COOPERATIVE SEED TREATMENT TRIALS - 1972[1]

J.T. Mills[2]

Abstract

Twenty-six seed treatment chemicals were tested for their efficacy in controlling bunt of wheat (Tilletia foetida), covered smut of oats (Ustilago kolleri), and covere smut of barley (U. hordei) and for their effects on the emergence of wheat: barley, oats, rye, flax, rape, and corn. The results show that UNI 2002 and BASF 3302 controlled the three smuts without reducing emergence. None of the treatments gave significantly increased emergence in all of the seven crops, but Panogen 15B, Manzate D, Polyram liquid, RHC 287, and **BASF** 3302 gave significant increases in four or five of them.

Introduction

In 1972, 26 seed treatment chemicals were tested for their efficacy in controlling common bunt of wheat [Tilletia foetida (Wallr.) Liro], covered smut of oats (Ustilago kolleri Wille), and covered smut of barley (U. hordei (Pers.) Lagerh.] and for their **effects on** the emergence of wheat, oats, barley, flax, rye, rape, and corn under Manitoba conditions.

Materials and methods

The tests were designed to test the efficacy of the chemicals upon the smuts and the effects on emergence of wheat, oats, barley, flax, rye, rape, and corn. Table 1 lists the chemical composition where available, the product name, and the source of the materials used. Panogen 15B was included as a standard.

Seed of 'Red Bobs' wheat (Triticum aestivum L.), 'Random' oats (Avena sativa L.), and 'Herta' barley (Hordeum distichon L.) were used in the smut and emergence tests. 'Noralta' flax (Linum usitatissimum L.), 'cougar' rye (Secale cereale L.), 'Target' **rape** (Brassica napus L.) and cultivar CM7 field corn (Zea mays L.) were used for emergence tests. Many cracks were evident at the edges of the **flax** seed and also above the embryos of the rye seed.

One gram of the appropriate smut spores was added to each 200g of wheat, oats, and barley seed before treatment to ensure heavy infection. Each of the chemicals was applied to 200-g seed samples of the seven crops, at the rates of product suggested by the manufacturer, by hand-shaking the seed in a glass jar until the seed was uniformly covered. As recommended by the manufacturer, corn treated with DL plus was pretreated with a slurry of Captan 75W (1.00 *oz* in **1** pint water per bushel). Seed was removed from the jars after not more than 3 days, and lots of 200 seeds were packaged in paper envelopes. Envelopes that contained seed from the same treatment were stored in polyethylene bags at 15 C for not more than 4 weeks before seeding.

Tests were carried out at Brandon and at Morden, Manitoba. There were four replicates per location. Each plot replicate consisted of 200 seeds (100 for corn) planted in a row 12 ft long; all rows were planted 9 inches apart, and plots were arranged in a randomized block design. Emergence of all crops was recorded 3-4 weeks after seeding.

The percentage of smutty heads, based on counts of 500 heads per row, was recorded after the crop had headed. The results are given as means of eight replicates, four from each planting site. The "LSD-05" is based on an analysis of the means of the treatments €or each station.

Results and discussion

Smut infection of untreated seed was 4% for barley and varied from 11% to 17% for wheat, and from 10%to 12%for oats. Some chemicals gave complete control **of** all smut diseases on wheat, oats, and barley: others controlled oat and barley smut but failed to control bunt, or they controlled bunt and barley smut but failed to control oat smut (Table 2). Treatments giving good control of

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[1] Contribution No. 542, Research Station, Canada Agriculture, Winnipeg, Manitoba, R3T 2M9.

[2] Plant Pathologist.

Table 1. Seed treatment materials used in the cooperative tests

Treatment no.	Source*	Product name	Chemical name
1		Untreated check	
2	BASF	BASF 3270	2,5-dimethyl-3-furylamide (50%)
3	BASF	BASF 3302	BASF 3270 (50%) + maneb (32%)
4	Chipman	TF 3124	identity not available
5	Ciba-Geigy	NF 44	1,2-bis(3-methoxycarbonyl-2-thioureido) benzene (70%)
6	Interprovincial	Busan 301P	2-(thiocyanomethylthio) benzothiazole (30%)
7	Du Pant	Benlate T	benomyl [methyl 1-(butylcarbamoyl)-2-benzimidazole carbamate] (30%) + thiram (30%)
8	Du Pont	Manzate D	maneb (80%)
9	Hoechst	Hoe 6053	2-methyl-5,6 dihydro-4-H-pyran-3-carboxylic anilide (75%)
10	Hoechst	Hoe 6053 + thiram	Hoe 6053 (75%) + thiram (75%)
11	Merck	Me 77	identity not available
12	Niagara	Polyram liquid	zinc activated polyethylene thiuram disulfide (22.5%)
13	Niagara	NIA 25050	identity not available
14	Nor-Am	Panogen 15B	methylmercuric dicyandiamide (3.7 oz/gal)
15	Nor-Am	SN 43410	identity not available
16	Nor-Am	SN 43493	identity not available
17	Rohm & Haas	RHC 287	identity not available
18	Rohm & Haas	RHC 288	identity not available
19	Uniroyal	UNI 2002	Vitavax + thiram
20	Uniroyal	UNI 2005	Vitavax + thiram
21	Uniroyal	UNI 2009	Vitaflo DB + lindane
22	Chipman	DL plus	diazinon 15%, lindane 25%. captan 15%
23	Chipman	B-3	diazinon 11%, lindane 16.6%, captan 33.5%
24	Chipman	Gammasan	lindane 75%, captan 10%
25	Ciba-Geigy	CGF 2590	NF 44 7%, captan 37%, lindane 10%
26	Ciba-Geigy	CGF 2610	NF 44 23%, diazinon 10%, lindane 16.7%
27	Ciba-Geigy	CGF 2620	NF 44 7%, lindane 37.7%
28		Untreated check	

* BASF Canada Ltd., Montrdal, Québec; Chipman Chemicals Ltd., Hamilton, Ontario; Ciba-Geigy Canada Ltd., Montrdal, Qudbec; Interprovincial Cooperatives Ltd., Winnipeg, Manitoba; E.I. Du Pont de Nemours & Co., Inc., Wilmington, Delaware; Hoechst Chemicals Canada Ltd., Montrdal, Qudbec; Merck & Co., Inc., Rahway, New Jersey; Niagara Chemicals, Burlington, Ontario; Nor-Am Agricultural Products Inc., Woodstock, Illinois; Rohm & Haas Co. of Canada Ltd., west Hill, Ontario; Uniroyal Chemical Division, Elmira, Ontario.

the three smuts without reducing emergence were BASF **3302** (an unidentified wettable powder) and **UNI 2002,** a slurry containing vitavax and thiram.

Emergence of untreated cereal checks was: wheat, **69%** and **77%;** oats, **64%** to **85%;** and barley **92%** (Table **2).** Some seed treatments were phytotoxic: emergence of wheat, barley and oats was significantly reduced after treatment with BASF **3270, NF 44,** Hoe **6053,** Me **77** and NIA **25050.** At Brandon, Hoe **6053** and, to a lesser extent, Hoe **6053 + thiram** were associated with burnt foliage of oats and barley, probably due to the very high dosages used.

Emergence of untreated checks of the other crops was: flax, **36%** to **62%;** rye, **41%** to **47%;** rape **11%** to **69%;** corn, **52%.** Rape flea beetle (*Phyllotreta cruciferae* Goeze) caused severe damage to emerging rape

Table 2. Effects of seed-treatment chemicals on smuts and emergence in wheat, oats, and barley

Treatment no.	Product name	Formulation*	Dosage (oz/bu)	Smutted heads (%)** Wheat BM	Oats BM	Barley BM	Emergence (%) Wheat BM	Oats B	Oats M	Barley BM
1	Untreated check			10.5	12.1	4.3	69.4	73.0	63.5	92.3
2	BASF 3270	WP	0.96		0.0			80.0	68.3	
			1.44			0.0				87.8
			1.80	0.0			69.1			
3	BASF 3302	WP	0.96		Tr			78.5	83.0	
			1.44			0.0				91.4
			1.80	0.0			79.4			
4	TF 3124	SL	0.50	0.6			77.4			
			1.00	0.0	1.8	0.0	78.8	77.3	63.8	87.3
			1.50		1.1	0.0		81.5	70.5	90.4
5	NF 44	WP	1.00	3.2	0.3	0.2	70.9	82.3	64.8	87.0
			1.50	1.9	0.2	0.6	70.3	75.3	58.5	88.4
6	Busan 301P	SN	0.75	0.8	0.4	0.0	71.5	83.8	79.8	85.0
			1.00	0.3	0.0	0.1	71.9	78.3	77.0	85.8
7	Benlate T	WP	0.70	0.5			75.8			
			1.25		0.0	0.0		83.5	62.8	91.3
8	Manzate D	WP	0.70	0.1			85.3			
			1.25		0.1	0.2		81.8	82.5	93.2
9	Hoe 6053	D	4.00	0.0	0.0	0.0	64.9	70.0	66.5	90.3
10	Hoe 6053 + thiram	D	2.00 + 2.00	0.0	0.0	0.0	82.8	85.0	75.0	83.3
11	Me 77	SN	1.02		2.0			80.3	68.5	
			1.54			1.8				88.3
			1.92	0.7			70.0			
			2.04		0.3			80.3	66.8	
			3.08			0.6				90.1
			3.84	0.0			65.1			
12	Polyram liquid	SL	2.00	0.0	4.1	0.1	77.4	89.8	77.0	93.9
13	NIA 25050	WP	2.00	5.4	---***	0.2	49.9	92.8	62.0	81.4
14	Panogen 15B	SN	0.75	0.1	0.3	0.0	84.5	80.5	84.8	89.6
15	SN 43410	WP	2.00	0.3	0.0	0.0	77.5	81.5	76.0	90.7
16	SN 43493	WP	2.00	0.4	0.6	0.1	82.8	81.5	78.5	90.5
17	RHC 287	SL	1.00	0.1		0.0	82.6			89.5
			1.50		1.8			82.8	77.0	
18	RHC 288	SL	0.75	0.3		0.1	82.0			88.1
			1.00		5.9			89.0	75.8	
19	UNI 2002	SL	1.50	0.1	Tr	0.0	81.8	79.5	72.5	91.4
20	UNI 2005	SL	1.50	0.2	0.3	0.0	76.6	78.8	71.0	90.3
28	Untreated check			16.9	9.9	3.6	77.3	85.0	72.5	92.0
LSD .05				6.4	2.0	1.5	2.9	NS	1.4	1.1

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

** See text.

*** Morden had complete smut control, Brandon not sown.

B = Brandon, M = Morden, BM = Brandon and Morden combined.

NS = not significant.

Tr = Trace.

Table 3. Effects of seed-treatment chemicals on emergence in flax, rye, rape, and corn

Treatment no.	Product name	Formulation*	Flax Dosage (oz/bu)	Flax Emergence (%) B	Flax Emergence (%) M	Rye Dosage (oz/bu)	Rye Emergence (%) BM	Rape Dosage (oz/bu)	Rape Emergence (%) B	Rape Emergence (%) M	Corn Dosage (oz/bu)	Corn mergence (%) BM
1	Untreated check			61.8	40.0		46.8		69.3	11.0		51.5
2	BASF 3270	WP	1.68	55.0	36.8	1.68	36.8	1.50	72.3	8.0	1.68	42.8
3	BASF 3302	WP	1.68	64.8	64.8	1.68	55.3	1.50	69.3	34.3	1.68	66.0
4	TF 3124	SL†	4.00	53.8	52.5	0.50	47.4					
						1.00	51.6					
5	NF 44	WP	2.00	52.0	39.8							
6	Bugan 301P	SN	0.75	55.0	43.8	0.50	27.5	1.50	73.3	16.8	1.12	75.8
			1.00	56.5	55.8	0.75	30.5				1.40	71.8
7	Benlate T	WP	2.50	55.8	70.3	0.70	48.9	2.50	78.0	49.8	2.00	36.8
8	Manzate D	WP	2.50	54.3	32.0	0.70	59.1	2.50	71.8	33.3	2.00	54.1
9	Hoe 6053	D	4.00	61.3	61.0	4.00	39.9	4.00	63.8	50.8		
10	Hoe 6053 +		2.00 +			2.00 +		2.00 +				
	thiram	D	2.00	50.8	37.0	2.00	64.1	2.00	62.0	13.0		
12	Polyram liquid	SL				2.00	54.9	3.00	65.3	48.5	2.00	58.5
14	Panogen 15B	SN	1.50	61.8	63.0	0.75	72.0	1.00	67.0	32.8	1.50	70.6
15	SN 43410	WP	1.12	55.0	40.5	2.00	46.9	1.00	78.3	37.8	1.12	75.0
16	SN 43493	WP	1.12	52.3	40.5	2.00	39.5	1.00	81.3	10.5	1.12	61.1
17	RHC 287	SL	3.00	53.3	50.3	1.00	60.5	1.00	70.5	15.0	1.00	78.4
18	RHC 288	SL	2.00	58.0	55.0	0.75	57.9	0.75	71.3	35.3	0.75	48.9
19	UNI 2002	SL	4.00	51.5	59.5	1.50	50.3				1.50	48.6
20	UNI 2005	SL	4.00	54.3	62.0	1.50	55.4				1.50	70.6
21	UNI 2009	D						24.0	75.5	29.8		
22	DL plus +										2.00 +	
	captan**	D									1.00	66.3
23	B-3	D									3.00	73.3
24	Gammasan	D						8.0	72.8	44.5		
25	CGF 2590	D						75.0	62.3	6.0		
26	CGF 2610	D									3.00	73.1
27	CGF 2620	D						75.0	69.3	39.8		
28	Untreated check			44.5	36.0		41.1					51.9
LSD .05				2.3	2.2		3.9		NS	2.1		2.6

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

† 50:50 Mixture of ethylene glycol and water.

** Captan applied as a pretreatment.

B = Brandon, M = Morden, BM = Brandon and Morden combined.

NS = not significant.

seedlings at Morden. None of the treatments gave significantly increased emergence of flax, rape, corn, and rye, but Polyram liquid and Panogen 15B gave significantly increased emergence in three of them. A significant decrease in emergence in three crops was evident with BASF 3270 (Table 3).

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