6                             |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Trifluralin (spring)               | 1,879                             | 8.7                             | Outlook   | 2,694                             | 5.5                             |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Eptam (spring)                     | 1,818                             | 8.5                             | Trifluralin (spring)  | 2,659                             | 5.4                             |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Sonalan (fall)                     | 1,561                             | 7.3                             | Poast   | 2,610                             | 5.3                             |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Pursuit                            | 1,468                             | 6.8                             | Permit  | 2,345                             | 4.8                             |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Assure                             | 1,430                             | 6.7                             | Sonalan (fall)  | 2,301                             | 4.7                             |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Pursuit Plus                       | 989                               | 4.6                             | Glyphosate (preplant)   | 2,252                             | 4.6                             |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Glyphosate (preharvest)            | 779                               | 3.6                             | Eptam (spring)  | 1,818                             | 3.7                             |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Intro                              | 606                               | 2.8                             | Glyphosate (preharvest)   | 1,479                             | 3.0                             |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Spartan                            | 490                               | 2.3                             | Rotary hoe  | 1,327                             | 2.7                             |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Rotary hoe                         | 467                               | 2.2                             | Pursuit Plus  | 1,239                             | 2.5                             |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Fusilade                           | 155                               | 0.7                             | Intro   | 606                               | 1.2                             |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| None                               | 83                                | 0.4                             | Fusilade  | 155                               | 0.3                             |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| <b>Herbicide Total<sup>c</sup></b> | <b>78,652</b>                     |                                 | Trifluralin (fall)  | 104                               | 0.2                             |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| <b>North Dakota</b>                |                                   |                                 |   |                                   |                                 |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Rezult                             | 24,513                            | 88.6                            | None  | 225                               | 0.5                             |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Raptor                             | 19,219                            | 69.5                            | <b>Herbicide Total<sup>c</sup></b>  | <b>166,217</b>                    |                                 |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Spartan                            | 7,789                             | 28.2                            | Sonalan (spring)  | 7,750                             | 28.0                            | <sup>a</sup> Respondents' acres only. Includes acreage treated more than once with the same product.  |               |     |                                    | Cultivation   | 7,527 | 27.2                               | Reflex                | 6,753 | 23.8                               | <sup>b</sup> 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. |       |                                    |               | Select   | 5,369                              | 19.4          | Prowl                 | 4,226                              | 15.3                 | <sup>c</sup> Herbicide total does not include cultivation, rotary hoe or nontreated acres. |                                    |                |        | Basagran                           | 3,222                   | 11.6       | Glyphosate (preplant)              | 2,252         | 8.1                  | Pursuit                            | 1,512         | 5.5            | Assure                             | 1,318         | 4.8                     | Rotary hoe                         | 860           | 3.1     | Trifluralin (spring) | 780                | 2.8    | Sonalan (fall) | 740  | 2.7          | Glyphosate (preharvest) | 700                                | 2.5           | Outlook | 650 | 2.3                | Permit | 298 | 1.1  | Pursuit Plus | 250 | 0.9                                | Poast         | 120 | 0.4 | Trifluralin (fall) | 104 | 0.4 | None | 142 | 0.5 | <b>Herbicide Total<sup>c</sup></b> | <b>87,565</b> |  |
| Sonalan (spring)                   | 7,750                             | 28.0                            | <sup>a</sup> Respondents' acres only. Includes acreage treated more than once with the same product.  |                                   |                                 |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Cultivation                        | 7,527                             | 27.2                            | Reflex  | 6,753                             | 23.8                            | <sup>b</sup> 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. |               |     |                                    | Select        | 5,369 | 19.4                               | Prowl                 | 4,226 | 15.3                               | <sup>c</sup> Herbicide total does not include cultivation, rotary hoe or nontreated acres.  |       |                                    |               | Basagran | 3,222                              | 11.6          | Glyphosate (preplant) | 2,252                              | 8.1                  | Pursuit  | 1,512                              | 5.5            | Assure | 1,318                              | 4.8                     | Rotary hoe | 860                                | 3.1           | Trifluralin (spring) | 780                                | 2.8           | Sonalan (fall) | 740                                | 2.7           | Glyphosate (preharvest) | 700                                | 2.5           | Outlook | 650                  | 2.3                | Permit | 298            | 1.1  | Pursuit Plus | 250                     | 0.9                                | Poast         | 120     | 0.4 | Trifluralin (fall) | 104    | 0.4 | None | 142          | 0.5 | <b>Herbicide Total<sup>c</sup></b> | <b>87,565</b> |     |     |                    |     |     |      |     |     |                                    |               |  |
| Reflex                             | 6,753                             | 23.8                            | <sup>b</sup> 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. |                                   |                                 |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Select                             | 5,369                             | 19.4                            | Prowl   | 4,226                             | 15.3                            | <sup>c</sup> Herbicide total does not include cultivation, rotary hoe or nontreated acres.  |               |     |                                    | Basagran      | 3,222 | 11.6                               | Glyphosate (preplant) | 2,252 | 8.1                                | Pursuit   | 1,512 | 5.5                                | Assure        | 1,318    | 4.8                                | Rotary hoe    | 860                   | 3.1                                | Trifluralin (spring) | 780  | 2.8                                | Sonalan (fall) | 740    | 2.7                                | Glyphosate (preharvest) | 700        | 2.5                                | Outlook       | 650                  | 2.3                                | Permit        | 298            | 1.1                                | Pursuit Plus  | 250                     | 0.9                                | Poast         | 120     | 0.4                  | Trifluralin (fall) | 104    | 0.4            | None | 142          | 0.5                     | <b>Herbicide Total<sup>c</sup></b> | <b>87,565</b> |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Prowl                              | 4,226                             | 15.3                            | <sup>c</sup> Herbicide total does not include cultivation, rotary hoe or nontreated acres.  |                                   |                                 |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Basagran                           | 3,222                             | 11.6                            | Glyphosate (preplant)   | 2,252                             | 8.1                             | Pursuit   | 1,512         | 5.5 | Assure                             | 1,318         | 4.8   | Rotary hoe                         | 860                   | 3.1   | Trifluralin (spring)               | 780   | 2.8   | Sonalan (fall)                     | 740           | 2.7      | Glyphosate (preharvest)            | 700           | 2.5                   | Outlook                            | 650                  | 2.3  | Permit                             | 298            | 1.1    | Pursuit Plus                       | 250                     | 0.9        | Poast                              | 120           | 0.4                  | Trifluralin (fall)                 | 104           | 0.4            | None                               | 142           | 0.5                     | <b>Herbicide Total<sup>c</sup></b> | <b>87,565</b> |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Glyphosate (preplant)              | 2,252                             | 8.1                             | Pursuit   | 1,512                             | 5.5                             | Assure  | 1,318         | 4.8 | Rotary hoe                         | 860           | 3.1   | Trifluralin (spring)               | 780                   | 2.8   | Sonalan (fall)                     | 740   | 2.7   | Glyphosate (preharvest)            | 700           | 2.5      | Outlook                            | 650           | 2.3                   | Permit                             | 298                  | 1.1  | Pursuit Plus                       | 250            | 0.9    | Poast                              | 120                     | 0.4        | Trifluralin (fall)                 | 104           | 0.4                  | None                               | 142           | 0.5            | <b>Herbicide Total<sup>c</sup></b> | <b>87,565</b> |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Pursuit                            | 1,512                             | 5.5                             | Assure  | 1,318                             | 4.8                             | Rotary hoe  | 860           | 3.1 | Trifluralin (spring)               | 780           | 2.8   | Sonalan (fall)                     | 740                   | 2.7   | Glyphosate (preharvest)            | 700   | 2.5   | Outlook                            | 650           | 2.3      | Permit                             | 298           | 1.1                   | Pursuit Plus                       | 250                  | 0.9  | Poast                              | 120            | 0.4    | Trifluralin (fall)                 | 104                     | 0.4        | None                               | 142           | 0.5                  | <b>Herbicide Total<sup>c</sup></b> | <b>87,565</b> |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Assure                             | 1,318                             | 4.8                             | Rotary hoe  | 860                               | 3.1                             | Trifluralin (spring)  | 780           | 2.8 | Sonalan (fall)                     | 740           | 2.7   | Glyphosate (preharvest)            | 700                   | 2.5   | Outlook                            | 650   | 2.3   | Permit                             | 298           | 1.1      | Pursuit Plus                       | 250           | 0.9                   | Poast                              | 120                  | 0.4  | Trifluralin (fall)                 | 104            | 0.4    | None                               | 142                     | 0.5        | <b>Herbicide Total<sup>c</sup></b> | <b>87,565</b> |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Rotary hoe                         | 860                               | 3.1                             | Trifluralin (spring)  | 780                               | 2.8                             | Sonalan (fall)  | 740           | 2.7 | Glyphosate (preharvest)            | 700           | 2.5   | Outlook                            | 650                   | 2.3   | Permit                             | 298   | 1.1   | Pursuit Plus                       | 250           | 0.9      | Poast                              | 120           | 0.4                   | Trifluralin (fall)                 | 104                  | 0.4  | None                               | 142            | 0.5    | <b>Herbicide Total<sup>c</sup></b> | <b>87,565</b>           |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Trifluralin (spring)               | 780                               | 2.8                             | Sonalan (fall)  | 740                               | 2.7                             | Glyphosate (preharvest)   | 700           | 2.5 | Outlook                            | 650           | 2.3   | Permit                             | 298                   | 1.1   | Pursuit Plus                       | 250   | 0.9   | Poast                              | 120           | 0.4      | Trifluralin (fall)                 | 104           | 0.4                   | None                               | 142                  | 0.5  | <b>Herbicide Total<sup>c</sup></b> | <b>87,565</b>  |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Sonalan (fall)                     | 740                               | 2.7                             | Glyphosate (preharvest)   | 700                               | 2.5                             | Outlook   | 650           | 2.3 | Permit                             | 298           | 1.1   | Pursuit Plus                       | 250                   | 0.9   | Poast                              | 120   | 0.4   | Trifluralin (fall)                 | 104           | 0.4      | None                               | 142           | 0.5                   | <b>Herbicide Total<sup>c</sup></b> | <b>87,565</b>        |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Glyphosate (preharvest)            | 700                               | 2.5                             | Outlook   | 650                               | 2.3                             | Permit  | 298           | 1.1 | Pursuit Plus                       | 250           | 0.9   | Poast                              | 120                   | 0.4   | Trifluralin (fall)                 | 104   | 0.4   | None                               | 142           | 0.5      | <b>Herbicide Total<sup>c</sup></b> | <b>87,565</b> |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Outlook                            | 650                               | 2.3                             | Permit  | 298                               | 1.1                             | Pursuit Plus  | 250           | 0.9 | Poast                              | 120           | 0.4   | Trifluralin (fall)                 | 104                   | 0.4   | None                               | 142   | 0.5   | <b>Herbicide Total<sup>c</sup></b> | <b>87,565</b> |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Permit                             | 298                               | 1.1                             | Pursuit Plus  | 250                               | 0.9                             | Poast   | 120           | 0.4 | Trifluralin (fall)                 | 104           | 0.4   | None                               | 142                   | 0.5   | <b>Herbicide Total<sup>c</sup></b> | <b>87,565</b>   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Pursuit Plus                       | 250                               | 0.9                             | Poast   | 120                               | 0.4                             | Trifluralin (fall)  | 104           | 0.4 | None                               | 142           | 0.5   | <b>Herbicide Total<sup>c</sup></b> | <b>87,565</b>         |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Poast                              | 120                               | 0.4                             | Trifluralin (fall)  | 104                               | 0.4                             | None  | 142           | 0.5 | <b>Herbicide Total<sup>c</sup></b> | <b>87,565</b> |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| Trifluralin (fall)                 | 104                               | 0.4                             | None  | 142                               | 0.5                             | <b>Herbicide Total<sup>c</sup></b>  | <b>87,565</b> |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| None                               | 142                               | 0.5                             | <b>Herbicide Total<sup>c</sup></b>  | <b>87,565</b>                     |                                 |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |
| <b>Herbicide Total<sup>c</sup></b> | <b>87,565</b>                     |                                 |   |                                   |                                 |   |               |     |                                    |               |       |                                    |                       |       |                                    |   |       |                                    |               |          |                                    |               |                       |                                    |                      |  |                                    |                |        |                                    |                         |            |                                    |               |                      |                                    |               |                |                                    |               |                         |                                    |               |         |                      |                    |        |                |      |              |                         |                                    |               |         |     |                    |        |     |      |              |     |                                    |               |     |     |                    |     |     |      |     |     |                                    |               |  |



**Figure 31. Northharvest weed control practices used in dry bean in 2011.**

**Table 32. Weed control practices used by dry bean market class in 2011.**

| Herbicide or other practice | Black                          | Kidney | Navy | Pink  | Pinto | Red |
|-----------------------------|--------------------------------|--------|------|-------|-------|-----|
|                             | % Acres Treated <sup>a,b</sup> |        |      |       |       |     |
| <b>Minnesota</b>            |                                |        |      |       |       |     |
| Assure                      | 0                              | 0      | 19.3 | 0     | 0     | 0   |
| Basagran                    | 60.6                           | 21.9   | 53.9 | 46.8  | 13.5  | 0   |
| Cultivation                 | 27.0                           | 18.5   | 38.4 | 27.9  | 68.5  | 100 |
| Dual                        | 13.5                           | 28.3   | 1.3  | 8.5   | 0     | 0   |
| Eptam (spring)              | 0                              | 4.8    | 18.3 | 0     | 0     | 0   |
| Fusilade                    | 0                              | 0      | 2.1  | 0     | 0     | 0   |
| Glyphosate (preharvest)     | 0                              | 8.1    | 0    | 0     | 0     | 0   |
| Intro                       | 0                              | 6.3    | 0    | 0     | 0     | 0   |
| None                        | 0                              | 0      | 1.1  | 0     | 0     | 0   |
| Outlook                     | 0                              | 16.8   | 4.1  | 16.8  | 0     | 0   |
| Permit                      | 21.2                           | 11.2   | 6.2  | 11.0  | 5.9   | 0   |
| Poast                       | 25.9                           | 3.9    | 21.3 | 0     | 7.7   | 0   |
| Prowl                       | 29.0                           | 12.1   | 17.9 | 0     | 15.3  | 0   |
| Pursuit                     | 0                              | 9.2    | 5.9  | 0     | 7.2   | 0   |
| Pursuit Plus                | 11.9                           | 7.8    | 0.8  | 0     | 0     | 0   |
| Raptor                      | 110.8                          | 74.5   | 96.4 | 91.5  | 95.1  | 0   |
| Reflex                      | 35.0                           | 35.7   | 39.6 | 8.5   | 30.5  | 100 |
| Rezult                      | 36.7                           | 60.7   | 63.1 | 44.7  | 112.6 | 100 |
| Rotary hoe                  | 0                              | 0      | 0    | 0     | 23.9  | 0   |
| Select                      | 13.5                           | 0.7    | 17.5 | 11.0  | 23.9  | 0   |
| Sonalan (fall)              | 0                              | 0      | 19.1 | 0     | 7.7   | 0   |
| Sonalan (spring)            | 21.2                           | 5.9    | 38.4 | 0     | 46.4  | 0   |
| Spartan                     | 7.7                            | 0      | 3.5  | 0     | 5.9   | 0   |
| Trifluralin (spring)        | 16.6                           | 1.8    | 15.4 | 44.3  | 0     | 0   |
| <b>North Dakota</b>         |                                |        |      |       |       |     |
| Assure                      | 0                              | 0      | 21.6 | 0     | 2.3   | 0   |
| Basagran                    | 3.1                            | 0      | 20.8 | 102.4 | 9.3   | 0   |
| Cultivation                 | 9.5                            | 0      | 37.0 | 203.2 | 25.4  | 0   |
| Glyphosate (preharvest)     | 5.7                            | 0      | 0    | 0     | 1.9   | 0   |
| Glyphosate (preplant)       | 0                              | 0      | 0    | 0     | 14.5  | 0   |
| None                        | 0                              | 0      | 0    | 0     | 0.9   | 0   |
| Outlook                     | 0                              | 0      | 0    | 0     | 4.2   | 0   |
| Permit                      | 0                              | 0      | 5.3  | 0     | 0.4   | 0   |
| Poast                       | 1.7                            | 0      | 0    | 0     | 0     | 0   |
| Prowl                       | 25.0                           | 100    | 11.3 | 0     | 12.3  | 0   |
| Pursuit                     | 3.6                            | 0      | 1.9  | 0     | 7.6   | 0   |
| Pursuit Plus                | 0                              | 0      | 5.6  | 0     | 0     | 0   |
| Raptor                      | 69.8                           | 100    | 69.2 | 134.4 | 66.7  | 0   |
| Reflex                      | 19.7                           | 100    | 52.3 | 0     | 19.2  | 0   |
| Rezult                      | 88.7                           | 100    | 86.7 | 50.4  | 90.6  | 0   |
| Rotary hoe                  | 8.0                            | 0      | 0    | 0     | 1.9   | 0   |
| Select                      | 18.8                           | 0      | 25.9 | 0     | 18.7  | 0   |
| Sonalan (fall)              | 6.4                            | 0      | 2.9  | 0     | 1.0   | 0   |
| Sonalan (spring)            | 16.2                           | 0      | 41.7 | 50.4  | 28.7  | 0   |
| Spartan                     | 32.9                           | 0      | 11.4 | 0     | 32.1  | 0   |
| Trifluralin (fall)          | 0                              | 0      | 0    | 0     | 0.7   | 0   |
| Trifluralin (spring)        | 4.3                            | 0      | 4.5  | 0     | 1.8   | 0   |
| <b>Northarvest</b>          |                                |        |      |       |       |     |
| Assure                      | 0                              | 0      | 20.2 | 0     | 2.1   | 0   |
| Basagran                    | 13.2                           | 21.7   | 41.5 | 72.5  | 9.7   | 0   |
| Cultivation                 | 12.6                           | 18.4   | 37.9 | 108.9 | 30.2  | 100 |
| Dual                        | 2.4                            | 28.2   | 0.8  | 4.6   | 0     | 0   |
| Eptam (spring)              | 0                              | 4.7    | 11.5 | 0     | 0     | 0   |
| Fusilade                    | 0                              | 0      | 1.3  | 0     | 0     | 0   |
| Glyphosate (preharvest)     | 4.7                            | 8.0    | 0    | 0     | 1.7   | 0   |
| Glyphosate (preplant)       | 0                              | 0      | 0    | 0     | 12.9  | 0   |
| Intro                       | 0                              | 6.2    | 0    | 0     | 0     | 0   |
| None                        | 0                              | 0      | 0.7  | 0     | 0.8   | 0   |
| Outlook                     | 0                              | 16.6   | 2.6  | 9.0   | 3.7   | 0   |
| Permit                      | 3.7                            | 11.1   | 5.9  | 5.9   | 1.0   | 0   |
| Poast                       | 6.0                            | 3.9    | 13.3 | 0     | 0.9   | 0   |
| Prowl                       | 25.7                           | 12.7   | 15.5 | 0     | 12.6  | 0   |
| Pursuit                     | 2.9                            | 9.1    | 4.4  | 0     | 7.5   | 0   |
| Pursuit Plus                | 2.1                            | 7.7    | 2.6  | 0     | 0     | 0   |
| Raptor                      | 77.0                           | 74.7   | 86.2 | 111.3 | 69.8  | 0   |
| Reflex                      | 22.4                           | 36.1   | 44.4 | 4.6   | 20.5  | 100 |
| Rezult                      | 79.6                           | 60.9   | 72.0 | 47.3  | 93.1  | 100 |
| Rotary hoe                  | 6.6                            | 0      | 0    | 0     | 4.4   | 0   |
| Select                      | 17.8                           | 0.7    | 20.7 | 5.9   | 19.3  | 0   |
| Sonalan (fall)              | 5.3                            | 0      | 13.0 | 0     | 1.8   | 0   |
| Sonalan (spring)            | 17.1                           | 5.9    | 39.7 | 23.3  | 30.6  | 0   |

| Herbicide or other practice | Black | Kidney | Navy | Pink                           | Pinto | Red |
|-----------------------------|-------|--------|------|--------------------------------|-------|-----|
|                             |       |        |      | % Acres Treated <sup>a,b</sup> |       |     |
| Spartan                     | 28.5  | 0      | 6.5  | 0                              | 29.1  | 0   |
| Trifluralin (fall)          | 0     | 0      | 0    | 0                              | 0.6   | 0   |
| Trifluralin (spring)        | 6.5   | 1.8    | 11.3 | 23.8                           | 1.6   | 0   |

<sup>a</sup>Respondents' acres only. Includes acreage treated more than once with the same product.

<sup>b</sup>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.

# References

1. Bradley, C.A., and Luecke, J.L. 2004. 2002 Dry Bean Grower Survey of Pest Problems and Pesticide Use in Minnesota and North Dakota. NDSU Extension Rpt. PP-1265.
2. Knodel, J.J., Beauzay, P.B., Franzen, D.W., Kandel, H.J., Markell, S.G., Osorno, J.M., and Zollinger, R.K. 2011. 2010 Dry Bean Grower Survey of Pest Problems and Pesticide Use in Minnesota and North Dakota. NDSU Extension Rpt. E-1522.
3. Knodel, J.J., Luecke, J.L., Beauzay, P.B., Franzen, D.W., Kandel, H.J., Markell, S.G., Osorno, J.M., and Zollinger, R.K. 2010. 2009 Dry Bean Grower Survey of Pest Problems and Pesticide Use in Minnesota and North Dakota. NDSU Extension Rpt. E-1421 (revised).
4. Knodel, J.J., Luecke, J.L., Beauzay, P.B., Franzen, D.W., Kandel, H.J., Markell, S.G., Osorno, J.M., and Zollinger, R.K. 2009. 2008 Dry Bean Grower Survey of Pest Problems and Pesticide Use in Minnesota and North Dakota. NDSU Extension Rpt. E-1421 (revised).
5. Knodel, J.J., Luecke, J.L., Beauzay, P.B., Franzen, D.W., Kandel, H.J., Markell, S.G., Osorno, J.M., and Zollinger, R.K. 2008. 2007 Dry Bean Grower Survey of Pest Problems and Pesticide Use in Minnesota and North Dakota. NDSU Extension Rpt. PP-1392.
6. Knodel, J.J., Luecke, J.L., Beauzay, P.B., Franzen, D.W., Kandel, H.J., Markell, S.G., Osorno, J.M., and Zollinger, R.K. 2008. 2006 Dry Bean Grower Survey of Pest Problems and Pesticide Use in Minnesota and North Dakota. NDSU Extension Rpt. PP-1265 (revised).
7. Knodel, J.J., Bradley, C.A., Luecke, J.L., and Mars, G.A. 2008. 2004 and 2005 Dry Bean Grower Survey of Pest Problems and Pesticide Use in Minnesota and North Dakota. NDSU Extension Rpt. PP-1265 (revised).
8. Lamey, H.A., Berglund, D.R., McMullen, M.P., Luecke, J.L., Venette, J.R., McBride, D.K., Zollinger, R.K., and Grafton, K.F. 1993. 1991 Dry Bean Grower Survey of Pest Problems and Pesticide Use in Minnesota and North Dakota. NDSU Extension Rpt. 13.
9. Lamey, H.A., Berglund, D.R., McMullen, M.P., Luecke, J.L., Zollinger, R.K., Glogoza, P.A., Venette, J.R., McBride, D.K., and Grafton, K.F. 1994. 1992 Dry Bean Grower Survey of Pest Problems and Pesticide Use in Minnesota and North Dakota. NDSU Extension Rpt. 19.
10. Lamey, H.A., Berglund, D.R., McMullen, M.P., Zollinger, R.K., Venette, J.R., McBride, D.K., Venette, S.J., and Venette, R.C. 1992. 1990 Dry Bean Grower Survey of Pest Problems and Pesticide Use in Minnesota and North Dakota. NDSU Extension Rpt. 10.
11. Lamey, H.A., Dexter, A.G., McBride, D.K., Venette, R.C., and Venette, J.R. 1990. Problems and Practices of Northarvest Dry Bean Growers in 1988. N.D. Farm Res. 48(20):6-11, 14.
12. Lamey, H.A., McMullen, M.P., Glogoza, P.A., Zollinger, R.K., Luecke, J.L., Berglund, D.R., Venette, J.R., and Grafton, K.F. 1998. 1996 Dry Bean Grower Survey of Pest Problems and Pesticide Use in Minnesota and North Dakota. NDSU Extension Rpt. 44.
13. Lamey, H.A., Zollinger, R.K., Luecke, J.L., Berglund, D.R., Glogoza, P.A., and Grafton, K.F. 2001. 2000 Dry Bean Grower Survey of Pest Problems and Pesticide Use in Minnesota and North Dakota. NDSU Extension Rpt. 72.
14. Lamey, H.A., Zollinger, R.K., McBride, D.K., Venette, R.C., and Venette, J.R. 1991. Production Problems and Practices of Northarvest Dry Bean Growers in 1989. N.D. Farm Res. 29(2):17-24.
15. Lamey, H.A., Zollinger, R.K., McMullen, M.P., Luecke, J.L., Grafton, K.F., Berglund, D.R., Venette, J.R., and Glogoza, P.A. 1996. 1994 Dry Bean Grower Survey of Pest Problems and Pesticide Use in Minnesota and North Dakota. NDSU Extension Rpt. 28.
16. Lamey, H.A., Zollinger, R.K., Venette, J.R., Berglund, D.R., Luecke, J.L., Grafton, K.F., and Glogoza, P.A. 1997. 1995 Dry Bean Grower Survey of Pest Problems and Pesticide Use in Minnesota and North Dakota. NDSU Extension Rpt. 33.
17. Lamey, H.A., Zollinger, R.K., Venette, J.R., McMullen, M.P., Luecke, J.L., Glogoza, P.A., Grafton, K.F., and Berglund, D.R. 1999. 1997 Dry Bean Grower Survey of Pest Problems and Pesticide Use in Minnesota and North Dakota. NDSU Extension Rpt. 47.
18. Lamey, H.A., Zollinger, R.K., McMullen, M.P., Luecke, J.L., Venette, J.R., Berglund, D.R., Grafton, K.F., and Glogoza, P.A. 1999. 1998 Dry Bean Grower Survey of Pest Problems and Pesticide Use in Minnesota and North Dakota. NDSU Extension Rpt. 58.
19. Lamey, H.A., Zollinger, R.K., McMullen, M.P., Luecke, J.L., Venette, J.R., Berglund, D.R., Grafton, K.F., and Glogoza, P.A. 2000. 1999 Dry Bean Grower Survey of Pest Problems and Pesticide Use in Minnesota and North Dakota. NDSU Extension Rpt. 64.
20. Venette, J.R., Lamey, H.A., Peterson, D.E., and Venette, R.C. 1989. Problems and Practices of Dry Edible Bean Production in North Dakota and Minnesota, 1987. N.D. Farm Res. 46(5):25-31.

# APPENDIX I.

Please circle or fill in the requested information on pest problems and pesticide used on your 2011 dry bean crop.

|   |
|---|
| Total dry bean acres planted in 2011        |
| 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. GT 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                      |       |
|                 | 28. T9905                       |       |
|                 | 29. Avalanche                   |       |
|                 | 30. 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 2011) (write in crops grown in previous years)

|      | Field 1 - dry beans '11 | Field 2 - dry beans '11 |
|------|-------------------------|-------------------------|
| 2010 |                         |                         |
| 2009 |                         |                         |
| 2008 |                         |                         |
| 2007 |                         |                         |

## Agronomy

What is your row spacing in inches for prostrated 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<br>(write in name or number<br>from list below)  | No. Acres Treated   | No. of Sprays |                |         |            |  |                                   |  |         |  |        |  |               |  |             |  |
|   |   |               |                |         |            |  |                                   |  |         |  |        |  |               |  |             |  |
|   |   |               |                |         |            |  |                                   |  |         |  |        |  |               |  |             |  |
|   |   |               |                |         |            |  |                                   |  |         |  |        |  |               |  |             |  |
|   |   |               |                |         |            |  |                                   |  |         |  |        |  |               |  |             |  |
| Dry Bean Insecticides   | 1. Acephate (Orthene, Address)<br>2. Adjourn<br>3. Asana XL<br>4. Baythroid XL<br>5. Brigade 2EC<br>6. Capture<br>7. Caputre "LFR"<br>8. Carbaryl (Sevin)<br>9. Dimethoate<br>10. Dipel<br>11. Di-Syston G<br>12. Fanfare 2EC<br>13. Grizzly Z<br>14. Hero<br>15. Kasio<br>16. Lambda-Cy<br>17. Leverage 360<br><br>18. Lannate LV<br>19. Malathion<br>20. Mustang Max<br>21. PennCap-M<br>22. Spintor<br>23. Proaxis<br>24. Respect<br>25. Nuprid<br>26. Sevin<br>27. Silencer<br>28. Sniper<br>29. Thimet 20G<br>30. Tombstone /<br>Tombstone Helios<br>31. Voliam Xpress<br>32. Warrior<br>33. Other (write in product name) |               |                |         |            |  |                                   |  |         |  |        |  |               |  |             |  |
| <b>Was INSECTICIDE-TREATED SEED used?</b><br>If yes, please answer questions below.   |   |               |                |         |            |  |                                   |  |         |  |        |  |               |  |             |  |
| Yes   | No  |               |                |         |            |  |                                   |  |         |  |        |  |               |  |             |  |
| <b>How many acres were planted using the following insecticide seed treatments?</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding: 2px;">Seed Treatment</th> <th style="text-align: left; padding: 2px;">Acreage</th> </tr> </thead> <tbody> <tr><td style="padding: 2px;">Enhance AW</td><td style="padding: 2px;"></td></tr> <tr><td style="padding: 2px;">Cruiser 5FS or Cruiser MAXX Beans</td><td style="padding: 2px;"></td></tr> <tr><td style="padding: 2px;">Lorsban</td><td style="padding: 2px;"></td></tr> <tr><td style="padding: 2px;">Gaucho</td><td style="padding: 2px;"></td></tr> <tr><td style="padding: 2px;">Attendant 600</td><td style="padding: 2px;"></td></tr> <tr><td style="padding: 2px;">Senator 600</td><td style="padding: 2px;"></td></tr> </tbody> </table> |   |               | Seed Treatment | Acreage | Enhance AW |  | Cruiser 5FS or Cruiser MAXX Beans |  | Lorsban |  | Gaucho |  | Attendant 600 |  | Senator 600 |  |
| Seed Treatment  | Acreage   |               |                |         |            |  |                                   |  |         |  |        |  |               |  |             |  |
| Enhance AW  |   |               |                |         |            |  |                                   |  |         |  |        |  |               |  |             |  |
| Cruiser 5FS or Cruiser MAXX Beans   |   |               |                |         |            |  |                                   |  |         |  |        |  |               |  |             |  |
| Lorsban   |   |               |                |         |            |  |                                   |  |         |  |        |  |               |  |             |  |
| Gaucho  |   |               |                |         |            |  |                                   |  |         |  |        |  |               |  |             |  |
| Attendant 600   |   |               |                |         |            |  |                                   |  |         |  |        |  |               |  |             |  |
| Senator 600   |   |               |                |         |            |  |                                   |  |         |  |        |  |               |  |             |  |
| How many acres were planted using some other insecticide seed treatment?<br>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<br>(write in name or<br>number) | Class of Bean  | Acres Treated  | Class of Bean<br>(if additional)   | Acres Treated | Class of Bean<br>(if additional) | Acres Treated |
|---|--|--|--|---------------|----------------------------------|---------------|
|   |  |  |  |               |                                  |               |
|   |  |  |  |               |                                  |               |
|   |  |  |  |               |                                  |               |
|   |  |  |  |               |                                  |               |
|   |  |  |  |               |                                  |               |
|   |  |  |  |               |                                  |               |
|   |  |  |  |               |                                  |               |
|   |  |  |  |               |                                  |               |
|   |  |  |  |               |                                  |               |
|   |  |  |  |               |                                  |               |
|   |  |  |  |               |                                  |               |
| Dry Bean<br>Herbicide                             | 1. Assure II/Targa<br>2. Basagran/generics<br>3. Dual/generics<br>4. Eptam (fall)<br>5. Eptam (spring)<br>6. Fusilade DX<br>7. Glyphosate (preharvest)<br>8. Intro/generics<br>9. Outlook<br>10. Permit<br>11. Peast | 12. Prowl<br>13. Pursuit<br>14. Raptor<br>15. Pursuit Plus<br>16. Reflex<br>17. Glyphosate/generics<br>18. Rezult<br>19. Select/generics<br>20. Sonalan (fall)<br>21. Sonalan (spring)<br>22. Spartan / Charge | 23. Trifluralin (fall)<br>24. Trifluralin (spring)<br>25. Trifluralin + Eptam (spring)<br>26. No Herbicide<br>27. Cultivation<br>28. Rotary hoe<br>29. Other |               |                                  |               |
| Desiccants  | Class of Bean  | Acres Treated  | Class of Bean<br>(if additional)   | Acres Treated | Class of Bean<br>(if additional) | Acres Treated |
| Sodium Chlorate<br>(Leafex, Defol)                |  |  |  |               |                                  |               |
| Paraquat  |  |  |  |               |                                  |               |
| Aim   |  |  |  |               |                                  |               |
| Glyphosate  |  |  |  |               |                                  |               |
| Spartan   |  |  |  |               |                                  |               |
| Valor   |  |  |  |               |                                  |               |

|   |                   |                          |                      |          |      |            |      |
|---|-------------------|--------------------------|----------------------|----------|------|------------|------|
| <b>Worst Disease Problems (Rank 1-3; 1 = worst)<br/>mark ONLY 3</b> | 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<br>(write in name or number) | No. Acres Treated  | No. of Sprays  | Application Method (circle one) |        |
|   |  |  | air                             | ground |
| Dry Bean Fungicides                         | 1. Bravo/Echo/generics<br>2. Champion/Champ<br>3. Endura<br>4. Folicur/generics<br>5. Headline<br>6. Intercept<br>7. Kocide<br>8. Omega<br>9. Proline<br>10. Maneb | 11. Rorval<br>12. Serenade<br>13. Switch<br>14. Thiolux<br>15. Tilt<br>16. Topsin/generics (broadcast)<br>17. Topsin/generics (banded)<br>18. Quadris/Amistar<br>19. Quadris Opti<br>20. Other<br>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     |      |       |

|                |  |
|----------------|--|
| 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)? _____ %   |

## Acknowledgments

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

Cover photos by H.J. Kandel and J.M. Osorno

For more information on this and other topics, see: [www.ag.ndsu.edu](http://www.ag.ndsu.edu)

NDSU encourages you to use and share this content, but please do so under the conditions of our Creative Commons license. You may copy, distribute, transmit and adapt this work as long as you give full attribution, don't use the work for commercial purposes and share your resulting work similarly. For more information, visit [www.ag.ndsu.edu/agcomm/creative-commons](http://www.ag.ndsu.edu/agcomm/creative-commons).

North Dakota State University does not discriminate on the basis of age, color, disability, gender expression/identity, genetic information, marital status, national origin, public assistance status, sex, sexual orientation, status as a U.S. veteran, race or religion. Direct inquiries to the Vice President for Equity, Diversity and Global Outreach, 205 Old Main, (701) 231-7708.

County Commissions, NDSU and U.S. Department of Agriculture Cooperating. This publication will be made available in alternative formats for people with disabilities upon request, (701) 231-7881.

1M-2-08; 600-12-08; 600-6-09; 400-4-10; 400-2-11; 300-2-12