Co-operative seed treatment trials - 1977[1]

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Nineteen seed treatment chemicals were tested at four stations for their efficacy in controlling bunt of wheat *(Tilletia caries* and *T. foetida).* loose smut of oats *(Ustilago avenae),* and false loose smut of barley (*U. nigra).* Infection of untreated seed was high with the exception of false loose smut of barley with *2%* at Ste. Foy and 6.7% at Winnipeg. One treatment gave significantly less control of bunt and oat smut at four stations, and four other treatments of oat smut at two stations than the standard Vitaflo *280,* but the remaining treatments were not significantly better than this standard.

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On a evalue a quatre stations l'efficacite de 19 traitements chimiques de la semence a prevenir l'apparition de la carie du ble (*Tilletia caries* et *T. foetida*), du charbon nu de l'avoine *(Ustilago avenae)* et du faux charbon nu de l'orge (*U. nigra).* Le taux d'infection des semences non traitees a ete élevé partout, sauf dans le cas du faux charbon nu de l'orge, *2%* a Ste-Foy et 6.7% a Winnipeg. Aux quatre stations, un des traitements a ete significativement moins efficace que le traitement ordinaire au Vitaflo *280* contre la carie du ble et le charbon nu de l'avoine, mais quatre autres traitements se sont reveles superieurs à deux stations contre cette derniere maladie. Les autres produits ne se sont pas montres plus efficaces que le traitement standard.

Introduction

In 1977, 19 seed treatment chemicals were tested for their efficacy in controlling common bunt of wheat [*Tilletia foetida* (Wallr.) Liro and *T. caries* (DC.) Tul.], loose smut of oats, [*Ustilago avenae* (Pers.) Rostr.] and false loose smut of barley *(U. nigra* Tapke).

Materials and Methods

Table 1 lists source, name of the product, and the active ingredients of the materials used. Vitaflo 280 was included as a standard for comparison.

Seeds of 'Norteno M67' wheat *(Triticum aestivum* L.), 'Random' oats (*Avena sativa* L.), and 'Beacon' barley *(Hordeum vulgare* L.) were used in the smut tests.

Prior to chemical treatment wheat was inoculated with dry bunt spores at the rate of 1 g spores per 200 g of wheat. The technique for inoculation of oats and barley by partial vacuum is described by Nielsen (1). The chemical dosages used were those suggested by the manufacturer (Table 2). Each sample was hand-shaken in a glass jar to cover the seed uniformly with the chemical.

After 3 days or more, 200 seeds were removed from each jar and placed in a paper envelope. Envelopes that contained seed of the same treatment were stored in polyethylene bags at 15°C for up to 5 weeks before seeding.

The tests on bunt were planted at Beaverlodge (May 20) and Lacombe, Alberta (May 20); those on the smuts of oats and barley at Ste. Foy, Quebec (May 24) and Winnipeg, Manitoba (May 18). There were four replicates per test at each location. Each replicate consisted of 200 seeds planted in a row 4 m long; all rows were planted 25 cm apart; plots were arranged in a randomized block design.

The number of smutted heads in each row was recorded after the crop had headed and are expressed as means of the number of heads in the untreated rows. The results are given as means of four replicates, at each planting site. Significance at the 0.05 level was determined from the means of the treatments at each station.

Results and Discussion

Smut infection of untreated seed varied from 9.3 to 22.5% for wheat, from 2.0 to 6.7% for barley and 17.3 to 18.4% for oats.

One treatment (No. 11) gave significantly less control of bunt and oat smut at four stations, and four other treatments (Nos. 4, 5, 9, 10) of oat smut at two stations than the standard Vitaflo 280, but the remaining treatments were not significantly better than this standard (Table 2). No obvious symptoms of phytotoxicity were observed at any station.

Acknowledgements

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Literature Cited

1. Nielsen, J. 1977. A method for artificial inoculation of oats and barley for seed treatment trials on seedling-infecting smuts. Can. Plant Dis. Serv. 56: 114-116.

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Table 1. Seed treatment materials used in the cooperative tests 1977.

Treatment no.	Source*	Product name	Active ingredient(s)
1		Untreated check	
2	Chemagro	Bay-meb 6447	1-(4-chlorophenoxy)-3,3-dimethyl-1-(1H-1,2,4-triazol-1-yl)-2-butanone (25%)
3	Chemagro	Bay-KWG 0519	identity not available
4	Chevron	Difolatan + Vitavax 2-2	cis-N-[(1,1,2,2-Tetrachloroethyl)thio]-4-cyclohexene-1,2-dicarboximide + carbathiin
5	Chevron	Difolatan 4	cis-N-[(1,1,2,2-Tetrachloroethyl)thio]-4-cyclohexene-1,2-dicarboximide (80%)
6	Chipman	TF 3387	identity not available
7	Chipman	TF 3388	identity not available
8	Dupont	DPX-14	identity not available
9	Interprovincial	Busan 25	2-(thiocyanomethylthio) benzothiazole (25%)
10	Interprovincial	Busan 30	2-(thiocyanomethylthio) benzothiazole (30%)
11	Rohm & Haas	RH-2161	identity not available
12	Uniroyal	Vitaflo 250	identity not available
13	Uniroyal	Vitaflo 280	carbathiin 14.9% + thiram 13.2%
14	Uniroyal	UBI 2036	identity not available
15	Uniroyal	UBI 2109	identity not available
16	Uniroyal	UBI 2110	identity not available
17	Uniroyal	UBI 2111	identity not available
18	Uniroyal	UBI 2112	identity not available
19	Uniroyal	UBI 2114	identity not available
20	Uniroyal	UBI 2116	identity not available

*Chemagro Ltd., Mississauga, Ontario; Chevron Chemical (Canada) Ltd., Burlington, Ontario; Chipman Chemicals Ltd., Hamilton, Ontario; Dupont de Nemours & Co. Inc., Wilmington, Delaware; Interprovincial Cooperatives Ltd., Winnipeg, Manitoba; Rohm & Haas Co. of Canada Ltd., West Hill, Ontario; Uniroyal Chemical Division, Elmira, Ontario.

Table 2. Effect of seed-treatment chemicals on infection of wheat, oats and barley by bunt or smut at Beaverlodge (B), Lacombe (L), Ste. Foy (SF), and Winnipeg (W).

Treatment no.	Product name	Formulation*	Dosage (gor ml/kg)	% smutted heads†					
				Wheat		Barley		Oats	
				B	L	SF	W	SF	W
1	Untreated check			22.5	9.3	2.0	6.7	17.3	18.4
2	Bay-meb 6447	WP	2.52	0.0	0.0	0.0	0.0	0.0	0.0
3	Bay-KWG 0519	WP	1.25	0.0	0.0	0.0	0.0	0.0	0.0
			2.52	0.0	0.0	0.0	0.0	0.0	0.0
			5.04	0.0	0.0	0.0	0.0	0.4	0.0
4	Difolatan +	SL	1.25	0.4	0.5	0.0	0.0	3.1	0.9
	Vitavax 2-2		1.87	0.0	0.3	0.0	0.0	1.2	0.1
			2.50	0.6	0.1	0.0	0.0	0.8	0.0
			3.12	0.0	0.0	0.0	0.1	0.7	0.0
5	Difolatan 4	SL	1.25	0.4	0.5	0.0	0.0	7.6	7.1
			1.87	0.8	0.1	0.0	0.2	9.9	7.3
			2.50	0.2	0.3	0.0	0.1	7.6	6.8
6	TF 3387	SN	1.70	1.8	2.4				
			1.90			0.0	0.0		
			3.10					1.2	0.0
7	TF 3388	SN	1.60	0.9	2.4				
			1.70			0.0	0.0		
			2.80					0.0	0.0
8	DPX-14	WP	1.56	0.4	0.0				
			1.95			0.0	0.0		
			2.60	0.1	0.1				
			2.75					0.4	0.0
			3.25			0.0	0.1		
			4.59					0.0	0.0
9	Busan 25	D	2.10	0.9	0.6	0.0	0.0	2.6	0.9
10	Busan 30	SN	0.78	0.3	2.0	0.0	0.0	3.7	0.7

(continued)

Table 2. Effect of seed-treatment chemicals on infection of wheat, oats and barley by bunt or smut at Beaverlodge (B), Lacombe (L), Ste. Foy (SF), and Winnipeg (W). (concluded)

Treatment no.	Product name	Formulation*	Dosage (gor ml/kg)	% smutted heads† Wheat B	Wheat L	Barley SF	Barley W	Oats SF	Oats W
11	RH-2161	SN	1.28	8.4	1.3	0.1	0.0	2.3	1.5
			5.12	0.2	0.1	0.0	0.0	0.1	0.0
1%	Vitaflo 250	SL	1.56	0.4	0.8				
			1.95			0.0	0.0		
			2.76					0.9	*0.0*
13	Vitaflo 280	SL	1.82	0.6	0.3				
			2.28			*0.0*	*0.0*		
			3.22					0.6	*0.0*
14	UBI 2036	WP	1.56	0.2	0.1				
			1.95			*0.0*	*0.0*		
			2.75					0.1	*0.0*
15	UBI 2109	SN	1.56	0.6	0.5				
			1.95			***0.0***	*0.0*		
			2.76					0.9	*0.0*
16	UBI 2110	SN	1.82	0.0	0.1				
			2.28			*0.0*	***0.0***		
			3.22					0.8	*0.0*
17	UBI 2111	SN	1.82	0.1	0.3				
			2.28			*0.0*	*0.0*		
			3.22					0.9	*0.0*
18	UBI 2112	SN	1.56	0.1	0.0				
			1.95			0.3	0.0		
			2.76					1.8	*0.0*
19	UBI 2114	SN	1.82	0.3	0.3				
			2.28			*0.0*	*0.0*		
			3.22					1.1	*0.0*
20	UBI 2116	SL	1.56	0.6	**0.4**				
			1.95			*0.0*	*0.0*		
			2.76					0.6	*0.0*
†† Significance limit (0.05)				8.4	1.3	NS	**NS**	2.3	0.7
Mean no. of heads				223	372	275	290	228	251

* Formulation code: D = dust; SL = slurry; SN = solution; WP = wettable powder.

† % smut = $\frac{\text{mean number of smutted heads}}{\text{mean number of heads}} \times 100$

†† Treatments significantly not as good as Vitaflo 280 have values equal to or higher than the significance limit.

NS = not significant