Disease Control Practices

Fungicides were used on 61% of Northarvest survey respondents' acres, up from 42% in 1995 and 56% in 1994. Fungicides were used on 68% of Minnesota and 59% of North Dakota respondents' acres (Table 19). This represents a one third increase for Minnesota and only a marginal increase for North Dakota. Benlate was the most widely used fungicide in Minnesota (25% of respondents' acres), followed by Topsin M (19% of respondents' acres) and Tilt (17% of respondents' acres). Tilt was the most widely used fungicide in North Dakota (27% of respondents' acres), followed by Benlate and Topsin M (11% of respondents' acres for each product). The percentage of acres treated by ground and by air was nearly equal for Northarvest respondents and for North Dakota respondents. In contrast, Minnesota respondents treated more than twice as many acres by ground as by air.

Minnesota respondents sprayed 44% of their acres with the benzimidazole fungicides Benlate and Topsin M for white mold control, double the amount in 1995 (Table 20). North Dakota respondents sprayed 22% of their acres with the benzimidazole fungicides, up slightly from 1995. In Minnesota 11% of respondents' acres were band sprayed and 33% were broadcast sprayed, approximately the same ratio of band to broadcast application as in 1995. Total Benlate use in Minnesota was slightly higher than Topsin M use. In North Dakota, 9% of respondents' acres were band sprayed and 13% were broadcast sprayed. The data indicate slightly more use of broadcast spray in 1996 than in 1995. Wet conditions in both years may have reduced the ability of respondents to band apply in a timely manner. Increased sugarbeet acres in recent years may have resulted in increased use of 22 inch row spacing for dry beans, a row spacing that makes band application difficult or impractical. Use of Benlate and Topsin M in North Dakota was the same, each being applied on 11% of respondents' acres.

Rust fungicides were used on 34% of respondents' acres, compared to 23% in 1995. (Table 21). Tilt, available for use in both states under a specific exemption (Section 18), was used on 25% of respondents' acres, followed by Bravo on 5% and maneb on 4%. In Minnesota, Tilt was used on 17% of respondents' acres, followed by Bravo on 5% and Maneb on 2%. In North Dakota, Tilt was used on 27% of respondents' acres, followed by Bravo on 5% and maneb on 5%. The increased application of rust fungicides in 1996 can be attributed almost entirely to increased use of Tilt. Moreover, the rust fungicide increase (primarily Tilt) in North Dakota is not surprising since much of the North Dakota crop was pinto beans, and most of the commonly grown varieties are susceptible to the races of rust present in 1996.

Use of rust fungicides was highest in ND1, MN1, ND2 and ND3 with 65%, 48%, 35% and 35% of respondents' acres treated, respectively (Table 22). The data correlates with the districts that have the highest percentage of pinto beans, namely ND1 (85%) and MN1 (59%).

Use of white mold fungicides in Minnesota was highest in MN2, where 59% of respondents' acres were treated (Table 22). This is almost the same as in 1995 when 60% of respondents' acres in that district were treated for white mold. MN2 respondents used broadcast Benlate on 45% of treated acres, followed by banded Topsin M on 10% and broadcast Topsin M on 4%. Use was also high in MN5, MN1 and MN4, where 52%, 42% and 40% of respondents' acres were treated, respectively. In MN5, 21% of respondents' acres were broadcast treated with Topsin M, followed by 16% of acres band treated with Benlate and 11% of acres broadcast treated with Benlate. In MN1, 21% of respondents' acres were broadcast treated with Topsin M followed by 18% broadcast treated with Benlate. In MN4, 28% of respondents' acres were band treated with Benlate, followed by 7% band treated with Topsin M.

Use of white mold fungicides in North Dakota was highest in ND1, where 44% of respondents' acres were treated: 20% were band treated with Benlate, followed by 12% broadcast treated with Benlate and lesser amounts broadcast and band treated with Topsin M (Table 22). Use was moderately high in ND2, where 30% of respondents' acres were treated: 18% were broadcast treated with Topsin M and only 5% each were band treated with Benlate or band treated with Topsin M.

Table 19. Fungicides used in 1996 by respondents in Minnesota and North Dakota.

Fungicide	Method of Application[a]	Total Acres Treated[b]		Acres Treated by Air[c]		Acres Treated by Ground[c]	
		Number	%	Number	%	Number	%
Minnesota							
Benlate	Banded	4,404	8.1	--	--	3,804	7.0
Benlate	Broadcast	9,107	16.8	1,435	2.6	5,912	10.9
Bravo	--	2,956	5.4	1,753	3.2	549	1.0
Maneb	--	1,080	2.0	960	1.8	120	0.2
Tilt	--	8,959	16.5	4,587	8.4	3,957	7.3
Topsin M	Banded	1,725	3.2	--	--	1,425	2.6
Topsin M	Broadcast	8,638	15.9	1,114	2.0	6,525	12.0
MN Total		36,869	67.8	9,849	18.1	22,292	41.0
North Dakota							
Benlate	Banded	10,406	6.1	--	--	9,806	5.7
Benlate	Broadcast	8,345	4.9	2,467	1.4	4,878	2.9
Bravo	--	8,543	5.0	5,481	3.2	3,062	1.8
Maneb	--	8,371	4.9	3,263	1.9	2,933	1.7
Tilt	--	46,458	27.2	34,942	20.5	7,811	4.6
Topsin M	Banded	4,858	2.8	--	--	4,488	2.6
Topsin M	Broadcast	13,738	8.0	3,991	2.3	8,967	5.3
ND Total		100,719	59.0	50,144	29.4	41,945	24.6
Northarvest Total							
Benlate	Banded	14,810	6.6	--	--	13,610	6.0
Benlate	Broadcast	17,452	7.8	3,902	1.7	10,790	4.8
Bravo	--	11,499	5.1	7,234	3.2	3,611	1.6
Maneb	--	9,451	4.2	4,223	1.9	3,053	1.4
Tilt	--	55,417	24.6	39,529	17.6	11,768	5.2
Topsin M	Banded	6,583	2.9	--	--	5,913	2.6
Topsin M	Broadcast	22,376	9.9	5,105	2.3	15,492	6.9
Northarvest Total		137,588	61.1	59,993	26.7	64,237	28.5

[a]Respondents were not asked method of application for Bravo, Maneb or Tilt.

[b]Respondents' acres only.

[c]Respondents' acres only. The sum of acres treated by air and acres treated by ground may be less than total acres treated because some respondents did not indicate if application was by air or ground.

Table 20. Fungicides and application methods used for white mold control in 1996 by respondents in Minnesota and North Dakota.

Fungicide	Band Applied		Broadcast		Total	
	Acres	%[a]	Acres	%[a]	Acres	%[a]
Minnesota						
Benlate	4,404	8.1	9,107	16.8	13,511	24.9
Topsin M	1,725	3.2	8,638	15.9	10,361	19.1
Total[b]	6,129	11.3	17,743	32.6	23,872	43.9
North Dakota						
Benlate	10,406	6.1	8,345	4.9	18,751	11.0
Topsin M	4,858	2.8	13,738	8.0	18,596	10.9
Total	15,264	8.9	22,083	12.9	37,347	21.9
Northarvest Total						
Benlate	14,810	6.6	17,452	7.8	32,262	14.3
Topsin M	6,583	2.9	22,376	9.9	28,959	12.9
Total	21,393	9.5	39,828	17.7	61,221	27.2

[a]percent of respondents' acres.
[b]total of Benlate + Topsin M.

Table 21. Fungicides used for rust control in 1996 in Minnesota and North Dakota.

State	Bravo		Maneb		Tilt		Total[b]	
	Acres	%[a]	Acres	%[a]	Acres	%[a]	Acres	%[a]
Minnesota	2,956	5.4	1,080	2.0	8,959	16.5	12,995	23.9
North Dakota	8,543	5.0	8,371	4.9	46,458	27.2	63,372	37.1
Northarvest Total	11,499	5.1	9,451	4.2	55,417	24.6	76,367	33.9

[a]Percent of respondents' acres.
[b]Total of Bravo+Maneb+Tilt.

Table 22. Fungicides used in 1996 in each Northarvest district in

Minnesota and North Dakota.

Northharvest District	Benlate Banded	Benlate Broadcast	Bravo	Maneb	Tilt	Topsin M Banded	Topsin M Broadcast
% Respondents' Acres Treated							
Minnesota							
MN1	2.5	18.0	11.3	4.2	32.8	1.3	20.6
MN2	0	45.1	0	0.3	3.8	9.5	4.2
MN3	5.1	8.4	1.5	0	0	0	9.1
MN4	27.6	0.3	0	0	0	7.4	4.5
MN5	16.3	11.2	0	0	3.3	3.2	21.1
North Dakota							
ND1	19.8	12.0	19.1	9.9	35.7	4.8	6.9
ND2	5.4	1.6	0	6.7	28.5	5.0	18.1
ND3	2.1	5.2	2.4	2.0	30.8	0	1.7
ND4	0	2.3	0.3	5.0	14.5	4.7	8.2
ND5	0.3	1.4	0.9	0.4	19.7	0.5	6.4

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