## **Disease Control Practices**

Fungicides were used on 28% of Northarvest survey respondents' acres, down from 43% in 1997 and 61% in 1996. Fungicides were used on 28% of Minnesota and 27% of North Dakota respondents' acres, down from 59% and 37%, respectively, in 1997 and from 68% and 59% in 1996. Benlate was the most widely used fungicide in Minnesota, applied to 19% of respondents acres, followed by Topsin M, applied to 8% of their acres, and Tilt, applied to 0.4% of their acres. Benlate was the most widely used fungicide in North Dakota, applied to 13% of respondents' acres, followed by Topsin M applied to 9% of their acres, Tilt applied to 2%, Bravo applied to 2%, and maneb applied to less than 1% (Tables 10 and 11).

The percentage of acres treated by ground was nearly 9 times that treated by air for all Northarvest respondents. It was 9 times as great for Minnesota respondents and 8 times as great for North Dakota respondents (Table 10).

Minnesota respondents sprayed 27% of their acres with the benzimidazole fungicides Benlate and Topsin M for white mold control, compared with 52% in 1997, 44% in 1996 and 21% in 1995. North Dakota respondents sprayed 22% of their acres with the benzimidazole fungicides, compared to 28% in 1997, 22% in 1996 and 18% in 1995. In Minnesota 9% of respondents' acres were band sprayed (directed spray with drop nozzles between the rows) with benzimidazole fungicides and 19% were broadcast sprayed, a slightly higher percentage of band spraying than in previous years. In North Dakota, 12% of respondents' acres were band sprayed with benzimidazole fungicides and 10% were broadcast sprayed, an increase in band spraying from 1996 and 1997. Wet conditions in 1996 and 1997 may have reduced the ability of respondents to band spray in a timely manner. Use of Benlate in Minnesota was about twice that of Topsin M and in North Dakota it was about 50% higher (Table 11).

Table 10: Fungicides applied to dry beans in 1998 by respondents in Minnesota and North Dakota

		Total Acres Treated <sup>c</sup>		Acres Treated by Air <sup>c</sup>		Acres Treated by Ground	
Fungicide <sup>a</sup>	Method of Appl. <sup>b</sup>	Number	%	Number	%	Number	%
Minnesota							
Benlate	Banded	1,880	7.5	0	0	1,880	7.5
Benlate	Broadcast	2,904	11.7	378	1.5	2,526	10.1
Tilt	-	208	0.8	108	0.4	100	0.4
Topsin M	Banded	230	0.9	0	0	230	0.9
Topsin M	Broadcast	1,812	7.3	190	0.8	1,622	6.5
Total Fungicide		7,034	28.2	676	2.7	6,358	25.5
North Dakota							
Benlate	Banded	7,117	9.9	0	0	7,117	
	Broadcast	<2,040	2.8	570	0.8	1,470	2.0
Bravo	-	1,600	2.2	0	0	1,600	2.2
Maneb	-	850	1.2	200	0.3	650	0.9
	-	1,645	2.3	135	0.2	1,510	2.1
Topsin M	Banded	<1,395	1.9	0	0	1,395	1.9
Topsin M	Broadcast	4,915	6.8	1,205	1.7	3,710	5.2
Total Fungicide		19,562	27.2	2,110	2.9	17,452	24.3

Northarvest									
Benlate	Banded	8,997	9.3	0	0	8,997	9.3		
Benlate	Broadcast	4,944	5.1	948	1.0	3,996	4.1		
Bravo	-	1,600	1.7	0	0	1,600	1.7		
Maneb	-	850	0.9	200	0.2	650	0.7		
Tilt	-	1,853	1.9	243	0.3	1,610	1.7		
Topsin M	Banded	1,625	1.7	0	0	1,625	1.7		
Topsin M	Broadcast	6,727	7.0	1,395	1.4	5,332	5.5		
Total Fungicide		26,596	27.5	2,786	2.9	23,810	24.6		

<sup>&</sup>lt;sup>a</sup>Mention of a trade name does not constitute an endorsement, recommendation nor preference over other similar fungicides.

Table 11: Fungicides and application methods for white mold control in 1998 in Minnesota and North Dakota.

	Band Applied		Broadc	ast	Total					
Fungicide	Acres	% <sup>a</sup>	Acres	% <sup>a</sup>	Acres	%ª				
Minnesota										
Benlate	1,880	7.5	2,904	11.7	4,784	19.2				
Topin M	230	0.9	1,812	7.3	2,042	8.2				
Total <sup>b</sup>	2,110	8.5	4,716 18.9		6,826	27.4				
North Dakota		'	1	•		'				
Benlate	7,117	9.9	2,040	2.8	9,157	12.8				
Topin M	1,395	1.9	4,915	6.8	6,310	8.8				
Total <sup>b</sup>	8,512	11.9	6,955	9.7	15,467	21.5				
Northarvest		-				•				
Benlate	8,997	9.3	4,994	5.1	13,991	14.5				
Topin M	1,625	1.7	6,727	7.0	8,352	8.6				
Total <sup>b</sup>	10,622	11.0	11,721	12.1	22,343	23.1				

<sup>&</sup>lt;sup>a</sup>Percent of respondents' acres

Rust fungicides were used on 4% of Northarvest respondents' acres, compared to 9% in 1997 and 34% in 1996. Tilt, available in both states under a specific exemption (section 18), was used on 2% of Northarvest respondents' acres, followed by Bravo on less than 2% and maneb on less than 1%. In Minnesota, Tilt was used on less than 1% of respondents' acres. In North Dakota, Tilt was used on 2% of respondents' acres, followed by Bravo on 2% and maneb on 1% (Table 12). This dramatic reduction in use of rust fungicides since 1996 is at least partly due to increased use of pinto varieties that have resistance to the current rust races, as indicated in the section on varieties grown.

<sup>&</sup>lt;sup>b</sup>Respondents were not asked method of application for Bravo, Maneb or Tilt.

<sup>&</sup>lt;sup>c</sup>Respondents' acres only.

<sup>&</sup>lt;sup>b</sup>Total of Benlate and Topin M

Table 12: Fungicides used for rust control in 1998 in Minnesota and North Dakota

State	Bravo		Maneb		Tilt		Total	
	Acres	% <sup>a</sup>	Acres	% <sup>a</sup>	Acres	% <sup>a</sup>	Acres	%
Minnesota	0	0	0	0	208	0.8	208	0.8
North Dakota	1,600	2.2	850	1.2	1,645	2.3	4,095	5.7
Northarvest Total	1,600	1.7	850	0.9	1,853	1.9	4,303	4.4

<sup>&</sup>lt;sup>a</sup>Percent of respondents' acres

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<sup>&</sup>lt;sup>b</sup>Total of Bravo, Maneb and Tilt