Cooperative seed treatment trials - 1974[1]

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Twenty-one seed treatment chemicals were tested in the field at two locations in Manitoba for their efficacy in controlling bunt of wheat [*Tilletia caries* and *T. foetida],* covered smut of oats *[Ustilago kolleri*], and covered smut of barley [*U. horde,],* and for their effects on the emergence of flax. Smut infection of untreated seed was low. Vitaflo 280 gave complete control of bunt and of the oat and barley smuts. Seventeen other treatments gave significantly reduced levels of cereal smuts. Flax emergence was significantly increased after seed treatment with Vitaflo 280, DPX 12, DPX 14, Busan 30, and RCH 364 (1 oz/bu rates). **FNC** 2512 at the 2% rate reduced cereal and flax emergence.

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Vingt et un produits chimiques pour le traitement des semences ont ete mis a l'essai en plein champ, a deux endroits differents au Manitoba, pour evaluer leur efficacite a combattre la carie du blé (*Tilletia caries* et *T. foetida),* le charbon couvert de l'avoine (*Ustilago kolleri*), et le charbon couvert de l'orge (*U. horde;),* et pour étudier leurs effets sur l'emergence du lin. L'infection par le charbon des semences non traitees a ete faible. Le Vitaflo 280 a completement detruit la carie et les charbons de l'avoine et de l'orge. Dix-sept autres traitements ont significativement reduit le niveau d'infection des charbons des cereales. L'emergence du lin a ete significativement accrue apres le traitement des semences au Vitaflo 280. DPX 12, DPX 14, Busan 30 et RCH 364 (a raison de 1 ozéboiss.). La dose de 2%. de FNC 2512 a reduit l'emergence des cereales et du lin.

Materials and methods

Table 1 lists the chemical composition, where available, and the product name and source of the materials used. Vitaflo 280 was included as a comparison standard.

Seeds of 'Norteno M67' wheat *(Triticum aestivum* L.), 'Random' oats *(Avena sativa* L.), and 'Herta' barley *(Hordeum distichon* L.) were used in the smut tests. 'Raja' flax (*Linum usitatissimum* L.) was used for emergence tests.

Prior to chemical treatment the cereals were inoculated with the appropriate dry smut spores at the rate of 1 g per 200 g of seed of wheat, oats, or barley. 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 at 15°C for up to 4 weeks before seeding.

Tests were carried out at Brandon and duplicated at Morden, Manitoba. There were four replicates at each location. Each replicate consisted of 200 seeds planted in a row 12 ft (3.7 m) long; all rows were planted 9 inches (23 cm) apart; plots were arranged in a randomized block design. Emergence of flax was recorded 3-4 weeks after seeding.

Wheat, oats, and barley were sown on 24 May and flax on 28 May at Brandon; all sowings at Morden took place on 30 May 1974.

The number of smutted heads in each row was recorded after the crop had headed and was expressed as a percentage of the number of heads in the untreated rows. The results are given as means of four replicates, at each planting site. The "LSD-05" was determined from the means of the treatments at each station.

Results and discussion

Smut infection of inoculated, untreated seed varied from 2% to 5% for wheat, from 7% to 11% for oats, and from 1% to 5% for barley.

The comparison standard Vitaflo 280 gave complete control of bunt, and of the oat and barley smuts. At both stations, 17 other treatments gave significantly reduced levels of cereal smuts.

The FNC 2512 treatments were omitted from the statistical analyses because cereal emergence at both stations was nil at the high dosage and a trace at the low dosage, making smut counts impossible.

Emergence of untreated flax checks varied from 47% to 59% (Table 2). Products that gave a significant increase in flax emergence at both stations were the wettable powders DPX 12 and DPX 14, the solutions Busan 30 (1 oz rate) and RHC 364 (1 oz rate), and the slurry Vitaflo 280 (3 oz rate). FNC 2512 applied at the 2% rate significantly reduced emergence of flax at both stations.

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Table 1. Seed treatment materials used in the cooperative tests

Treatment no.	Source*	Product name	Active ingredient
1		Untreated check	
2	Chiprnan	TF 3262	identity not available
3	Chiprnan	TF 3266	identity not available
4	Dow	M-4018 17.5%	3,4,5-trichloro-, pyridinedicarbonitrile (Dowco 263)
5	DuPont	DPX 12	identity not available
6	DuPont	DPX 14	identity not available
7	FMC	Polyram liquid	metiram 22.5 %
8	FMC	Polyram lindane liquid	metiram 15.6 % lindane 10.9 %
9	FMC	Polyram lindane powder	metiram 53.5 % lindane 20.0 %
10	Hoechst	Sicarol 15%	2-methyl-5, 6 dihydro-4-H-pyran-3-carboxylic anhydride (75 %) + maneb (50%)
11	Interprovincial	Busan 25	2-(thiocyanomethylthio) benzothiazole (25 %)
12	Interprovincial	Busan 30	2-(thiocyanomethylthio) benzothiazole (30 %)
13	May & Baker	26019 RP 50%	(1-(isopropylcarbamoyl)-3-(3,5-dichlorophenyl hydantoin)
14	Nor-Am	SN 49137 50 %	identity not available
15	Nor-Am	SN 49182 50 %	identity not available
16	Rohm & Haas	RHC 364 39 %	identity not available
17	Standard	FNC 2512	identity not available
18	Uniroyal	Vitaflo 280	carbathiin 14.9% + thiram 13.2 %
19	Uniroyal	Uni-2060	identity not available
20	Uniroyal	Uni-2061	identity not available
21	Uniroyal	Uni-2063	identity not available
22	Uniroyal	Uni-2064	identity not available
23		Untreated check	

* Chipman Chemicals Ltd., Hamilton, Ontario; Dow Chemical of Canada Ltd., Sarnia, Ontario; E. I. DuPont de Nemours & Co., Inc., Wilmington, Delaware; FMC of Canada Ltd., Burlington, Ontario; Hoechst Chemicals Canada Ltd., Montreal, Quebec; Interprovincial Cooperatives Ltd., Winnipeg, Manitoba; May & Baker (Canada) Ltd., Montreal, Quebec; Nor-Am Agricultural Products Inc., Woodstock, Illinois; Rohm & Haas Co. of Canada Ltd., West Hill, Ontario; Standard Chemical Ltd., Montreal, Quebec; Uniroyal Chemical Division, Elmira, Ontario.

Table 2. Effects of seed-treatment chemicals on smuts in wheat, oats, and barley and on emergence of flax at Brandon (B) and Morden (M), Manitoba, 1974

Treatment no.	Product name	Formulation*	Dosage oz/bu	Dosage g/kg	% smutted heads† Wheat B	Wheat M	Oats B	Oats M	Barley B	Barley M	Flax emergence % B	Flax emergence % M
1	Untreated check				5.5	2.1	7.0	10.1	0.9	4.9	59.0	49.3
2	TF 3262	SL	2.00	2.10	0.1	0.0						
			2.66	4.90			0.0	0.0				
			2.66	3.45					0.0	0.0		
			4.00	4.45							60.3	49.3
3	TF 3266	SL	2.25	2.35	0.0	0.0						
			3.00	5.50			0.0	0.0				
			3.00	3.90					0.0	0.0		
			4.00	4.45							62.3	47.3
4	M-4018	SL	0.60	0.65	1.0	0.4						
			1.20	1.30	0.1	0.0						
			0.34	0.65			1.2	0.0				

Table 2 (cont'd)

Treatment no.	Product name	Formulation*	Dosage oz/bu	Dosage g/kg	% smutted heads† Wheat B	Wheat M	Oats B	Oats M	Barley B	Barley M	Flax emergence % B	Flax emergence % M
			0.68	1.30			0.0	0.3				
			0.48	0.65					0.4	0.3		
			0.96	1.30					0.0	0.0		
			0.56	0.65							52.8	41.0
			1.12	1.30							58.5	55.8
5	DPX-12	WP	0.75	0.80	0.0	0.1						
			1.00	1.85			***0.0***	***0.0***				
			1.00	1.30					***0.0***	***0.0***		
			2.00	2.25							71.3	62.0
6	**DPX-14**	WP	0.75	0.80	0.3	0.1						
			1.00	1.85			0.0	0.3				
			1.00	1.30					***0.0***	***0.0***		
			2.00	2.25							74.5	72.3
7	**Polyram liquid**	SL	3.00	3.90					***0.0***	***0.0***		
8	**Polyram lindane liquid**	SL	3.00	3.15	***0.0***	***0.0***						
			3.00	3.90					***0.0***	***0.0***		
9	**Polyram lindane powder**	WP	2.00	2.10	***0.0***	***0.0***						
			2.00	3.70			0.2	0.4				
			2.00	2.60					***0.0***	***0.0***		
10	**Sicarol**	SL	1.50	1.55	0.3	0.0						
			2.00	2.10	0.7	0.2						
			1.50	2.75			0.1	0.1				
			2.00	3.70			0.1	0.0				
			1.50	1.95					***0.0***	***0.0***		
			2.00	2.60					***0.0***	***0.0***		
			1.50	1.70							47.3	46.5
			2.00	2.25							55.8	49.0
11	**Busan** 25	D	1.00	1.05	0.0	0.0						
			2.00	2.10	0.0	0.2						
			1.00	1.85			0.0	0.2				
			2.00	3.70			0.0	0.2				
			1.00	1.30					***0.0***	***0.0***		
			2.00	2.60					***0.0***	***0.0***		
			2.00	2.25							63.0	52.5
			4.00	4.45							63.0	55.5
12	**Busan** 30	SN	0.75	0.85							65.5	55.3
			1.00	1.10							65.3	55.8
13	26019 **RP**	WP	0.96	1.00	0.0	0.2						
			2.40	2.50	0.0	0.0						
			0.55	**1.00**			9.9	5.1				
			1.38	2.50			6.2	5.3				
			0.77	1.00					0.4	0.9		
			1.93	2.50					0.7	1.8		
			0.90	**1.00**							64.0	47.8
			2.25	2.50							65.8	45.0
14	SN 49137	WP	**1.00**	1.05	0.1	0.0						
			1.00	1.85			1.3	0.4				
			1.00	1.30					***0.0***	***0.0***		
			1.00	1.10							64.3	42.0
15	SN 49182	WP	1.00	1.05	***0.0***	***0.0***						
			1.00	1.85			0.3	0.7				

Table 2 (cont'd)

Treatment no.	Product name	Formulation*	Dosage oz/bu	Dosage g/kg	% smutted heads† Wheat B	Wheat M	Oats B	Oats M	Barley B	Barley M	Flax emergence % B	Flax emergence % M
			1.00	1.30					*0.0*	***0.0***		
			1.00	1.10							57.8	47.3
16	RHC 364	SN	0.50	0.55	**0.0**	***0.0***						
			1.00	1.05	0.0	***0.0***						
			0.50	0.90			5.7	5.5				
			1.00	1.85			1.1	0.5				
			0.50	0.65					0.9	2.1		
			1.00	1.30					0.1	1.1		
			1.00	1.10							68.0	55.8
			2.00	2.25							61.8	52.5
17**	FNC 2512 1%	SN+									44.8	43.8
	2%	SN+									14.5	9.0
18	Vitaflo 280	SL	1.50	1.55	***0.0***	***0.0***						
			1.50	2.75			***0.0***	***0.0***				
			1.50	1.95					*0.0*	0.0		
			3.00	3.35							70.5	63.5
19	Uni-2060	SL	2.30	2.40	0.2	0.0						
			1.75	3.20			**0.0**	**0.0**				
			2.30	4.25			***0.0***	***0.0***				
			2.30	3.00					0.0	***0.0***		
			3.00	3.35							55.5	41.5
			3.50	3.90							47.8	59.0
20	Uni-2061	SL	2.30	2.40	0.0	0.5						
			2.30	4.25			***0.0***	***0.0***				
			2.30	3.00					*0.0*	**0.0**		
			3.50	3.90							53.5	38.8
21	Uni-2063		1.75	1.85	***0.0***	***0.0***						
			2.30	2.40	**0.0**	**0.0**						
			1.75	3.20			***0.0***	***0.0***				
			2.30	4.25			***0.0***	0.0				
			1.75	2.30					0.0	0.0		
			2.30	3.00					0.0	2.8		
			3.50	3.90							54.8	48.0
22	Uni-2064	SL	1.50	1.55	0.1	0.0						
			1.50	2.75			***0.0***	***0.0***				
			3.00	3.35							53.5	49.8
23	Untreated check				3.6	3.2	10.5	11.7	2.3	4.5	57.3	47.0
LSD (0.05)					0.9	0.2	1.4	1.1	0.3	1.1	4.1	6.5

* Formulation code: D = dust, SN = solution, **SL** = slurry, WP = wettable pwder, SN^+ = seeds dipped in solution for 10 sec then placed in sealed container overnight, air dried, then packaged.

† % smutted heads= $\frac{\text{number of smutted heads X 100}}{\text{number of heads in control}}$; B = Brandon, M = Morden.

Flax emergence based on mean *of* 4 reps each having 200 seeds planted

** Treatment No. 17 was omitted from statistical analysis.