1995 Dry Bean Grower Survey

of Pest Problems and Pesticide Use in Minnesota and North Dakota

H.A. Lamey R.K. Zollinger J.R. Venette D.R. Berglund

J.L. Luecke K.F. Grafton P.A. Glogoza

NDSU EXTENSION SERVICE
North Dakota State University, Fargo, ND 58105
JANUARY 1997
This is the eighth annual survey of pest problems, pesticide use and grower practices of the Northarvest Bean Growers Association, an association of dry bean growers in Minnesota and North Dakota. Results of previous surveys dated 1987-94 have been published (1, 2, 3, 4, 5, 6, 8). There was no survey in 1993.

The survey form (Figure 1, pages 3-6) was designed with input from research and extension faculty at North Dakota State University, the University of Minnesota, and the directors of Northarvest Bean Growers Association. The survey was mailed on November 15, 1995, to all 3,893 Northarvest dry bean growers in the two-state area. The surveys were sorted by Northarvest production district, with the district number marked in the corner of the form. Except for district designation, the survey was anonymous. For purposes of this discussion, districts are identified as MN1 through MN5 and ND1 through ND5 (Figure 2).
TO: All Northarvest Dry Bean Growers

FROM: Art Lamey  
Extension Plant Pathologist  
North Dakota State University

SUBJECT: Survey of Pest Problems and Pesticide Use in 1995

This is the eighth survey of Northarvest dry bean growers. Designed by research and extension specialists from North Dakota and Minnesota with suggestions from the Northarvest board of directors, it seeks specific information on pest problems and pesticide use in dry beans. Results help define research and extension needs, future pesticide needs, and the potential effect of any pesticide cancellations.

Please take the time to complete the survey on the reverse side and return it in the enclosed envelope, which is addressed with postage paid. Your reply is important and will help guide the future of the dry bean industry. Please answer the questions as completely as possible. Please be sure to provide information on acres treated or planted whenever this question is asked. Please be sure to report the acres for each variety grown, as well as acres treated by a pesticide. Accurate information will help us the most. Please feel free to add explanations or written comments that clarify your practices or express your concerns. Results will be published in future issues of the Northarvest Bean Grower.

In one question, you are asked to rank your most serious disease and weed problems up to a total of 3. If you had no serious problems, just circle “None” and go on to the next question. If you had two serious weed or disease problems, please put a “1” beside the worst problem, and a “2” beside the next worst problem. Use a “3” only if you had a third serious problem, but please don’t rank minor problems.

May we please have your reply by December 15, 1995.

The mailing list for this questionnaire was derived from Northarvest Bean Grower magazine mailing list. If you no longer wish to receive the magazine or would like to notify them of address changes, please include the mailing label from this packet or include your name and your old and new address including zip code.
Please circle or fill in the requested information on pest problems and pesticide use on your 1995 dry bean crop.

Total acres planted in 1995 ____________
Irrigated acres ________ Dryland acres ________
Total acres harvested ____________
Acres with hail damage ________
Acres with water damage ________

State and County Where Grown
(If beans are grown in more than one county, list each county and acres)

<table>
<thead>
<tr>
<th>State</th>
<th>County</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minnesota</td>
<td></td>
<td></td>
</tr>
<tr>
<td>North Dakota</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Dakota</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Seed Source
Western Grown
Northarvest Grown

Biggest Weather Problem in Dry Beans in 1995
(Circle One)

<table>
<thead>
<tr>
<th>Biggest Weather Problem</th>
<th>Acres Lost</th>
<th>Bean Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drought</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flooding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frost</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hail</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind/sandblasting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heat stress</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Biggest Production Problem in Dry Beans in 1995
(Circle One)

<table>
<thead>
<tr>
<th>Biggest Production Problem</th>
<th>Acres Lost</th>
<th>Bean Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied herbicide injury</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herbicide drift injury</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delayed planting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergence/stand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harvest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Micronutrient deficiency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weeds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (specify)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Variety Grown in 1995

<table>
<thead>
<tr>
<th>Variety Grown in 1995</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pinto</td>
<td></td>
</tr>
<tr>
<td>Arapaho</td>
<td></td>
</tr>
<tr>
<td>Bill Z</td>
<td></td>
</tr>
<tr>
<td>Fargo</td>
<td></td>
</tr>
<tr>
<td>Fiesta</td>
<td></td>
</tr>
<tr>
<td>Nodak</td>
<td></td>
</tr>
<tr>
<td>Othello</td>
<td></td>
</tr>
<tr>
<td>RS101</td>
<td></td>
</tr>
<tr>
<td>Topaz</td>
<td></td>
</tr>
<tr>
<td>Other (specify)</td>
<td></td>
</tr>
<tr>
<td>Navy</td>
<td></td>
</tr>
<tr>
<td>Agri 1</td>
<td></td>
</tr>
<tr>
<td>Mayflower</td>
<td></td>
</tr>
<tr>
<td>Midland</td>
<td></td>
</tr>
<tr>
<td>Norstar</td>
<td></td>
</tr>
<tr>
<td>Schooner</td>
<td></td>
</tr>
<tr>
<td>Upland</td>
<td></td>
</tr>
<tr>
<td>Vista</td>
<td></td>
</tr>
<tr>
<td>Voyager</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

Kidney

<table>
<thead>
<tr>
<th>Kidney</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cal. Early LRK</td>
<td></td>
</tr>
<tr>
<td>Montcalm</td>
<td></td>
</tr>
<tr>
<td>Sacramento</td>
<td></td>
</tr>
<tr>
<td>Other (specify)</td>
<td></td>
</tr>
</tbody>
</table>

Black Turtle
(specify)

Pink
(specify)

Other Market Class/Variety (specify)
Evaluate Weed Control Chemical
Mark weed control used and indicate areas treated for each item. Count double application, double cultivation, etc. As double acres.

<table>
<thead>
<tr>
<th>Weed Control Used</th>
<th>Acres Treated</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roundup/generics (preplant)</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Eptam (fall)</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Eptam (spring)</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Trifluralin (fall)</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Trifluralin (spring)</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Trifluralin + Eptam</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Sonalan (fall)</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Sonalan (spring)</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Lasso/generics</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Dual</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Prowl</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Pursuit</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Basagran/generics</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Poast/Poast Plus</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Desiccants
Sodium Chlorate
Gramoxone Extra

Insecticides Used on Dry Beans in 1995

<table>
<thead>
<tr>
<th>Insecticide</th>
<th>No. Acres Treated</th>
<th>No. of Sprays</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Worst Insect/Mite Problem in 1995
- Grasshoppers
- Leafhoppers
- Spider Mites
- Seed Corn Maggot

Fungicides Used on Dry Beans in 1995

<table>
<thead>
<tr>
<th>Fungicide</th>
<th>No. Acres Treated</th>
<th>No. of Sprays</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bravo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maneb</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Champion/Champ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kocide</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benlate (broadcast)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benlate (banded)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tilt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topsin (broadcast)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topsin (banded)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thiolux</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Worst Disease Problems in 1995
(Rank 1-3; 1 = worst)
- Alternaria
- Bacterial blight
- Root Rot
- Rust
- White Mold
- None

Please see back side for more questions!
Crop Rotation
Please specify practices below:

1. Crop rotation ____________ # acres.
2. Preceding crop _______________.
   How long since previous dry beans _______________?

Micronutrient Use
Acres treated with zinc _______________
No. of sprays _______________

COMMENTS:

Results of the survey will be published in Northarvest Bean Grower
Please return by December 15, 1995  - Thank you  - Art Lamey, Extension Plant Pathologist, NDSU
Responses

We received 680 useable responses, or a return rate of 18% (Table 1). The useable response rate is about the same as in 1994 (6), higher than the 15% in 1992 and 1991 and lower than the 19-23% useable response rate of 1987-1990. The surveys returned in 1995 represented 205,787 acres (A), or 26% of the Northharvest total of 790,000 A planted in 1995 (7). This is a similar response rate to previous surveys.

Responses by district are shown in Table 2. MN1, which comprises primarily the Red River Valley, represents 49% or Minnesota respondents' acres. ND1, which is the northernmost part of North Dakota, represents 31% of North Dakota respondents' acres. These values are similar to those for 1994. Compared to 1994, there were more acres represented in responses from MN1, MN5, ND5, and ND3.

Irrigation

Irrigation was used on 6% of Northharvest respondents' acres (Table 3), down from 9% in 1994. In Minnesota, irrigation was used on 14% of respondents' acres, down from 27% in 1994 and 40% in 1992 (3). In MN2 it was down from 85% in 1994 to 75% in 1995 in MN2. Irrigation was used on only 3% of North Dakota respondents' acres, down from 5% in 1994. The irrigated acres in ND5 have fluctuated from 3% in 1992 to 20% in 1994 to 10% in 1995.

Table 1. Number of Northharvest dry bean growers contacted, respondents, total acres and acres planted by Minnesota and North Dakota respondents in 1995.

<table>
<thead>
<tr>
<th>Growers</th>
<th>Contacted Number</th>
<th>Responded Number</th>
<th>Responded %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minnesota</td>
<td>1,085</td>
<td>221</td>
<td>20.4</td>
</tr>
<tr>
<td>North Dakota</td>
<td>2,808</td>
<td>459</td>
<td>16.3</td>
</tr>
<tr>
<td>Northharvest Total</td>
<td>3,893</td>
<td>680</td>
<td>17.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acres Planted</td>
<td>Total Number</td>
<td>Respondents Number</td>
<td>Respondents' Acres % of Total</td>
</tr>
<tr>
<td>--------</td>
<td>--------------</td>
<td>--------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Minnesota</td>
<td>160,000</td>
<td>55,762</td>
<td>34.9</td>
</tr>
<tr>
<td>North Dakota</td>
<td>570,000</td>
<td>150,025</td>
<td>26.3</td>
</tr>
<tr>
<td>Northharvest Total</td>
<td>730,000</td>
<td>205,787</td>
<td>28.2</td>
</tr>
</tbody>
</table>

*Total acres planted in state according to USDA data.

Table 2. Number of respondents and acres planted in 1995 by respondents in each Northharvest district of Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Northharvest District</th>
<th>Respondents</th>
<th>% of Survey Total</th>
<th>Acres Planted</th>
<th>% of Survey Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minnesota MN1</td>
<td>65</td>
<td>29.4</td>
<td>27,263</td>
<td>48.9</td>
</tr>
<tr>
<td>MN2</td>
<td>17</td>
<td>7.7</td>
<td>5,164</td>
<td>9.3</td>
</tr>
<tr>
<td>MN3</td>
<td>44</td>
<td>19.9</td>
<td>8,089</td>
<td>14.3</td>
</tr>
<tr>
<td>MN4</td>
<td>53</td>
<td>24.0</td>
<td>6,053</td>
<td>10.9</td>
</tr>
<tr>
<td>MN5</td>
<td>42</td>
<td>19.0</td>
<td>9,193</td>
<td>16.5</td>
</tr>
<tr>
<td>MN Total</td>
<td>221</td>
<td>100.0</td>
<td>55,762</td>
<td>100.0</td>
</tr>
</tbody>
</table>

| North Dakota ND1 | 142 | 30.9 | 46,415 | 30.9 |
| ND2 | 80 | 17.4 | 27,586 | 18.4 |
| ND3 | 88 | 19.2 | 30,766 | 20.5 |
| ND4 | 66 | 14.4 | 23,415 | 15.6 |
| ND5 | 83 | 18.1 | 21,843 | 14.6 |
| ND Total | 459 | 100.0 | 150,025 | 100.0 |

| Northharvest Total | 680 | 205,787 |

*Respondents' acres only.

Table 3. Acres irrigated in 1995 by respondents in each Northharvest district of Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Northharvest District</th>
<th>Acres</th>
<th>% of District Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minnesota MN1</td>
<td>425</td>
<td>1.6</td>
</tr>
<tr>
<td>MN2</td>
<td>3,869</td>
<td>74.9</td>
</tr>
<tr>
<td>MN3</td>
<td>127</td>
<td>1.6</td>
</tr>
<tr>
<td>MN4</td>
<td>737</td>
<td>12.2</td>
</tr>
<tr>
<td>MN5</td>
<td>2,870</td>
<td>31.2</td>
</tr>
<tr>
<td>MN Total</td>
<td>8,028</td>
<td>14.4</td>
</tr>
</tbody>
</table>

| North Dakota ND1 | 1,123 | 2.4 |
| ND2 | 0 | 0 |
| ND3 | 1,141 | 3.7 |
| ND4 | 530 | 2.3 |
| ND5 | 2,160 | 9.9 |
| ND Total | 4,954 | 3.3 |

| Northharvest Total | 12,982 | 6.3 |

*Respondents' acres only.

*No irrigated acres reported for this district.
Zinc Usage

Zinc, a commonly used micronutrient on dry beans, was used on 57% of respondents’ acres (Table 4). This is three times the percentage of respondents’ acres treated in 1990-1992 (2, 3, 4), but only slightly higher than the percentage treated in 1994. Almost identical percentages were treated by respondents from each state.

Table 4. Acres harvested in 1995 by respondents in each Northharvest district in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Northharvest District</th>
<th>Acres Harvested</th>
<th>% of District Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minnesota</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MN1</td>
<td>24,299</td>
<td>89.1</td>
</tr>
<tr>
<td>MN2</td>
<td>5,034</td>
<td>97.5</td>
</tr>
<tr>
<td>MN3</td>
<td>7,061</td>
<td>87.3</td>
</tr>
<tr>
<td>MN4</td>
<td>5,394</td>
<td>89.1</td>
</tr>
<tr>
<td>MN5</td>
<td>8,858</td>
<td>96.4</td>
</tr>
<tr>
<td>MN Total</td>
<td>50,646</td>
<td>90.8</td>
</tr>
<tr>
<td>North Dakota</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND1</td>
<td>43,792</td>
<td>94.3</td>
</tr>
<tr>
<td>ND2</td>
<td>23,166</td>
<td>84.0</td>
</tr>
<tr>
<td>ND3</td>
<td>29,600</td>
<td>95.9</td>
</tr>
<tr>
<td>ND4</td>
<td>22,009</td>
<td>94.0</td>
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<tr>
<td>ND5</td>
<td>19,465</td>
<td>89.1</td>
</tr>
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<td>ND Total</td>
<td>137,932</td>
<td>91.9</td>
</tr>
<tr>
<td>Northharvest Total</td>
<td>188,578</td>
<td>91.6</td>
</tr>
</tbody>
</table>

Use of Western Grown and Northharvest Grown Seed

In previous surveys respondents were asked about the use of bagged and tagged seed. This is the first time that respondents were asked about geographic origin of their seed, whether it was “Western grown” or Northharvest grown. Although Western-grown seed was most commonly used (Table 5), 23% of all seed planted was Northharvest-grown seed. Minnesota respondents planted 11% of their acres with Northharvest-grown seed and North Dakota respondents planted 27% with Northharvest-grown seed. The district with the highest percentage of acres planted with Northharvest-grown seed was ND3, where 46% of acres were planted with Northharvest-grown seed. It is also the Northharvest district that grows the largest amount of seed.

Varieties Grown

Othello pinto, which was the leading Northharvest variety in 1992 and 1994 (3, 6), continued to be the leading variety in 1995, as 35% of Northharvest survey respondents planted this variety on 25% of all dry bean acres reported (Table 6). Although this figure is still high, it is down

<table>
<thead>
<tr>
<th>Variety</th>
<th>Type</th>
<th>Respondents</th>
<th>Acres Planted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arapaho</td>
<td>P</td>
<td>23</td>
<td>1,707</td>
</tr>
<tr>
<td>Bill Z</td>
<td>P</td>
<td>48</td>
<td>4,985</td>
</tr>
<tr>
<td>Fiesta</td>
<td>P</td>
<td>41</td>
<td>7,690</td>
</tr>
<tr>
<td>Nodak</td>
<td>P</td>
<td>104</td>
<td>17,263</td>
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<tr>
<td>Olathe</td>
<td>P</td>
<td>20</td>
<td>2,692</td>
</tr>
<tr>
<td>Othello</td>
<td>P</td>
<td>236</td>
<td>50,790</td>
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<td>RS 101</td>
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<td>Sierra</td>
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<td>1,309</td>
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<tr>
<td>Topaz</td>
<td>P</td>
<td>167</td>
<td>27,291</td>
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<tr>
<td>Agri 1</td>
<td>N</td>
<td>64</td>
<td>7,723</td>
</tr>
<tr>
<td>Mayflower</td>
<td>N</td>
<td>19</td>
<td>1,330</td>
</tr>
<tr>
<td>Midland</td>
<td>N</td>
<td>38</td>
<td>4,476</td>
</tr>
<tr>
<td>Norstar</td>
<td>N</td>
<td>105</td>
<td>12,520</td>
</tr>
<tr>
<td>Schooner</td>
<td>N</td>
<td>76</td>
<td>8,797</td>
</tr>
<tr>
<td>Upland</td>
<td>N</td>
<td>97</td>
<td>9,861</td>
</tr>
<tr>
<td>Vista</td>
<td>N</td>
<td>51</td>
<td>4,413</td>
</tr>
<tr>
<td>Montcalm</td>
<td>DRK</td>
<td>51</td>
<td>7,163</td>
</tr>
<tr>
<td>Calif. Early</td>
<td>LRK</td>
<td>14</td>
<td>1,102</td>
</tr>
<tr>
<td>—</td>
<td>B</td>
<td>63</td>
<td>8,238</td>
</tr>
<tr>
<td>—</td>
<td>PK</td>
<td>30</td>
<td>6,606</td>
</tr>
</tbody>
</table>

Table 5. Acres seeded with Western grown and to Northharvest grown seed in 1995 in each Northharvest district.

Table 6. Varieties growna in 1995 by all Northharvest respondents in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Type</th>
<th>Respondents</th>
<th>Acres Planted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arapaho</td>
<td>P</td>
<td>23</td>
<td>1,707</td>
</tr>
<tr>
<td>Bill Z</td>
<td>P</td>
<td>48</td>
<td>4,985</td>
</tr>
<tr>
<td>Fiesta</td>
<td>P</td>
<td>41</td>
<td>7,690</td>
</tr>
<tr>
<td>Nodak</td>
<td>P</td>
<td>104</td>
<td>17,263</td>
</tr>
<tr>
<td>Olathe</td>
<td>P</td>
<td>20</td>
<td>2,692</td>
</tr>
<tr>
<td>Othello</td>
<td>P</td>
<td>236</td>
<td>50,790</td>
</tr>
<tr>
<td>RS 101</td>
<td>P</td>
<td>42</td>
<td>3,892</td>
</tr>
<tr>
<td>Sierra</td>
<td>P</td>
<td>10</td>
<td>1,309</td>
</tr>
<tr>
<td>Topaz</td>
<td>P</td>
<td>167</td>
<td>27,291</td>
</tr>
<tr>
<td>Agri 1</td>
<td>N</td>
<td>64</td>
<td>7,723</td>
</tr>
<tr>
<td>Mayflower</td>
<td>N</td>
<td>19</td>
<td>1,330</td>
</tr>
<tr>
<td>Midland</td>
<td>N</td>
<td>38</td>
<td>4,476</td>
</tr>
<tr>
<td>Norstar</td>
<td>N</td>
<td>105</td>
<td>12,520</td>
</tr>
<tr>
<td>Schooner</td>
<td>N</td>
<td>76</td>
<td>8,797</td>
</tr>
<tr>
<td>Upland</td>
<td>N</td>
<td>97</td>
<td>9,861</td>
</tr>
<tr>
<td>Vista</td>
<td>N</td>
<td>51</td>
<td>4,413</td>
</tr>
<tr>
<td>Montcalm</td>
<td>DRK</td>
<td>51</td>
<td>7,163</td>
</tr>
<tr>
<td>Calif. Early</td>
<td>LRK</td>
<td>14</td>
<td>1,102</td>
</tr>
<tr>
<td>—</td>
<td>B</td>
<td>63</td>
<td>8,238</td>
</tr>
<tr>
<td>—</td>
<td>PK</td>
<td>30</td>
<td>6,606</td>
</tr>
</tbody>
</table>

Table 5. Acres seeded with Western grown and to Northharvest grown seed in 1995 in each Northharvest district.

<table>
<thead>
<tr>
<th>Northharvest District</th>
<th>Western Grown Seed</th>
<th>Northharvest Grown Seed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acres Planted</td>
<td>Respondents’ Acres Planted (%)</td>
</tr>
<tr>
<td>Minnesota</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MN1</td>
<td>24,698</td>
<td>90.6</td>
</tr>
<tr>
<td>MN2</td>
<td>4,376</td>
<td>84.7</td>
</tr>
<tr>
<td>MN3</td>
<td>6,418</td>
<td>79.3</td>
</tr>
<tr>
<td>MN4</td>
<td>3,756</td>
<td>62.1</td>
</tr>
<tr>
<td>MN5</td>
<td>6,840</td>
<td>74.4</td>
</tr>
<tr>
<td>MN Total</td>
<td>46,088</td>
<td>82.7</td>
</tr>
<tr>
<td>North Dakota</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND1</td>
<td>29,153</td>
<td>62.8</td>
</tr>
<tr>
<td>ND2</td>
<td>21,722</td>
<td>77.1</td>
</tr>
<tr>
<td>ND3</td>
<td>14,392</td>
<td>46.8</td>
</tr>
<tr>
<td>ND4</td>
<td>18,317</td>
<td>78.2</td>
</tr>
<tr>
<td>ND5</td>
<td>12,139</td>
<td>55.6</td>
</tr>
<tr>
<td>ND Total</td>
<td>95,273</td>
<td>63.5</td>
</tr>
<tr>
<td>Northharvest Total</td>
<td>141,361</td>
<td>68.7</td>
</tr>
</tbody>
</table>

\(^a\)Includes all varieties reported grown on more than 1,000 acres.

\(^b\)Respondents’ acres only.

\(^c\)B = Black; DRK = Dark Red Kidney; LRK = Light Red Kidney; N = Navy; P = Pinto; PK = Pink
slightly from 1994. Othello accounted for 41% of the pinto bean acres (Table 7).

Topaz pinto continued to be the second most commonly planted Northharvest variety, planted by 25% of respondents on 13% of dry bean acres reported. This is similar to 1994. Nodak pinto continued to be the third most commonly planted variety, planted by 15% of Northharvest respondents on 8% of respondents’ acres.

Norstar was the top navy variety, planted by 15% of respondents on 6% of respondents’ acres, followed by Upland and Schooner, planted by 14% and 11% of respondents on 5% and 4% of respondents’ acres, respectively. This is the first year that Norstar was the dominant navy variety, planted on 22% of navy acres in the two states.

Other varieties commonly grown were Agri 1 navy, Fiesta pinto and Montcalm dark red kidney, each planted on nearly 4% of respondents’ acres. Montcalm was planted on 80% of kidney acres in the two states.

Navy bean was the most commonly grown class in Minnesota, with 39% of respondents’ acres planted to that class (Table 8). Pinto was the second most commonly planted class in Minnesota, with 32% of respondents’ acres, and 18% was planted to kidney beans.

Pinto bean was the most commonly grown class in North Dakota, with 60% of respondents’ acres planted to that class (Table 8). Navy was the second most commonly planted class in North Dakota, with 28% of respondents’ acres planted to navy beans. Only 5% was planted to kidney beans.

The class of bean varied by district, with 58% of respondents’ dry bean acres in MN1 planted to pinto beans and 30% to navy beans, 68% of respondents’ acres in MN2 planted to kidney beans and 20% to pink beans, 76% of respondents’ acres in MN3 planted to navy beans and 14% to kidney beans, 47% of respondents’ acres in MN4 planted to navy beans and 42% to kidney beans, and 45% of respondents’ acres in MN5 planted to navy beans and 28% to kidney beans (Table 8).

In North Dakota, 86% of respondents’ acres in ND1 were planted to pinto beans, 53% of respondents’ acres in ND2 were planted to pinto beans and 42% to navy beans, 88% of respondents’ acres in ND3 were planted to pinto beans and 10% to navy beans, 56% of respondents’ acres in ND4 were planted to pinto beans and 33% to navy beans, and 54% of respondents’ acres in ND5 were planted to pinto beans and 45% to navy beans (Table 8).

---

Table 7. Leading varieties of dry bean, by class, grown in Minnesota and North Dakota in 1995.

<table>
<thead>
<tr>
<th>Class/ Variety</th>
<th>Minnesota</th>
<th>North Dakota</th>
<th>Northharvest Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pinto</td>
<td>23.4</td>
<td>43.9</td>
<td>41.0</td>
</tr>
<tr>
<td>Othello</td>
<td>25.3</td>
<td>21.5</td>
<td>22.0</td>
</tr>
<tr>
<td>Topaz</td>
<td>2.2</td>
<td>15.9</td>
<td>13.9</td>
</tr>
<tr>
<td>Fiesta</td>
<td>29.3</td>
<td>2.4</td>
<td>6.2</td>
</tr>
<tr>
<td>Navy</td>
<td>15.8</td>
<td>26.0</td>
<td>22.1</td>
</tr>
<tr>
<td>Norstar</td>
<td>12.9</td>
<td>19.5</td>
<td>17.0</td>
</tr>
<tr>
<td>Upland</td>
<td>11.1</td>
<td>17.7</td>
<td>15.2</td>
</tr>
<tr>
<td>Schooner</td>
<td>16.6</td>
<td>11.4</td>
<td>13.3</td>
</tr>
<tr>
<td>Kidney</td>
<td>11.1</td>
<td>0</td>
<td>10.7</td>
</tr>
<tr>
<td>Cal. Early (LRK)</td>
<td>79.5</td>
<td>100.0</td>
<td>80.3</td>
</tr>
</tbody>
</table>

*Varieties grown on more than 10% of respondents’ acres, for that class, in at least one state.

---

Table 8. Class of dry bean grown in 1995 by respondents in each district in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Northharvest District</th>
<th>Pinto</th>
<th>Navy</th>
<th>Kidney</th>
<th>Black</th>
<th>Pink</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Acres Planted*</td>
</tr>
<tr>
<td>Minnesota</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MN1</td>
<td>57.7</td>
<td>29.5</td>
<td>0.7</td>
<td>5.4</td>
<td>0.2</td>
<td>6.5</td>
</tr>
<tr>
<td>MN2</td>
<td>0.4</td>
<td>12.2</td>
<td>67.8</td>
<td>0</td>
<td>19.5</td>
<td>0</td>
</tr>
<tr>
<td>MN3</td>
<td>4.6</td>
<td>76.1</td>
<td>13.6</td>
<td>0</td>
<td>0</td>
<td>5.7</td>
</tr>
<tr>
<td>MN4</td>
<td>4.8</td>
<td>46.5</td>
<td>42.2</td>
<td>5.5</td>
<td>0</td>
<td>1.0</td>
</tr>
<tr>
<td>MN5</td>
<td>12.8</td>
<td>44.7</td>
<td>27.6</td>
<td>9.0</td>
<td>1.2</td>
<td>4.8</td>
</tr>
<tr>
<td>MN Total</td>
<td>31.5</td>
<td>39.0</td>
<td>17.7</td>
<td>4.7</td>
<td>2.1</td>
<td>4.9</td>
</tr>
</tbody>
</table>

| North Dakota          |       |      |        |       |      |                   |
| ND1                   | 86.0  | 9.3  | 0      | 0.4   | 3.1  | 1.2               |
| ND2                   | 52.7  | 41.6 | 0      | 4.8   | 0.7  | 0.2               |
| ND3                   | 87.9  | 9.8  | 0      | 1.5   | 0.8  | 0                 |
| ND4                   | 55.8  | 32.6 | 1.2    | 7.1   | 0.9  | 2.7               |
| ND5                   | 53.7  | 44.5 | 0.4    | 1.5   | 0    | 0                 |
| ND Total              | 70.8  | 24.1 | 0.2    | 2.7   | 1.4  | 0.8               |

| Northharvest Total    | 60.2  | 28.1 | 5.0    | 3.2   | 1.6  | 1.9               |

*Minnesota districts are Bean Council districts, not Northharvest districts.
Weather Problems

The worst weather problem in 1995 was flooding and wet weather, as reported for 73% of Minnesota respondents' acres, 70% of North Dakota respondents' acres and 71% of all Northharvest respondents' acres (Table 9). This is even higher than in 1994 when 61% of all Northharvest respondents' acres were reported with flooding or wet weather problems. Acres lost to flooding were 7% in Minnesota, 6% in North Dakota and 6% for all of Northharvest acres, which is about half of the acres lost in 1994. Thus, even though more acres were reported with flooding and wet problems, fewer acres were lost to flooding and wet conditions. Losses to drought, frost and hail were minimal. Respondents reported that 6% of Minnesota respondents' 5% of North Dakota respondents' 7% of all respondents' acres were damaged by heat stress; acres lost to heat stress were minimal.

Flooding and wet conditions damaged 91% of MN1 respondents' acres, 84% of MN3 respondents' acres, 63% of MN5 respondents' acres, 92% of ND2 respondents' acres, 87% of ND5 respondents' acres and 78% of ND4 respondents' acres (Table 10). Overall, damage was more extensive than in 1994. Respondents lost 10% of their acres in MN1 to flooding and wet conditions and 11% of their acres in ND2. As noted before, even though flooding damage was more extensive than in 1994, fewer acres were lost to flooding.

Heat stress damage was most common in MN2, with 23% of beans on respondents' acres damaged, followed by ND2 with 16% damaged and MN4 with 11% damaged. Losses were minimal in all districts.

Acres Harvested

Respondents harvested 92% of their planted acres in 1995, compared to 81% in 1994. Acres harvested ranged from 98% in MN2, 96% in MN5, 96% in ND3, and 94% in ND1 and ND4 to 89% in MN1, MN4 and ND5 to 84% in ND2 (Table 11).

| Table 9. Worst weather problem in 1995 for respondents in Minnesota and North Dakota. |
|-----------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Worst Weather Problem Reported               | Respondents -  | Number | %    | Acres Reported -  | Number | %    | Acres Lost | %    |                      |
|                                              | Respondents -  |        |      | Acres Reported -  |        |      |           |     |                      |
|                                              | Number |        |      | Number |        |      |           |     |                      |
| Minnesota                                    |        |        |      |        |        |      |           |     |                      |
| Drought/dry                                  | 5      | 2.6    |      | 563    | 1.0    |      | 80        | 0.1  |                      |
| Flooding/wet                                 | 133    | 67.9   |      | 40,892 | 73.3   |      | 3,748     | 6.7  |                      |
| Frost                                        | 1      | 0.5    |      | 400    | 0.7    |      | 160       | 0.3  |                      |
| Hail                                         | 4      | 2.0    |      | 720    | 1.3    |      | 0         |      |                      |
| Wind/sandblast                               | 6      | 3.1    |      | 1,013  | 1.8    |      | 7†        |      |                      |
| Heat stress                                  | 20     | 10.2   |      | 3,070  | 5.5    |      | 27        |      |                      |
| None                                         | 9      | 4.6    |      | 1,612  | 2.9    |      |           |      |                      |
| North Dakota                                 |        |        |      |        |        |      |           |     |                      |
| Drought/dry                                  | 17     | 4.1    |      | 8,333  | 5.6    |      | 320       | 0.1  |                      |
| Flooding/wet                                 | 324    | 78.6   |      | 105,221| 70.1   |      | 8,493     | 5.7  |                      |
| Frost                                        | 8      | 1.9    |      | 2,425  | 1.6    |      | 295       | 0.2  |                      |
| Hail                                         | 11     | 2.7    |      | 4,553  | 3.0    |      | 395       | 0.3  |                      |
| Wind/sandblast                               | 6      | 1.5    |      | 991    | 0.7    |      | 213       | 0.1  |                      |
| Heat stress                                  | 17     | 4.1    |      | 7,723  | 5.1    |      | 0         |      |                      |
| None                                         | 13     | 3.2    |      | 4,354  | 2.9    |      |           |      |                      |
| Northharvest                                 |        |        |      |        |        |      |           |     |                      |
| Drought/dry                                  | 22     | 3.6    |      | 8,896  | 4.3    |      | 400       | 0.2  |                      |
| Flooding/wet                                 | 457    | 75.2   |      | 146,113| 71.0   |      | 12,450    | 6.0  |                      |
| Frost                                        | 9      | 1.5    |      | 2,825  | 1.4    |      | 455       | 0.2  |                      |
| Hail                                         | 15     | 2.5    |      | 5,273  | 2.6    |      | 395       | 0.2  |                      |
| Wind/sandblast                               | 12     | 2.0    |      | 2,004  | 1.0    |      | 220       | 0.2  |                      |
| Heat stress                                  | 37     | 6.1    |      | 10,793 | 5.2    |      | 27        |      |                      |
| None                                         | 22     | 3.6    |      | 5,866  | 2.9    |      |           |      |                      |

*Respondents' acres only.
†tr = trace
Production Problems

The worst production problems for Northharvest survey respondents were diseases, followed by weeds and harvesting problems (Table 12). Diseases were reported to be the worst production problem by 32% of survey respondents representing 38% of the acres reported. Weeds were reported to be the worst production problem by 19% of survey respondents representing 16% of the acres reported, and harvesting problems were reported to be the worst production problem by 9% of survey respondents representing 12% of the acres reported. These data are similar to 1994 (6).

Diseases were reported as the worst production problem in Minnesota by 29% of that state's respondents representing 35% of respondents' acres. Weeds were reported as the worst production problem in Minnesota by 19% of that state's respondents representing 17% of respondents' acres. Harvesting problems were reported

Table 10. Weather damage reported by respondents in 1995 in each Northharvest district of Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Northharvest District</th>
<th>Area Damageda</th>
<th>Area Losta</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Flooding/Wet</td>
<td>Heat Stress</td>
</tr>
<tr>
<td></td>
<td>Acres %</td>
<td>Acres %</td>
</tr>
<tr>
<td>Minnesota</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MN1</td>
<td>24,795 90.9</td>
<td>71 1.4</td>
</tr>
<tr>
<td>MN2</td>
<td>635 12.3</td>
<td>1,170 22.7</td>
</tr>
<tr>
<td>MN3</td>
<td>6,759 83.6</td>
<td>128 1.6</td>
</tr>
<tr>
<td>MN4</td>
<td>2,877 47.5</td>
<td>638 10.5</td>
</tr>
<tr>
<td>MN5</td>
<td>5,826 63.4</td>
<td>763 8.3</td>
</tr>
<tr>
<td>MN Total</td>
<td>40,892 73.3</td>
<td>3,070 5.5</td>
</tr>
<tr>
<td>North Dakota</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND1</td>
<td>24,374 52.5</td>
<td>2,962 6.4</td>
</tr>
<tr>
<td>ND2</td>
<td>25,259 91.6</td>
<td>0 0</td>
</tr>
<tr>
<td>ND3</td>
<td>18,289 59.4</td>
<td>4,761 15.5</td>
</tr>
<tr>
<td>ND4</td>
<td>18,291 78.1</td>
<td>0 0</td>
</tr>
<tr>
<td>ND5</td>
<td>19,008 87.0</td>
<td>0 0</td>
</tr>
<tr>
<td>ND Total</td>
<td>105,221 70.1</td>
<td>7,723 5.1</td>
</tr>
</tbody>
</table>

a Respondents' acres only.
b tr = trace.

Table 11. Acres harvested in 1995 by respondents in each Northharvest district in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Northharvest District</th>
<th>Acres Harvested</th>
<th>% of District Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minnesota</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MN1</td>
<td>4,299</td>
<td>99.1</td>
</tr>
<tr>
<td>MN2</td>
<td>5,034</td>
<td>97.5</td>
</tr>
<tr>
<td>MN3</td>
<td>7,061</td>
<td>87.3</td>
</tr>
<tr>
<td>MN4</td>
<td>8,858</td>
<td>96.4</td>
</tr>
<tr>
<td>MN Total</td>
<td>50,646</td>
<td>90.8</td>
</tr>
<tr>
<td>North Dakota</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND1</td>
<td>43,792</td>
<td>94.3</td>
</tr>
<tr>
<td>ND2</td>
<td>23,166</td>
<td>84.0</td>
</tr>
<tr>
<td>ND3</td>
<td>29,500</td>
<td>95.9</td>
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<tr>
<td>ND4</td>
<td>22,009</td>
<td>94.0</td>
</tr>
<tr>
<td>ND5</td>
<td>19,465</td>
<td>89.1</td>
</tr>
<tr>
<td>ND Total</td>
<td>137,932</td>
<td>91.9</td>
</tr>
<tr>
<td>Northharvest Total</td>
<td>188,578</td>
<td>91.6</td>
</tr>
</tbody>
</table>
as the worst production problem in Minnesota by 10% of that state’s respondents representing 17% of respondents’ acres (Table 12).

Diseases were reported as the worst production problem in North Dakota by 33% of that state’s respondents representing 39% of their acres. Weeds were reported as the worst production problem by 19% of that state’s respondents representing 15% of their acres. Harvesting problems were reported as the worst production problem by 9% of that state’s respondents representing 10% of their acres (Table 12).

Diseases, the worst production problem for Minnesota respondents, were especially severe in MN1 and MN4 with 51% and 38% of respondents’ acres affected, respectively.

<table>
<thead>
<tr>
<th>Worst Production Problem</th>
<th>Respondents</th>
<th>Acres Reporteda</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>State</strong></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
<td>Minnesota</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diseases</td>
<td>65</td>
<td>29.4</td>
<td>19,514</td>
<td>35.0</td>
</tr>
<tr>
<td>Weeds</td>
<td>42</td>
<td>19.0</td>
<td>9,599</td>
<td>17.2</td>
</tr>
<tr>
<td>Harvesting</td>
<td>22</td>
<td>10.0</td>
<td>9,326</td>
<td>16.7</td>
</tr>
<tr>
<td>Delayed planting</td>
<td>8</td>
<td>3.6</td>
<td>1,594</td>
<td>2.9</td>
</tr>
<tr>
<td>Emergence/stand</td>
<td>7</td>
<td>3.2</td>
<td>906</td>
<td>1.6</td>
</tr>
<tr>
<td>Drift injury</td>
<td>1</td>
<td>0.5</td>
<td>440</td>
<td>0.8</td>
</tr>
<tr>
<td>Herbicide injury</td>
<td>4</td>
<td>1.8</td>
<td>294</td>
<td>0.5</td>
</tr>
<tr>
<td>Other</td>
<td>30</td>
<td>13.6</td>
<td>4,472</td>
<td>8.0</td>
</tr>
<tr>
<td>None</td>
<td>18</td>
<td>8.1</td>
<td>4,133</td>
<td>7.4</td>
</tr>
<tr>
<td>North Dakota</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diseases</td>
<td>150</td>
<td>32.7</td>
<td>59,124</td>
<td>39.4</td>
</tr>
<tr>
<td>Weeds</td>
<td>88</td>
<td>19.2</td>
<td>22,934</td>
<td>15.3</td>
</tr>
<tr>
<td>Harvesting</td>
<td>41</td>
<td>8.9</td>
<td>15,468</td>
<td>10.3</td>
</tr>
<tr>
<td>Delayed planting</td>
<td>34</td>
<td>7.4</td>
<td>9,776</td>
<td>6.5</td>
</tr>
<tr>
<td>Emergence/stand</td>
<td>14</td>
<td>3.1</td>
<td>4,705</td>
<td>3.1</td>
</tr>
<tr>
<td>Micronutrient deficiency</td>
<td>3</td>
<td>0.7</td>
<td>1,041</td>
<td>0.7</td>
</tr>
<tr>
<td>Herbicide injury</td>
<td>3</td>
<td>0.7</td>
<td>877</td>
<td>0.6</td>
</tr>
<tr>
<td>Other</td>
<td>18</td>
<td>3.9</td>
<td>2,978</td>
<td>2.0</td>
</tr>
<tr>
<td>None</td>
<td>45</td>
<td>9.8</td>
<td>13,229</td>
<td>8.8</td>
</tr>
<tr>
<td>Northarvest Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diseases</td>
<td>215</td>
<td>31.6</td>
<td>78,638</td>
<td>38.2</td>
</tr>
<tr>
<td>Weeds</td>
<td>130</td>
<td>19.1</td>
<td>32,533</td>
<td>15.8</td>
</tr>
<tr>
<td>Harvesting</td>
<td>63</td>
<td>9.3</td>
<td>24,794</td>
<td>12.0</td>
</tr>
<tr>
<td>Delayed planting</td>
<td>42</td>
<td>6.2</td>
<td>11,370</td>
<td>5.5</td>
</tr>
<tr>
<td>Emergence/stand</td>
<td>21</td>
<td>3.1</td>
<td>5,611</td>
<td>2.7</td>
</tr>
<tr>
<td>Herbicide injury</td>
<td>7</td>
<td>1.0</td>
<td>1,171</td>
<td>0.6</td>
</tr>
<tr>
<td>Micronutrient deficiency</td>
<td>3</td>
<td>0.4</td>
<td>1,041</td>
<td>0.5</td>
</tr>
<tr>
<td>Drift injury</td>
<td>1</td>
<td>0.1</td>
<td>440</td>
<td>0.2</td>
</tr>
<tr>
<td>Other</td>
<td>48</td>
<td>7.1</td>
<td>7,450</td>
<td>3.6</td>
</tr>
<tr>
<td>None</td>
<td>63</td>
<td>9.3</td>
<td>17,362</td>
<td>8.4</td>
</tr>
</tbody>
</table>

*a Respondents’ acres only

Weeds, the second worst production problem for Minnesota respondents, were worst in MN5 with 37% of respondents’ acres affected. Harvesting problems, the third worst production problem for Minnesota respondents, affected 39% of MN3 and 22% of MN5 respondents’ acres (Table 13).

Diseases, the worst production problem for North Dakota respondents, were especially severe in ND4, ND1, ND5 and ND2 with 53%, 46%, 37% and 33% of respondents’ acres affected, respectively. Weeds, the second worst production problem for North Dakota respondents, were worst in ND4, ND3 and ND5 with 23%, 22% and 20% of respondents’ acres affected, respectively. Harvest problems, the third worst production problem for North Dakota respondents, affected 24% of ND2 respondents’ acres. Respondents in ND2 and ND3 reported delayed planting a major production problem on 14% of their acres in each of these two districts (Table 13).

**Disease Problems**

White mold was the worst disease problem for 61% of Northarvest survey respondents representing 67% of their dry bean acres, followed by rust for 7% of respondents representing 7% of their acres. White mold was the worst disease problem on 61% of Minnesota and 70% of North Dakota respondents’ acres. These figures are up from 1994 when white mold was the worst disease problem on 42% of Minnesota and 52% of North Dakota respondents’ acres. Rust was the worst disease problem on 4% of Minnesota and 8% of North Dakota respondents’ acres. This is down from 1994. Bacterial blight and root rot were not listed as frequent problems in 1995 (Table 14).

White mold was ranked as one of the three worst disease problems by Northarvest survey respondents on 78% of dry bean acres reported, a number similar to that reported in 1994. Rust was ranked as one of the three worst disease problems on 46% of respondents’ acres, down from 1994. Bacterial blight was reported as one of the three worst disease problems on 18% of dry bean acres reported, down slightly from 1994 (Table 15).

White mold was cited as one of the three worst disease problems slightly more frequently in North Dakota than in Minnesota (80% of respondents’ acres compared to 72% in Minnesota). Rust was also cited more frequently in North Dakota than in Minnesota (50% of respondents’ acres compared to 36% in Minnesota). Bacterial blight was cited slightly more frequently in North Dakota than in Minnesota (20% of respondents’ acres in North Dakota and 14% in Minnesota) and root rot was cited more frequently
Table 13. Worst production problems for respondents by district in 1995, Minnesota and North Dakota.

| Northharvest District | Acres Affected* | | | | % Acres Affected* | | | |
|-----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                       | Disease | Weeds | Harvesting | Delayed Planting | Disease | Weeds | Harvesting | Delayed Planting |
| Minnesota             | MN1     | 13,812| 3,827 | 3,257 | 1,320 | 50.7 | 14.0 | 11.9 | 4.8 |
|                       | MN2     | 1,035 | 576 | 700 | 0 | 20.0 | 11.2 | 13.6 | 0 |
|                       | MN3     | 1,530 | 1,352 | 3,145 | 134 | 18.9 | 16.7 | 38.9 | 1.7 |
|                       | MN4     | 2,304 | 405 | 217 | 140 | 38.1 | 6.7 | 3.6 | 2.3 |
|                       | MN5     | 833 | 3,439 | 2,007 | 0 | 9.1 | 37.4 | 21.8 | 0 |
|                       | MN Total | 19,514 | 9,599 | 9,326 | 1,594 | 35.0 | 17.2 | 16.7 | 2.9 |
| North Dakota          | ND1     | 21,185 | 4,959 | 6,890 | 600 | 45.6 | 10.7 | 14.8 | 1.3 |
|                       | ND2     | 9,149 | 1,612 | 6,470 | 3,847 | 33.2 | 5.8 | 23.5 | 13.9 |
|                       | ND3     | 8,123 | 6,653 | 375 | 4,373 | 26.4 | 21.6 | 1.2 | 14.2 |
|                       | ND4     | 12,493 | 5,425 | 1,333 | 218 | 53.4 | 23.2 | 5.7 | 0.9 |
|                       | ND5     | 18,742 | 4,285 | 440 | 738 | 37.4 | 19.6 | 1.8 | 3.4 |
|                       | ND Total | 59,124 | 22,934 | 15,468 | 9,776 | 39.4 | 15.3 | 10.3 | 6.5 |
| North Total           | 78,638 | 32,533 | 24,794 | 11,370 | 38.2 | 15.8 | 12.0 | 5.5 |

*Respondents' acres only.

Table 14. Worst disease problem* in 1995 for respondents in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Worst Disease Problem</th>
<th>Respondents*</th>
<th>Acres Reported*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
<td>Minnesota</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White mold</td>
<td>125</td>
<td>56.6</td>
</tr>
<tr>
<td>Root rot</td>
<td>9</td>
<td>41.2</td>
</tr>
<tr>
<td>Rust</td>
<td>9</td>
<td>41.2</td>
</tr>
<tr>
<td>Bacterial blight</td>
<td>9</td>
<td>41.2</td>
</tr>
<tr>
<td>None</td>
<td>22</td>
<td>10.0</td>
</tr>
<tr>
<td>North Dakota</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White mold</td>
<td>289</td>
<td>63.0</td>
</tr>
<tr>
<td>Rust</td>
<td>41</td>
<td>8.9</td>
</tr>
<tr>
<td>Bacterial blight</td>
<td>7</td>
<td>1.5</td>
</tr>
<tr>
<td>Root rot</td>
<td>11</td>
<td>2.4</td>
</tr>
<tr>
<td>None</td>
<td>35</td>
<td>7.6</td>
</tr>
<tr>
<td>Northharvest Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White mold</td>
<td>414</td>
<td>60.9</td>
</tr>
<tr>
<td>Rust</td>
<td>50</td>
<td>7.4</td>
</tr>
<tr>
<td>Bacterial blight</td>
<td>7</td>
<td>1.5</td>
</tr>
<tr>
<td>Root rot</td>
<td>29</td>
<td>2.9</td>
</tr>
<tr>
<td>None</td>
<td>57</td>
<td>8.4</td>
</tr>
</tbody>
</table>

*Ranked as No.1 disease problem by respondents.

Table 15. Diseases ranked as one of the three worst* in 1995 by respondents in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Disease Problem</th>
<th>No.1, 2 or 3</th>
<th>Respondents*</th>
<th>Acres Reported*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
</tr>
<tr>
<td>Minnesota</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White mold</td>
<td>144</td>
<td>65.2</td>
<td>40,048</td>
</tr>
<tr>
<td>Rust</td>
<td>51</td>
<td>23.1</td>
<td>19,877</td>
</tr>
<tr>
<td>Root rot</td>
<td>36</td>
<td>16.3</td>
<td>9,616</td>
</tr>
<tr>
<td>Bacterial blight</td>
<td>31</td>
<td>14.0</td>
<td>7,661</td>
</tr>
<tr>
<td>Alternaria</td>
<td>2</td>
<td>0.9</td>
<td>363</td>
</tr>
<tr>
<td>None</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North Dakota</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White mold</td>
<td>332</td>
<td>72.3</td>
<td>120,109</td>
</tr>
<tr>
<td>Rust</td>
<td>187</td>
<td>40.7</td>
<td>74,210</td>
</tr>
<tr>
<td>Bacterial blight</td>
<td>83</td>
<td>18.1</td>
<td>29,791</td>
</tr>
<tr>
<td>Root rot</td>
<td>40</td>
<td>8.7</td>
<td>13,589</td>
</tr>
<tr>
<td>Alternaria</td>
<td>7</td>
<td>1.5</td>
<td>2,500</td>
</tr>
<tr>
<td>None</td>
<td>35</td>
<td>7.6</td>
<td>7,902</td>
</tr>
<tr>
<td>Northharvest Total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White mold</td>
<td>476</td>
<td>70.7</td>
<td>160,157</td>
</tr>
<tr>
<td>Rust</td>
<td>238</td>
<td>35.0</td>
<td>94,097</td>
</tr>
<tr>
<td>Bacterial blight</td>
<td>114</td>
<td>16.8</td>
<td>37,452</td>
</tr>
<tr>
<td>Root Rot</td>
<td>76</td>
<td>11.2</td>
<td>23,205</td>
</tr>
<tr>
<td>Alternaria</td>
<td>9</td>
<td>1.3</td>
<td>2,863</td>
</tr>
<tr>
<td>None</td>
<td>57</td>
<td>8.4</td>
<td>12,108</td>
</tr>
</tbody>
</table>

*Ranked as No.1, 2, or 3 disease problem by respondents.

*Respondents' acres only.
in Minnesota than North Dakota (17% of respondents' acres in Minnesota and 9% in North Dakota; see Table 15).

White mold was ranked as the worst disease problem in all Minnesota and North Dakota districts (Table 16). All but two of the districts ranked white mold as the worst disease problem on over half of the acres reported, and half of the districts ranked it as the worst disease problem on 70-80% of respondents' acres. Root rot was ranked as the worst disease on 23% of acres reported in MN5 and rust was ranked as the worst disease on 14% of acres reported in ND1. These are the only disease problems, other than white mold, that were reported as a worst disease problem on over 10% of acres in any district.

Not only was white mold ranked as the worst disease problem in all Minnesota and North Dakota districts, but it was also highest among those ranked as one of the three worst diseases. Rust was ranked next highest in MN1, MN2 and all five ND districts. Root rot was ranked next after white mold in the other three MN districts. Rust was ranked as one of the three worst diseases on as high as 60% of MN1 and 54% of ND1 respondents' acres. Root rot was ranked as one of the three worst diseases on as high as 34% of MN4 and 28% of MN5 respondents' acres (Table 17).

### Disease Control Practices

Fungicides were used on 42% of Northarvest survey respondents' acres, down from 56% in 1994. These usage figures are still far above the figures for 1992, when fungicides were used on only 14% of respondents' acres. Fungicides were used on 38% of Minnesota respondents' acres and 43% of North Dakota respondents' acres (Table 18). This represents a major drop in fungicide use in Minnesota and a somewhat less dramatic drop in North Dakota. The greatest use of fungicide in Minnesota was

### Table 16. Worst disease problem* in 1995 in each Northarvest district for respondents in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Northarvest District</th>
<th>Worst Disease Problem</th>
<th>Respondents Number</th>
<th>Respondents %</th>
<th>Acres Reported Number</th>
<th>Acres Reported %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Minnesota</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MN1</td>
<td>White mold</td>
<td>43</td>
<td>66.2</td>
<td>19,238</td>
<td>70.6</td>
</tr>
<tr>
<td></td>
<td>Rust</td>
<td>3</td>
<td>4.6</td>
<td>1,625</td>
<td>6.0</td>
</tr>
<tr>
<td>MN2</td>
<td>White mold</td>
<td>8</td>
<td>47.1</td>
<td>2,355</td>
<td>45.6</td>
</tr>
<tr>
<td></td>
<td>Rust</td>
<td>4</td>
<td>9.1</td>
<td>506</td>
<td>6.3</td>
</tr>
<tr>
<td>MN3</td>
<td>White mold</td>
<td>20</td>
<td>45.5</td>
<td>4,691</td>
<td>58.0</td>
</tr>
<tr>
<td></td>
<td>Rust</td>
<td>4</td>
<td>9.1</td>
<td>506</td>
<td>6.3</td>
</tr>
<tr>
<td></td>
<td>Root rot</td>
<td>3</td>
<td>6.8</td>
<td>432</td>
<td>5.3</td>
</tr>
<tr>
<td>MN4</td>
<td>White mold</td>
<td>36</td>
<td>67.9</td>
<td>4,488</td>
<td>74.1</td>
</tr>
<tr>
<td></td>
<td>Bacterial blight</td>
<td>7</td>
<td>13.2</td>
<td>782</td>
<td>12.9</td>
</tr>
<tr>
<td>MN5</td>
<td>White mold</td>
<td>18</td>
<td>42.9</td>
<td>3,124</td>
<td>34.0</td>
</tr>
<tr>
<td></td>
<td>Root rot</td>
<td>3</td>
<td>7.1</td>
<td>2,095</td>
<td>22.8</td>
</tr>
<tr>
<td><strong>North Dakota</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND1</td>
<td>White mold</td>
<td>94</td>
<td>66.2</td>
<td>33,463</td>
<td>72.1</td>
</tr>
<tr>
<td></td>
<td>Rust</td>
<td>22</td>
<td>15.5</td>
<td>6,423</td>
<td>13.8</td>
</tr>
<tr>
<td>ND2</td>
<td>White mold</td>
<td>52</td>
<td>65.0</td>
<td>16,447</td>
<td>59.6</td>
</tr>
<tr>
<td></td>
<td>Rust</td>
<td>6</td>
<td>7.5</td>
<td>2,117</td>
<td>7.7</td>
</tr>
<tr>
<td></td>
<td>Bacterial blight</td>
<td>3</td>
<td>3.8</td>
<td>1,660</td>
<td>6.0</td>
</tr>
<tr>
<td>ND3</td>
<td>White mold</td>
<td>47</td>
<td>53.4</td>
<td>19,166</td>
<td>62.3</td>
</tr>
<tr>
<td>ND4</td>
<td>White mold</td>
<td>47</td>
<td>71.2</td>
<td>19,012</td>
<td>81.2</td>
</tr>
<tr>
<td>ND5</td>
<td>White mold</td>
<td>49</td>
<td>59.0</td>
<td>16,592</td>
<td>76.0</td>
</tr>
<tr>
<td></td>
<td>Rust</td>
<td>4</td>
<td>4.8</td>
<td>1,160</td>
<td>5.3</td>
</tr>
</tbody>
</table>

* Diseases reported on more than 5% of respondents' acres.

† District respondents' acres only.

### Table 17. Diseases ranked as one of three worst in 1995 in each Northarvest district in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Northarvest District</th>
<th>Disease Problem</th>
<th>No.1, 2 or 3 Disease Problem</th>
<th>Respondents Number</th>
<th>Respondents %</th>
<th>Acres Reported Number</th>
<th>Acres Reported %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Minnesota</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MN1</td>
<td>White mold</td>
<td>31</td>
<td>72.3</td>
<td>21,468</td>
<td>78.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rust</td>
<td>47</td>
<td>47.7</td>
<td>16,284</td>
<td>59.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bacterial blight</td>
<td>9</td>
<td>13.8</td>
<td>3,866</td>
<td>14.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Root rot</td>
<td>6</td>
<td>9.2</td>
<td>3,563</td>
<td>13.1</td>
<td></td>
</tr>
<tr>
<td>MN2</td>
<td>White mold</td>
<td>8</td>
<td>47.1</td>
<td>2,355</td>
<td>45.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rust</td>
<td>3</td>
<td>17.6</td>
<td>723</td>
<td>14.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bacterial blight</td>
<td>2</td>
<td>11.8</td>
<td>655</td>
<td>12.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Root rot</td>
<td>2</td>
<td>11.8</td>
<td>620</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td>MN3</td>
<td>White mold</td>
<td>27</td>
<td>61.4</td>
<td>5,379</td>
<td>66.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Root rot</td>
<td>7</td>
<td>15.9</td>
<td>817</td>
<td>10.1</td>
<td></td>
</tr>
<tr>
<td>MN4</td>
<td>White mold</td>
<td>39</td>
<td>73.6</td>
<td>5,240</td>
<td>86.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Root rot</td>
<td>16</td>
<td>30.2</td>
<td>2,036</td>
<td>33.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bacterial blight</td>
<td>10</td>
<td>18.9</td>
<td>1,758</td>
<td>29.0</td>
<td></td>
</tr>
<tr>
<td>MN5</td>
<td>White mold</td>
<td>23</td>
<td>54.8</td>
<td>5,606</td>
<td>61.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Root rot</td>
<td>5</td>
<td>11.9</td>
<td>2,580</td>
<td>28.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rust</td>
<td>9</td>
<td>21.4</td>
<td>1,799</td>
<td>19.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bacterial blight</td>
<td>6</td>
<td>14.3</td>
<td>1,102</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td><strong>North Dakota</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND1</td>
<td>White mold</td>
<td>110</td>
<td>77.5</td>
<td>39,730</td>
<td>85.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rust</td>
<td>67</td>
<td>47.2</td>
<td>25,011</td>
<td>53.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bacterial blight</td>
<td>32</td>
<td>22.5</td>
<td>11,871</td>
<td>25.6</td>
<td></td>
</tr>
<tr>
<td>ND2</td>
<td>White mold</td>
<td>62</td>
<td>77.5</td>
<td>21,524</td>
<td>78.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rust</td>
<td>34</td>
<td>42.5</td>
<td>12,788</td>
<td>46.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bacterial blight</td>
<td>14</td>
<td>17.5</td>
<td>4,774</td>
<td>17.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Root rot</td>
<td>4</td>
<td>5.0</td>
<td>2,852</td>
<td>10.3</td>
<td></td>
</tr>
<tr>
<td>ND3</td>
<td>White mold</td>
<td>55</td>
<td>62.5</td>
<td>21,141</td>
<td>68.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rust</td>
<td>34</td>
<td>38.6</td>
<td>14,809</td>
<td>48.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bacterial blight</td>
<td>16</td>
<td>18.2</td>
<td>4,874</td>
<td>15.8</td>
<td></td>
</tr>
<tr>
<td>ND4</td>
<td>White mold</td>
<td>50</td>
<td>75.8</td>
<td>19,390</td>
<td>82.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rust</td>
<td>28</td>
<td>42.4</td>
<td>11,420</td>
<td>48.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bacterial blight</td>
<td>8</td>
<td>12.1</td>
<td>3,700</td>
<td>15.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Root rot</td>
<td>8</td>
<td>12.1</td>
<td>3,151</td>
<td>13.5</td>
<td></td>
</tr>
<tr>
<td>ND5</td>
<td>White mold</td>
<td>55</td>
<td>68.3</td>
<td>18,324</td>
<td>83.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rust</td>
<td>24</td>
<td>28.9</td>
<td>10,202</td>
<td>46.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bacterial blight</td>
<td>13</td>
<td>15.7</td>
<td>4,572</td>
<td>20.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Root rot</td>
<td>14</td>
<td>16.9</td>
<td>2,607</td>
<td>11.9</td>
<td></td>
</tr>
</tbody>
</table>

* Diseases reported on more than 10% of respondents' acres; those reporting no problem are not included.

† District respondents' acres.
Topsin M (11% of respondents’ acres) and Benlate (10% of respondents’ acres; see Table 19). The greatest use of fungicide in North Dakota was Tilt (13% of respondents acres; see Table 18).

In Minnesota 21% of respondents’ acres were sprayed with the benzimidazole fungicides Benlate and Topsin M for white mold control, compared to 18% of respondents’ acres in North Dakota. In Minnesota, 5% of respondents’ acres received a band application (directed spray) of a benzimidazole fungicide, compared to 10% of North Dakota respondents’ acres (Table 19). The acres that were band sprayed represented 26% of Minnesota respondents’ acres and 55% of North Dakota respondents’ acres that were sprayed for white mold. The figures for band sprays are lower than for 1994, especially for Minnesota. However, since the weather was extremely wet, many growers may not have been able to use a band application which required field entry.

Rust fungicides were used on 17% of respondents’ acres in Minnesota, 25% in North Dakota and 23% of all Northharvest respondents’ acres (Table 20). Tilt, available for use in both states under a specific exemption (Section 18), was used on 11% of respondents’ acres, followed by Bravo on 7% and maneb on 5%. In Minnesota, Bravo was used on 7% of respondents’ acres, Tilt on 6% and maneb on 4% of respondents’ acres. In North Dakota, Tilt was used on 13% of respondents’ acres, Bravo on 7% and maneb on 5% of respondents’ acres. The higher usage of rust fungicides (primarily Tilt) in North Dakota is not surprising since a much higher percentage of the North Dakota crop was planted to pinto beans, and all of the commonly grown varieties are susceptible to the races of rust present in 1995.

Use of rust fungicides was highest in ND1, MN1 and ND2 with 48%, 35% and 27% of respondents’ acres treated (Table 21).

Table 18. Fungicide use in 1995 by respondents in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Fungicide</th>
<th>Method of Application</th>
<th>— Respondents—</th>
<th>— Acres Treated—</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
<td>Minnesota</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benlate</td>
<td>Banded</td>
<td>4</td>
<td>6.3</td>
</tr>
<tr>
<td>Benlate</td>
<td>Broadcast</td>
<td>17</td>
<td>7.7</td>
</tr>
<tr>
<td>Bravo</td>
<td>—</td>
<td>12</td>
<td>5.4</td>
</tr>
<tr>
<td>Maneb</td>
<td>—</td>
<td>7</td>
<td>3.2</td>
</tr>
<tr>
<td>Tilt</td>
<td>—</td>
<td>10</td>
<td>4.5</td>
</tr>
<tr>
<td>Topsin M</td>
<td>Banded</td>
<td>5</td>
<td>2.3</td>
</tr>
<tr>
<td>Topsin M</td>
<td>Broadcast</td>
<td>27</td>
<td>12.2</td>
</tr>
<tr>
<td>MN Total</td>
<td></td>
<td>92</td>
<td>41.6</td>
</tr>
<tr>
<td>North Dakota</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benlate</td>
<td>Banded</td>
<td>30</td>
<td>6.5</td>
</tr>
<tr>
<td>Benlate</td>
<td>Broadcast</td>
<td>33</td>
<td>7.2</td>
</tr>
<tr>
<td>Bravo</td>
<td>—</td>
<td>45</td>
<td>9.8</td>
</tr>
<tr>
<td>Maneb</td>
<td>—</td>
<td>37</td>
<td>8.1</td>
</tr>
<tr>
<td>Tilt</td>
<td>—</td>
<td>68</td>
<td>14.8</td>
</tr>
<tr>
<td>Topsin M</td>
<td>Banded</td>
<td>23</td>
<td>5.0</td>
</tr>
<tr>
<td>Topsin M</td>
<td>Broadcast</td>
<td>26</td>
<td>5.7</td>
</tr>
<tr>
<td>ND Total</td>
<td></td>
<td>262</td>
<td>57.1</td>
</tr>
</tbody>
</table>

Table 19. Use of fungicides for white mold control in 1995 by respondents in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Fungicide</th>
<th>Band Applied</th>
<th>Broadcast</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acres</td>
<td>%</td>
<td>Acres</td>
</tr>
<tr>
<td>Minnesota</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benlate</td>
<td>1,812</td>
<td>3.2</td>
<td>3,574</td>
</tr>
<tr>
<td>Topsin M</td>
<td>1,207</td>
<td>2.2</td>
<td>5,021</td>
</tr>
<tr>
<td>Total</td>
<td>3,019</td>
<td>5.4</td>
<td>8,595</td>
</tr>
<tr>
<td>North Dakota</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benlate</td>
<td>7,962</td>
<td>5.3</td>
<td>6,265</td>
</tr>
<tr>
<td>Topsin M</td>
<td>6,477</td>
<td>4.3</td>
<td>5,678</td>
</tr>
<tr>
<td>Total</td>
<td>14,439</td>
<td>9.6</td>
<td>11,943</td>
</tr>
</tbody>
</table>

Table 20. Use of fungicides for rust control in 1995 in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Fungicide</th>
<th>Bravo</th>
<th>Maneb</th>
<th>Tilt</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acres</td>
<td>%</td>
<td>Acres</td>
<td>%</td>
</tr>
<tr>
<td>Minnesota</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minn.</td>
<td>3,692</td>
<td>6.6</td>
<td>2,429</td>
<td>4.4</td>
</tr>
<tr>
<td>N.D.</td>
<td>10,486</td>
<td>7.0</td>
<td>7,991</td>
<td>5.3</td>
</tr>
<tr>
<td>North.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>14,178</td>
<td>6.9</td>
<td>10,420</td>
<td>5.1</td>
</tr>
</tbody>
</table>

*Respondents were not asked method of application for Bravo, Maneb or Tilt.

*Respondents’ acres only.
Use of white mold fungicides was very high in MN2, where 60% of respondents’ acres were treated; 1% of their acres were banded with Benlate, 27% were broadcast with Benlate, 17% were banded with T wspin M and 15% were broadcast with T wspin M (Table 21). Use was also high in MN4 and MN5 where 28% and 31% of respondents’ acres were treated, respectively: in MN4 11% of respondents’ acres were banded with Benlate, 7% were broadcast with Benlate, 4% were banded with T wspin M and 6% were broadcast with T wspin M. In MN5 5% were banded with Benlate, 10% were broadcast with Benlate, 1% were banded with T wspin M and 15% were broadcast with T wspin.

Use of white mold fungicides was highest in ND1, where 31% of respondents’ acres were treated; 14% of the acres were banded with Benlate, 7% were broadcast with Benlate, 4% were banded with T wspin M and 6% were broadcast with T wspin M (Table 21). No more than 15% of respondents’ acres were treated for white mold in any other North Dakota district.

### Weed Problems

Wild mustard was the worst weed problem for 33% of Northharvest survey respondents representing 33% of the acres reported (Table 22). This is about half again as high a percentage as was reported in 1994, but is similar to the figures reported in 1992 when it was the worst weed problem for 37% of respondents representing 40% of the acres.

#### Table 21. Use of fungicides in 1995 in each Northharvest district in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Northharvest District</th>
<th>Benlate Banded</th>
<th>Benlate Broadcast</th>
<th>Bravo</th>
<th>Maneb</th>
<th>Tilt</th>
<th>Topsin M Banded</th>
<th>Topsin M Broadcast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minnesota</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MN1</td>
<td>2.4</td>
<td>2.9</td>
<td>13.5</td>
<td>8.8</td>
<td>12.6</td>
<td>0</td>
<td>8.0</td>
</tr>
<tr>
<td>MN2</td>
<td>1.1</td>
<td>26.8</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>16.5</td>
<td>15.1</td>
</tr>
<tr>
<td>MN3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>MN4</td>
<td>11.0</td>
<td>7.2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4.2</td>
<td>5.9</td>
</tr>
<tr>
<td>MN5</td>
<td>4.8</td>
<td>10.4</td>
<td>0</td>
<td>0.4</td>
<td>0.9</td>
<td>1.1</td>
<td>15.1</td>
</tr>
<tr>
<td>North Dakota</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND1</td>
<td>13.6</td>
<td>7.3</td>
<td>17.5</td>
<td>10.0</td>
<td>20.5</td>
<td>4.2</td>
<td>5.6</td>
</tr>
<tr>
<td>ND2</td>
<td>2.3</td>
<td>2.1</td>
<td>4.3</td>
<td>9.1</td>
<td>13.1</td>
<td>5.8</td>
<td>5.2</td>
</tr>
<tr>
<td>ND3</td>
<td>0.4</td>
<td>4.0</td>
<td>1.2</td>
<td>0.1</td>
<td>11.0</td>
<td>0.2</td>
<td>0</td>
</tr>
<tr>
<td>ND4</td>
<td>2.1</td>
<td>2.0</td>
<td>3.1</td>
<td>2.6</td>
<td>8.4</td>
<td>4.5</td>
<td>5.5</td>
</tr>
<tr>
<td>ND5</td>
<td>1.8</td>
<td>2.8</td>
<td>0.3</td>
<td>0.9</td>
<td>3.9</td>
<td>8.2</td>
<td>1.6</td>
</tr>
</tbody>
</table>

#### Table 22. Worst weed problema in 1995 for all Northharvest respondents in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Worst Weed Problem</th>
<th>Respondents Number</th>
<th>%</th>
<th>Acres Reported Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wild mustard</td>
<td>149</td>
<td>32.5</td>
<td>66,912</td>
<td>32.5</td>
</tr>
<tr>
<td>E. black nightshade</td>
<td>47</td>
<td>10.2</td>
<td>24,694</td>
<td>12.0</td>
</tr>
<tr>
<td>Foxtail</td>
<td>54</td>
<td>11.8</td>
<td>22,313</td>
<td>10.8</td>
</tr>
<tr>
<td>Redroot pigweed</td>
<td>49</td>
<td>10.7</td>
<td>22,273</td>
<td>10.8</td>
</tr>
<tr>
<td>Canada thistle</td>
<td>51</td>
<td>11.1</td>
<td>17,615</td>
<td>8.6</td>
</tr>
<tr>
<td>Cocklebur</td>
<td>26</td>
<td>5.7</td>
<td>10,934</td>
<td>5.3</td>
</tr>
<tr>
<td>Ragweed</td>
<td>11</td>
<td>2.4</td>
<td>9,652</td>
<td>4.7</td>
</tr>
<tr>
<td>Kochia</td>
<td>17</td>
<td>3.7</td>
<td>5,818</td>
<td>2.8</td>
</tr>
<tr>
<td>Lambsquarters</td>
<td>7</td>
<td>1.5</td>
<td>4,643</td>
<td>2.3</td>
</tr>
<tr>
<td>Volunteer grain</td>
<td>7</td>
<td>1.5</td>
<td>4,002</td>
<td>1.9</td>
</tr>
<tr>
<td>Wild oat</td>
<td>10</td>
<td>2.2</td>
<td>2,986</td>
<td>1.4</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
<td>1.3</td>
<td>3,294</td>
<td>1.6</td>
</tr>
<tr>
<td>None</td>
<td>9</td>
<td>2.0</td>
<td>3,927</td>
<td>1.9</td>
</tr>
</tbody>
</table>

a Ranked as No. 1 weed problem on more than 0.5% of respondents’ acres.
b Respondents’ acres only.
reported (3). Cool, moist conditions after planting caused multiple wild mustard flushes, contributing to it being the worst weed problem.

Eastern black nightshade was the worst weed for 10% of respondents representing 12% of the acres reported. The number of respondents reporting eastern black nightshade as the worst weed problem has steadily increased from 6% in 1987 to 13% in 1994. Several reasons can explain the increase in eastern black nightshade infestation. Some reasons are prolonged germination, four successive years of wet spring and early summer conditions, lack of effective, residual herbicides without risk of carryover, shade tolerance, and dissemination through contaminated crop seed.

Foxtail was the worst weed for 12% of respondents representing 11% of the acres reported, redroot pigweed was the worst weed for 11% of respondents representing 11% of the acres reported, Canada thistle was the worst weed for 11% of respondents representing 9% of the acres reported, and common cocklebur was the worst weed for 6% of respondents representing 5% of the acres reported. Other commonly reported weed problems included ragweed, kochia, common lambsquarters, volunteer grain and wild oats.

In Minnesota, redroot pigweed was the worst weed problem for 15% of survey respondents representing 21% of the Minnesota acres reported (Table 23). This is about twice as high a percentage of acres as in 1994. Wild mustard was the worst weed for 12% of respondents representing 17% of the acres reported, eastern black nightshade was the worst weed for 13% of respondents representing 14% of the acres reported, ragweed was the worst weed for 12% of respondents representing 12% of the acres reported, foxtail was the worst weed for 10% of respondents representing 11% of the acres reported, lambsquarters was the worst weed for 9% of respondents representing 6% of the acres reported, cocklebur was the worst weed for 8% of respondents representing 4% of the acres reported, and Canada thistle was the worst weed for 6% of respondents representing 4% of the acres reported. Kochia was also a commonly reported weed problem.

In North Dakota, wild mustard was the worst weed for 33% of respondents representing 38% of the North Dakota acres reported (Table 23). This is half again as high a percentage of acres as in 1994 but less than the 46% of North Dakota respondents’ acres reported in 1992 (3). Eastern black nightshade was the worst weed for 10% of respondents representing 11% of the acres reported, foxtail was the worst weed for 12% of respondents representing 11% of the acres reported, Canada thistle was the worst weed for 11% of respondents representing 10% of the acres reported, redroot pigweed was the worst weed for 11% of respondents representing 7% of the acres reported, cocklebur was the worst weed for 6% of respondents representing 6% of the acres reported and kochia was the worst weed for 4% of respondents representing 4% of the acres reported. Other commonly reported weed problems included volunteer grain, wild oats, ragweed and lambsquarters.

Wild mustard was reported as the worst weed problem, based on percent of respondents’ acres affected, in MN2, ND1, ND2, ND3 and ND4 with 32%, 36%, 57%, 39% and 50% of acres affected (Table 24). Eastern black nightshade was reported as the worst weed in MN3 and ND5, with 46% and 43% of acres affected. Redroot pigweed was reported as the worst weed in MN1, with 32% of acres affected; cocklebur was reported as the worst weed in MN4, with 20% of acres affected; and foxtail was reported as the worst weed in MN5, with 23% of acres affected. Most of these results are similar to those for 1994.

<table>
<thead>
<tr>
<th>Worst Weed Problem</th>
<th>Respondents Number</th>
<th>Acres Reported Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minnesota</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Redroot pigweed</td>
<td>32</td>
<td>11,459</td>
</tr>
<tr>
<td>Wild mustard</td>
<td>27</td>
<td>9,677</td>
</tr>
<tr>
<td>E. black nightshade</td>
<td>29</td>
<td>7,949</td>
</tr>
<tr>
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<td>27</td>
<td>6,710</td>
</tr>
<tr>
<td>Foxtail</td>
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<td>6,266</td>
</tr>
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<td>Lambsquarters</td>
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</tr>
<tr>
<td>Kochia</td>
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<td>533</td>
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<tr>
<td>Other</td>
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<td>1,643</td>
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<tr>
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<td>5</td>
<td>382</td>
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</tr>
<tr>
<td>Wild mustard</td>
<td>149</td>
<td>57,235</td>
</tr>
<tr>
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<td>47</td>
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</tr>
<tr>
<td>Foxtail</td>
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<td>16,047</td>
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<td>15,537</td>
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<td>10,814</td>
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</tr>
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<td>1,332</td>
</tr>
<tr>
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</tr>
<tr>
<td>None</td>
<td>9</td>
<td>3,545</td>
</tr>
</tbody>
</table>

* Ranked as No. 1 weed problem on more than 0.5% of respondents’ acres for that state.

* Respondents’ acres only.
Wild mustard was ranked most frequently as one of the three worst weeds in Minnesota, with 39% of respondents' acres reported, followed by redroot pigweed on 36%, lambsquarters on 33%, foxtail on 26%, eastern black nightshade on 25% and Canada thistle on 20% (Table 25). In North Dakota, wild mustard was reported as one of the three worst weeds on 66% of respondents' acres, followed by Canada thistle on 33%, foxtail on 30%, cocklebur on 21%, and eastern black nightshade on 21%. Weeds ranked as one of the three worst weeds by all respondents in both states were mild mustard on 59% of respondents' acres, followed by Canada thistle on 30%, foxtail on 29%, redroot pigweed on 23%, eastern black nightshade on 22% and cocklebur on 20%.

Wild mustard was ranked most frequently as one of the three worst weeds in MN1, ND1, ND2, ND3 and ND4. Eastern black nightshade was ranked most frequently as one of the three worst weeds in MN3 and ND5; lambsquarters was most frequently ranked as one of the three worst in MN2 and MN4; and foxtail was most frequently ranked as one of the three worst in MN4 (Table 26).

### Table 24. Worst weed problem\(^a\) in 1995 for respondents in each Northharvest district of Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Northharvest District</th>
<th>Worst Weed Problem</th>
<th>Respondents -</th>
<th>Acres Reported -</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
</tr>
<tr>
<td>Minnesota</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MN1</td>
<td>Redroot pigweed</td>
<td>17</td>
<td>26.2</td>
</tr>
<tr>
<td></td>
<td>Wild mustard</td>
<td>20</td>
<td>30.8</td>
</tr>
<tr>
<td></td>
<td>Foxtail</td>
<td>7</td>
<td>10.8</td>
</tr>
<tr>
<td>MN2</td>
<td>Wild mustard</td>
<td>3</td>
<td>17.6</td>
</tr>
<tr>
<td></td>
<td>E. black nightshade</td>
<td>4</td>
<td>23.5</td>
</tr>
<tr>
<td></td>
<td>Ragweed</td>
<td>4</td>
<td>23.5</td>
</tr>
<tr>
<td>MN3</td>
<td>E. black nightshade</td>
<td>8</td>
<td>18.2</td>
</tr>
<tr>
<td></td>
<td>Ragweed</td>
<td>9</td>
<td>20.5</td>
</tr>
<tr>
<td>MN4</td>
<td>Cocklebur</td>
<td>9</td>
<td>17.0</td>
</tr>
<tr>
<td></td>
<td>Lambsquarters</td>
<td>9</td>
<td>17.0</td>
</tr>
<tr>
<td></td>
<td>Foxtail</td>
<td>7</td>
<td>13.2</td>
</tr>
<tr>
<td></td>
<td>Redroot pigweed</td>
<td>6</td>
<td>11.3</td>
</tr>
<tr>
<td></td>
<td>E. black nightshade</td>
<td>8</td>
<td>15.1</td>
</tr>
<tr>
<td>MN5</td>
<td>Foxtail</td>
<td>3</td>
<td>7.1</td>
</tr>
<tr>
<td></td>
<td>Redroot pigweed</td>
<td>6</td>
<td>14.3</td>
</tr>
<tr>
<td></td>
<td>Ragweed</td>
<td>6</td>
<td>14.3</td>
</tr>
<tr>
<td></td>
<td>E. black nightshade</td>
<td>6</td>
<td>14.3</td>
</tr>
<tr>
<td>North Dakota</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>ND1</td>
<td>Wild mustard</td>
<td>54</td>
<td>38.0</td>
</tr>
<tr>
<td></td>
<td>Canada thistle</td>
<td>27</td>
<td>19.0</td>
</tr>
<tr>
<td></td>
<td>Redroot pigweed</td>
<td>18</td>
<td>12.7</td>
</tr>
<tr>
<td>ND2</td>
<td>Wild mustard</td>
<td>37</td>
<td>46.3</td>
</tr>
<tr>
<td></td>
<td>Canada thistle</td>
<td>10</td>
<td>12.5</td>
</tr>
<tr>
<td>ND3</td>
<td>Wild mustard</td>
<td>29</td>
<td>33.0</td>
</tr>
<tr>
<td></td>
<td>Cocklebur</td>
<td>12</td>
<td>13.6</td>
</tr>
<tr>
<td>ND4</td>
<td>Wild mustard</td>
<td>25</td>
<td>37.9</td>
</tr>
<tr>
<td></td>
<td>Foxtail</td>
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<td>16.7</td>
</tr>
<tr>
<td></td>
<td>E. black nightshade</td>
<td>9</td>
<td>13.6</td>
</tr>
<tr>
<td>ND5</td>
<td>E. black nightshade</td>
<td>24</td>
<td>28.9</td>
</tr>
<tr>
<td></td>
<td>Foxtail</td>
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<td>13.3</td>
</tr>
<tr>
<td></td>
<td>Cocklebur</td>
<td>10</td>
<td>12.0</td>
</tr>
</tbody>
</table>

\(^a\) Ranked as the No. 1 weed problem on more than 10% of respondents' acres for that district.

### Table 25. Weeds ranked as one of the three worst\(^b\) in 1995 by respondents in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>No. 1, 2 or 3 Weed Problem</th>
<th>Respondents -</th>
<th>Acres Reported -</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
<td>Minnesota</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wild mustard</td>
<td>60</td>
<td>27.1</td>
</tr>
<tr>
<td>Redroot pigweed</td>
<td>70</td>
<td>31.7</td>
</tr>
<tr>
<td>Lambsquarters</td>
<td>71</td>
<td>32.1</td>
</tr>
<tr>
<td>Foxtail</td>
<td>57</td>
<td>25.8</td>
</tr>
<tr>
<td>E. black nightshade</td>
<td>58</td>
<td>26.2</td>
</tr>
<tr>
<td>Canada thistle</td>
<td>38</td>
<td>17.2</td>
</tr>
<tr>
<td>Ragweed</td>
<td>56</td>
<td>25.3</td>
</tr>
<tr>
<td>Cocklebur</td>
<td>41</td>
<td>18.6</td>
</tr>
<tr>
<td>North Dakota</td>
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<td></td>
</tr>
<tr>
<td>Wild mustard</td>
<td>279</td>
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</tr>
<tr>
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<td>36.2</td>
</tr>
<tr>
<td>Foxtail</td>
<td>136</td>
<td>29.6</td>
</tr>
<tr>
<td>Cocklebur</td>
<td>79</td>
<td>17.2</td>
</tr>
<tr>
<td>E. black nightshade</td>
<td>93</td>
<td>20.3</td>
</tr>
<tr>
<td>Kochia</td>
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</tr>
<tr>
<td>Redroot pigweed</td>
<td>98</td>
<td>21.4</td>
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<tr>
<td>Northharvest Total</td>
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</tr>
<tr>
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<tr>
<td>Canada thistle</td>
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<tr>
<td>Foxtail</td>
<td>193</td>
<td>28.4</td>
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<tr>
<td>Redroot pigweed</td>
<td>168</td>
<td>24.7</td>
</tr>
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<td>151</td>
<td>22.2</td>
</tr>
<tr>
<td>Cocklebur</td>
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<td>17.6</td>
</tr>
<tr>
<td>Lambsquarters</td>
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<td>15.7</td>
</tr>
<tr>
<td>Ragweed</td>
<td>91</td>
<td>13.4</td>
</tr>
</tbody>
</table>

\(^b\) Respondents' acres only.
Table 26. Weeds ranked as one of the three worst* in 1995 in each Northharvest district in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Northharvest District</th>
<th>No.1, 2, or 3 Weed Problem</th>
<th>Respondents - Number</th>
<th>%</th>
<th>Acres Reported - Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minnesota</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MN1 Wild mustard</td>
<td>41</td>
<td>63.1</td>
<td>16,679</td>
<td>61.2</td>
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</tr>
<tr>
<td>Redroot pigweed</td>
<td>31</td>
<td>47.7</td>
<td>13,267</td>
<td>48.7</td>
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</tr>
<tr>
<td>Foxtail</td>
<td>18</td>
<td>27.7</td>
<td>7,635</td>
<td>28.0</td>
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</tr>
<tr>
<td>Lambsquarters</td>
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<td>20.0</td>
<td>7,137</td>
<td>26.2</td>
<td></td>
</tr>
<tr>
<td>Canada thistle</td>
<td>5</td>
<td>23.1</td>
<td>5,808</td>
<td>21.3</td>
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</tr>
<tr>
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<td>2,760</td>
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</tr>
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</tr>
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<td>1,846</td>
<td>35.7</td>
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</tr>
<tr>
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<td>17.6</td>
<td>1,638</td>
<td>31.7</td>
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</tr>
<tr>
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<td>2,058</td>
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<tr>
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<td>3,181</td>
<td>52.6</td>
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<td>2,596</td>
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<td>2,024</td>
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</tr>
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</tr>
<tr>
<td>North Dakota</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND1 Wild mustard</td>
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<tr>
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</tr>
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<td>12,137</td>
<td>25.1</td>
<td></td>
</tr>
<tr>
<td>Foxtail</td>
<td>29</td>
<td>20.4</td>
<td>10,894</td>
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</tr>
<tr>
<td>Kochia</td>
<td>32</td>
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<td>10,565</td>
<td>22.8</td>
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<tr>
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<td>72.5</td>
<td>22,147</td>
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<td>37.5</td>
<td>9,949</td>
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<td>6,493</td>
<td>23.5</td>
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<td>67.2</td>
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<td>31.8</td>
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<td>31.8</td>
<td>9,329</td>
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</tr>
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<td>66.7</td>
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<td>51.5</td>
<td>11,553</td>
<td>49.3</td>
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</tr>
<tr>
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<td>6,780</td>
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</tr>
<tr>
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<td>16.7</td>
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</tr>
<tr>
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<td>64.9</td>
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<td>48.6</td>
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</tr>
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<td>33.7</td>
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<tr>
<td>Foxtail</td>
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<td>27.7</td>
<td>6,133</td>
<td>28.1</td>
<td></td>
</tr>
</tbody>
</table>

*Ranked as No. 1, 2, or 3 on more than 20% of respondents' acres for that district.

**District respondents' acres only.

Weed Control Practices

The most common chemical weed control practice was spring pre-plant incorporation of Sonalan, used on 67% of respondents' acres (Table 27). This is similar to 1994. Other common chemical weed control practices included post-application of benazon (Basagran, others) on 56% of respondents’ acres, post-application of Poast on 19%, spring pre-plant incorporation of trifluralin on 18%, and post-application of Pursuit on 12%. The use of benazon doubled from 1994 to 1995.

The most common cultural weed control practice was row cultivation, used by 85% of Northharvest respondents on 88% of their acres (Table 27). Cultivation was used on 81% of Minnesota respondents’ acres and 90% of North Dakota respondents’ acres. Respondents indicated they used an average of 1.9 cultivations (Table 28). Over 27% of respondents used only one cultivation, nearly 60% used two cultivations, and over 14% used three or more cultivations (Table 29). The number of cultivations was similar for Minnesota and North Dakota. There were differences, however, among districts, with the percentage of single cultivations highest in MN3, MN5, ND3 and ND5. The percentage of three or more cultivations was highest in MN2 and ND1.

Table 27. Weed control practices* in 1995 by all Northharvest respondents in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Weed Control Practice</th>
<th>Respondents - Number</th>
<th>%</th>
<th>Acres Treated - Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultivation</td>
<td>581</td>
<td>85.4</td>
<td>180,302</td>
<td>87.6</td>
</tr>
<tr>
<td>Sonalan, spring</td>
<td>449</td>
<td>66.0</td>
<td>137,394</td>
<td>66.8</td>
</tr>
<tr>
<td>Bensazon</td>
<td>(Basagran, others)</td>
<td>438</td>
<td>64.4</td>
<td>115,294</td>
</tr>
<tr>
<td>Rotary hoe</td>
<td>154</td>
<td>22.6</td>
<td>49,668</td>
<td>24.1</td>
</tr>
<tr>
<td>Poast</td>
<td>249</td>
<td>36.6</td>
<td>39,781</td>
<td>19.3</td>
</tr>
<tr>
<td>Trifluralin, spring</td>
<td>155</td>
<td>22.8</td>
<td>37,006</td>
<td>18.0</td>
</tr>
<tr>
<td>Eptam, spring applied</td>
<td>123</td>
<td>18.1</td>
<td>24,749</td>
<td>12.0</td>
</tr>
<tr>
<td>Gramoxone Extra</td>
<td>54</td>
<td>7.9</td>
<td>16,288</td>
<td>7.9</td>
</tr>
<tr>
<td>Alachlor (Lasso, others)</td>
<td>94</td>
<td>13.8</td>
<td>15,278</td>
<td>7.4</td>
</tr>
<tr>
<td>Roundup, Preplant</td>
<td>13</td>
<td>7.1</td>
<td>11,029</td>
<td>5.4</td>
</tr>
<tr>
<td>Sonalan, fall applied</td>
<td>27</td>
<td>4.0</td>
<td>5,978</td>
<td>2.9</td>
</tr>
<tr>
<td>Trifluralin, fall applied</td>
<td>19</td>
<td>2.8</td>
<td>4,538</td>
<td>2.2</td>
</tr>
<tr>
<td>Dual</td>
<td>24</td>
<td>3.5</td>
<td>4,302</td>
<td>2.1</td>
</tr>
<tr>
<td>Prowl</td>
<td>19</td>
<td>2.8</td>
<td>2,807</td>
<td>1.4</td>
</tr>
<tr>
<td>Trifluralin + Eptam</td>
<td>13</td>
<td>1.9</td>
<td>2,631</td>
<td>1.3</td>
</tr>
</tbody>
</table>

*Includes all practices or herbicides used on more than 1,000 acres.

**Respondents’ acres only.
The rotary hoe was used by 23% of respondents on 24% of their acres, which is similar to 1994 and 1992 (3, 6). Respondents indicated they used an average of 1.4 rotary hoe cultivations (Table 30).

Desiccants were used more frequently in 1995 than in 1994. Gramoxone was used by 13.8% of Northharvest respondents on 7.4% of respondents' acres in 1995. Sodium chlorate was used by 8.5% of respondents on 4.2% of their acres (Table 27). The percent of acres treated by each desiccant is approximately twice those treated in 1994. Gramoxone was used to treat 13.2% of Minnesota respondents' acres compared to 5.3% of North Dakota respondents' acres (Table 31). Sodium chlorate was used to treat 6.1% of Minnesota respondents' acres compared to 3.5% of North Dakota respondents' acres (data not shown).

### Table 28. Dry bean acres cultivated in 1995 by Northharvest respondents in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Respondents Cultivating</th>
<th>Acres Cultivated</th>
<th>Total Cultivation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
<td>Minn.</td>
<td>176</td>
<td>79.6</td>
</tr>
<tr>
<td>N.D.</td>
<td>405</td>
<td>88.2</td>
</tr>
<tr>
<td>North.</td>
<td>581</td>
<td>85.4</td>
</tr>
</tbody>
</table>

*a Number of acres cultivated.

*b Acres cultivated multiplied by number of cultivations.

*c Average number of cultivations (total cultivation/number of cultivations).

### Table 29. Number of cultivations of dry beans in 1995 in each Northharvest district in Minnesota and North Dakota.

| Northharvest District | Number of Cultivations | % of Respondents  
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Minnesota</td>
<td>10.5</td>
<td>68.4</td>
</tr>
<tr>
<td>MN1</td>
<td>26.7</td>
<td>46.7</td>
</tr>
<tr>
<td>MN2</td>
<td>34.7</td>
<td>35.7</td>
</tr>
<tr>
<td>MN4</td>
<td>20.0</td>
<td>66.7</td>
</tr>
<tr>
<td>MN5</td>
<td>35.5</td>
<td>45.2</td>
</tr>
<tr>
<td>MN Total</td>
<td>26.1</td>
<td>56.8</td>
</tr>
<tr>
<td>North Dakota</td>
<td>10.8</td>
<td>66.2</td>
</tr>
<tr>
<td>ND1</td>
<td>19.7</td>
<td>64.8</td>
</tr>
<tr>
<td>ND2</td>
<td>42.5</td>
<td>53.8</td>
</tr>
<tr>
<td>ND4</td>
<td>21.3</td>
<td>62.3</td>
</tr>
<tr>
<td>ND5</td>
<td>58.7</td>
<td>38.1</td>
</tr>
<tr>
<td>ND Total</td>
<td>27.7</td>
<td>58.5</td>
</tr>
<tr>
<td>Northharvest Total</td>
<td>27.2</td>
<td>58.0</td>
</tr>
</tbody>
</table>

*a% of respondents answering question.

### Table 30. Use of rotary hoe on dry beans in 1995 in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th></th>
<th>Respondents Using</th>
<th>Acres Cultivated</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
</tr>
<tr>
<td>Minn.</td>
<td>53</td>
<td>24.0</td>
<td>20,542</td>
</tr>
<tr>
<td>N.D.</td>
<td>101</td>
<td>22.0</td>
<td>29,126</td>
</tr>
<tr>
<td>North.</td>
<td>154</td>
<td>22.6</td>
<td>49,668</td>
</tr>
</tbody>
</table>

*a Number of acres cultivated with rotary hoe.

*b Acres cultivated multiplied by number of cultivations.

*c Average number of cultivations (b/a).

### Table 31. Common weed control practices in 1995 by respondents in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Weed Control Practice</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minnesota</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultivation</td>
<td>44,986</td>
<td>80.7</td>
</tr>
<tr>
<td>Sonalan, spring applied</td>
<td>33,422</td>
<td>59.9</td>
</tr>
<tr>
<td>Bentazon (Basagran, others)</td>
<td>25,079</td>
<td>45.0</td>
</tr>
<tr>
<td>Rotary hoe</td>
<td>20,542</td>
<td>36.8</td>
</tr>
<tr>
<td>Poast</td>
<td>14,924</td>
<td>26.8</td>
</tr>
<tr>
<td>Trifluralin, spring applied</td>
<td>13,051</td>
<td>23.4</td>
</tr>
<tr>
<td>Alachlor (Lasso, others)</td>
<td>10,559</td>
<td>18.9</td>
</tr>
<tr>
<td>Pursuit</td>
<td>9,251</td>
<td>16.6</td>
</tr>
<tr>
<td>Eptam, spring applied</td>
<td>8,925</td>
<td>16.0</td>
</tr>
<tr>
<td>Gramoxone Extra</td>
<td>7,388</td>
<td>13.2</td>
</tr>
<tr>
<td>North Dakota</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultivation</td>
<td>135,316</td>
<td>90.2</td>
</tr>
<tr>
<td>Sonalan, spring applied</td>
<td>103,972</td>
<td>69.3</td>
</tr>
<tr>
<td>Bentazon (Basagran, others)</td>
<td>90,215</td>
<td>60.1</td>
</tr>
<tr>
<td>Rotary hoe</td>
<td>29,126</td>
<td>19.4</td>
</tr>
<tr>
<td>Poast</td>
<td>24,857</td>
<td>16.6</td>
</tr>
<tr>
<td>Trifluralin, spring applied</td>
<td>23,955</td>
<td>16.0</td>
</tr>
<tr>
<td>Pursuit</td>
<td>15,498</td>
<td>10.3</td>
</tr>
<tr>
<td>Northharvest Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultivation</td>
<td>180,302</td>
<td>87.6</td>
</tr>
<tr>
<td>Sonalan, spring applied</td>
<td>137,394</td>
<td>66.8</td>
</tr>
<tr>
<td>Bentazon (Basagran, others)</td>
<td>115,294</td>
<td>56.0</td>
</tr>
<tr>
<td>Rotary hoe</td>
<td>49,668</td>
<td>24.1</td>
</tr>
<tr>
<td>Poast</td>
<td>39,781</td>
<td>19.3</td>
</tr>
<tr>
<td>Trifluralin, spring applied</td>
<td>37,006</td>
<td>18.0</td>
</tr>
<tr>
<td>Pursuit</td>
<td>24,749</td>
<td>12.0</td>
</tr>
</tbody>
</table>

*a Practice used on more than 10% of respondents' acres.

*b Respondents' acres only.
Weed control practices in each state were similar. Pre-plant spring incorporated Sonalan was used on 60% of Minnesota respondents' acres and 69% of North Dakota respondents' acres (Table 31). Bentazon was used on 45% of Minnesota respondents' acres and 60% of North Dakota respondents' acres. Poast was used on 27% of Minnesota and 17% of North Dakota respondents' acres, spring pre-plant incorporated trifluralin was used on 23% of Minnesota and 16% of North Dakota respondents' acres, alachlor (Lasso, others) was used on 19% of Minnesota and no North Dakota respondents' acres, and Pursuit was used on 17% of Minnesota and 10% of North Dakota respondents' acres.

Spring pre-plant incorporated Sonalan was the most commonly used herbicide in MN1, MN2, ND1, ND3, and ND5 (Table 32). Post-applied bentazon (Basagran, others) was the most commonly used herbicide in MN4, MN5, ND2, and ND4. Post-applied Pursuit was the most commonly used herbicide in MN3.

Respondents rated most weed control practices as providing good weed control. Dual, Poast, Prowl, Pursuit, pre-plant Roundup, spring-applied Sonalan, spring-applied trifluralin, trifluralin + Eptam, and desiccants were among the herbicides rated as most effective (Table 33).

### Insect Problems

Potato leafhoppers were the worst insect problem for 0.3% of Northharvest survey respondents representing 2.4% of the dry bean acres reported (Table 34). The potato leafhopper was more frequently reported to be the worst insect problem by Minnesota respondents (12% of respondents representing 7% of Minnesota respondents' acres reported). Spider mites were reported as the worst insect problem by 0.5% of Minnesota respondents on 5% of their acres.

### Table 32. Herbicides commonly used in 1995 in each Northharvest district in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Northharvest District</th>
<th>Herbicide Description</th>
<th>Acres Reported</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>MN1</td>
<td>Sonalan, spring applied</td>
<td>18,583</td>
<td>66.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bentazon (Basagran, others)</td>
<td>11,166</td>
<td>41.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poast</td>
<td>7,051</td>
<td>25.9</td>
<td></td>
</tr>
<tr>
<td>MN2</td>
<td>Sonalan, spring applied</td>
<td>3,668</td>
<td>71.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alachlor (Lasso, others)</td>
<td>2,743</td>
<td>53.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bentazon (Basagran, others)</td>
<td>1,695</td>
<td>32.8</td>
<td></td>
</tr>
<tr>
<td>MN3</td>
<td>Pursuit</td>
<td>5,735</td>
<td>70.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sonalan, spring applied</td>
<td>4,778</td>
<td>59.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bentazon (Basagran, others)</td>
<td>3,329</td>
<td>41.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Eptam, spring applied</td>
<td>2,806</td>
<td>34.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trifluralin, spring applied</td>
<td>2,181</td>
<td>27.0</td>
<td></td>
</tr>
<tr>
<td>MN4</td>
<td>Bentazon (Basagran, others)</td>
<td>3,171</td>
<td>52.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poast</td>
<td>2,959</td>
<td>48.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alachlor (Lasso, others)</td>
<td>2,320</td>
<td>38.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trifluralin, spring applied</td>
<td>2,033</td>
<td>33.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sonalan, spring applied</td>
<td>1,258</td>
<td>20.8</td>
<td></td>
</tr>
<tr>
<td>MN5</td>
<td>Bentazon (Basagran, others)</td>
<td>5,718</td>
<td>62.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sonalan, spring applied</td>
<td>5,117</td>
<td>55.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trifluralin, spring applied</td>
<td>3,484</td>
<td>37.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alachlor (Lasso, others)</td>
<td>3,278</td>
<td>35.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poast</td>
<td>3,273</td>
<td>35.6</td>
<td></td>
</tr>
<tr>
<td>North Dakota</td>
<td>Sonalan, spring applied</td>
<td>32,156</td>
<td>69.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bentazon (Basagran, others)</td>
<td>30,667</td>
<td>66.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poast</td>
<td>14,199</td>
<td>30.6</td>
<td></td>
</tr>
<tr>
<td>ND2</td>
<td>Bentazon (Basagran, others)</td>
<td>19,440</td>
<td>70.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sonalan, spring applied</td>
<td>18,631</td>
<td>67.5</td>
<td></td>
</tr>
<tr>
<td>ND3</td>
<td>Sonalan, spring applied</td>
<td>26,780</td>
<td>87.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bentazon (Basagran, others)</td>
<td>14,923</td>
<td>48.5</td>
<td></td>
</tr>
<tr>
<td>ND4</td>
<td>Bentazon (Basagran, others)</td>
<td>13,311</td>
<td>56.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sonalan, spring applied</td>
<td>11,269</td>
<td>48.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trifluralin, spring applied</td>
<td>7,150</td>
<td>30.5</td>
<td></td>
</tr>
<tr>
<td>ND5</td>
<td>Sonalan, spring applied</td>
<td>15,136</td>
<td>69.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bentazon (Basagran, others)</td>
<td>11,874</td>
<td>54.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pursuit</td>
<td>4,800</td>
<td>22.0</td>
<td></td>
</tr>
</tbody>
</table>

*Herbicide use reported on more than 20% of respondents' acres.

**District respondents' acres only.

### Table 33. Effectiveness of herbicides in 1995 reported by all Northharvest respondents in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Herbicide Description</th>
<th>Number of Respondents</th>
<th>Efficacy of Weed Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Good</td>
</tr>
<tr>
<td>Alachlor (Lasso, others)</td>
<td>48</td>
<td>37.5</td>
</tr>
<tr>
<td>Bentazon (Basagran, others)</td>
<td>428</td>
<td>39.5</td>
</tr>
<tr>
<td>Dual</td>
<td>23</td>
<td>52.2</td>
</tr>
<tr>
<td>Eptam, spring applied</td>
<td>51</td>
<td>44.0</td>
</tr>
<tr>
<td>Poast</td>
<td>240</td>
<td>60.8</td>
</tr>
<tr>
<td>Prowl</td>
<td>19</td>
<td>52.6</td>
</tr>
<tr>
<td>Pursuit</td>
<td>121</td>
<td>74.4</td>
</tr>
<tr>
<td>Roundup, preplant</td>
<td>88</td>
<td>60.2</td>
</tr>
<tr>
<td>Sonalan, fall applied</td>
<td>26</td>
<td>26.9</td>
</tr>
<tr>
<td>Sonalan, spring applied</td>
<td>440</td>
<td>54.8</td>
</tr>
<tr>
<td>Trifluralin, fall applied</td>
<td>19</td>
<td>47.4</td>
</tr>
<tr>
<td>Trifluralin, spring applied</td>
<td>148</td>
<td>52.7</td>
</tr>
<tr>
<td>Trifluralin + Eptam</td>
<td>13</td>
<td>61.5</td>
</tr>
<tr>
<td>Desiccants (sodium chlorate, Gramoxone Extra)</td>
<td>126</td>
<td>60.3</td>
</tr>
</tbody>
</table>

*Data includes all herbicides used on more than 1,000 acres.
The potato leafhopper was reported as the worst insect problem in MN2, MN4, MN5 and ND5 (Table 35). However, it was reported as the worst insect problem on less than 10% of respondents’ acres in two of these districts; in contrast, it was the worst insect problem on 44% of MN4 respondents’ acres and on 11% of MN2 respondents’ acres. These results are similar to those for 1994. Spider mites were reported as the worst insect problem on 34% of MN3 respondents’ acres, a much larger figure than for any district in 1994. Grasshoppers were the worst insect problem on 9% of MN2 respondents’ acres, on 7% of ND4 respondents’ acres and on 4% of MN3 respondents’ acres.

### Insect Control Practices

Insecticide use was very limited in 1995. Carbaryl was used on 1.5% of Minnesota respondents’ dry bean acres, followed by dimethoate on 0.9% and Asana on 0.4%. Insecticide use in North Dakota was minimal (Table 36). Insecticide use in 1992 and 1994 also was very low (3, 6).

### Crop Rotations

Northarvest respondents reported use of crop rotation on 77% of respondents’ acres, up from 70% in 1994. Rotation was reported on 70% of respondents’ acres in Minnesota and 79% in North Dakota (Table 37).

#### Table 34. Worst insect problem in 1995 for respondents in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Worst Insect Problem</th>
<th>Respondents</th>
<th>Acres Reported</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
<td><strong>Minnesota</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potato Leaftopper</td>
<td>26</td>
<td>11.8</td>
</tr>
<tr>
<td>Spider Mites</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Grasshoppers</td>
<td>4</td>
<td>1.8</td>
</tr>
<tr>
<td><strong>North Dakota</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grasshopper</td>
<td>4</td>
<td>0.9</td>
</tr>
<tr>
<td><strong>Northarvest Total</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potato Leaftopper</td>
<td>2</td>
<td>0.3</td>
</tr>
<tr>
<td>Spider Mites</td>
<td>2</td>
<td>0.3</td>
</tr>
<tr>
<td>Grasshopper</td>
<td>8</td>
<td>1.2</td>
</tr>
</tbody>
</table>

*Insect problems reported on more than 1% of respondents’ acres.

*Respondents’ acres only.

#### Table 35. Worst insect problem in 1995 in each Northarvest district for respondents in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Northarvest District</th>
<th>Worst Insect Problem</th>
<th>Acres Reported</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Number</td>
</tr>
<tr>
<td><strong>Minnesota</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MN2</td>
<td>Potato Leaftopper</td>
<td>555</td>
</tr>
<tr>
<td></td>
<td>Grasshopper</td>
<td>483</td>
</tr>
<tr>
<td>MN3</td>
<td>Spider Mites</td>
<td>2,745</td>
</tr>
<tr>
<td></td>
<td>Grasshopper</td>
<td>330</td>
</tr>
<tr>
<td>MN4</td>
<td>Potato Leaftopper</td>
<td>134</td>
</tr>
<tr>
<td>MN5</td>
<td>Potato Leaftopper</td>
<td>2,687</td>
</tr>
<tr>
<td><strong>North Dakota</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND1</td>
<td>Seed Corn Maggot</td>
<td>485</td>
</tr>
<tr>
<td>ND4</td>
<td>Grasshopper</td>
<td>1,650</td>
</tr>
<tr>
<td>ND5</td>
<td>Potato Leaftopper</td>
<td>820</td>
</tr>
</tbody>
</table>

*Insect problems reported on more than 1% of respondents’ acres.

*District respondents’ acres only.

#### Table 36. Insecticide use in 1995 by respondents in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Insecticide</th>
<th>Acres Treated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
</tr>
<tr>
<td><strong>Minnesota</strong></td>
<td></td>
</tr>
<tr>
<td>Carbaryl</td>
<td>825</td>
</tr>
<tr>
<td>Dimethoate</td>
<td>478</td>
</tr>
<tr>
<td>Asana</td>
<td>205</td>
</tr>
<tr>
<td><strong>North Dakota</strong></td>
<td></td>
</tr>
</tbody>
</table>

*Data includes any insecticide applied to over 0.3% of respondents’ acres.

*Respondents’ acres only.

*No insecticide applied to more than 0.3% of respondents’ acres.

#### Table 37. Use of crop rotation in 1995 by respondents in Minnesota and North Dakota.

<table>
<thead>
<tr>
<th>Acres in Rotation</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Minnesota</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>39,085</td>
<td>70.1</td>
</tr>
<tr>
<td><strong>North Dakota</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>119,095</td>
<td>79.4</td>
</tr>
<tr>
<td><strong>Northarvest Total</strong></td>
<td></td>
<td>158,180</td>
</tr>
</tbody>
</table>

*Respondents’ acres only.
Crop rotations used by Northharvest respondents usually involved several years between dry bean crops (Table 38). The number of years since the previous dry bean crop had been grown was cited as two by 13% of respondents, three by 34%, four by 22%, five or more by 12% and never before (in that field) by 16%. More Minnesota respondents (23%) reported they had never planted dry beans in that field than North Dakota respondents (11%). The data are similar to 1994.

Wheat preceded dry beans for 56% of survey respondents, followed by corn for 19% and barley for 17%. There were differences between states, however, with wheat (65%) and barley (22%) used most frequently by North Dakota respondents and corn (43%) and wheat (38%) by Minnesota respondents (Table 39). These data are similar to 1992 and 1994 (3,6). Sugarbeets were used by 5% of respondents, up from 3% in 1994.

![Image](https://example.com/image.png)

**Table 38. Crop rotation in 1995 by respondents in Minnesota and North Dakota.**

<table>
<thead>
<tr>
<th>No. of Years Since Previous Dry Bean Crop</th>
<th>Minnesota % of Respondents</th>
<th>North Dakota % of Respondents</th>
<th>Northharvest % of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1.0</td>
<td>0.2</td>
<td>0.5</td>
</tr>
<tr>
<td>1</td>
<td>1.0</td>
<td>2.3</td>
<td>1.9</td>
</tr>
<tr>
<td>2</td>
<td>13.4</td>
<td>13.4</td>
<td>13.4</td>
</tr>
<tr>
<td>3</td>
<td>23.8</td>
<td>38.7</td>
<td>33.9</td>
</tr>
<tr>
<td>4</td>
<td>19.3</td>
<td>23.1</td>
<td>21.9</td>
</tr>
<tr>
<td>5</td>
<td>7.4</td>
<td>5.3</td>
<td>6.0</td>
</tr>
<tr>
<td>6+</td>
<td>6.5</td>
<td>6.2</td>
<td>6.3</td>
</tr>
<tr>
<td>Never before</td>
<td>22.7</td>
<td>10.6</td>
<td>16.1</td>
</tr>
</tbody>
</table>

*Percent of those responding to question.

**Table 39. Crop rotation. Crop grown by respondents in Minnesota and North Dakota preceding the 1995 dry bean crop.**

<table>
<thead>
<tr>
<th>Preceding Crop</th>
<th>Minnesota % of Respondents</th>
<th>North Dakota % of Respondents</th>
<th>Northharvest % of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfalfa</td>
<td>0.5</td>
<td>0.0</td>
<td>0.2</td>
</tr>
<tr>
<td>Barley</td>
<td>6.5</td>
<td>21.8</td>
<td>16.7</td>
</tr>
<tr>
<td>Corn</td>
<td>43.1</td>
<td>7.0</td>
<td>18.9</td>
</tr>
<tr>
<td>Oat</td>
<td>0.5</td>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Potato</td>
<td>2.8</td>
<td>0.7</td>
<td>1.4</td>
</tr>
<tr>
<td>Rye</td>
<td>0.5</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Soybean</td>
<td>1.9</td>
<td>0.2</td>
<td>0.8</td>
</tr>
<tr>
<td>Sugarbeet</td>
<td>6.0</td>
<td>4.1</td>
<td>4.7</td>
</tr>
<tr>
<td>Summer Fallow</td>
<td>0.0</td>
<td>0.5</td>
<td>0.3</td>
</tr>
<tr>
<td>Sunflower</td>
<td>0.0</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Wheat</td>
<td>38.4</td>
<td>65.1</td>
<td>56.3</td>
</tr>
</tbody>
</table>

*Percent of those responding to question.

**Acknowledgments**

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**Literature Cited**


