CO-OPERATIVE SEED TREATMENT TRIALS-1965[1]

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Introduction

Fifty-one seed treatment materials were tested in 1965 against common bunt of wheat (Tilletia foetida (Walk.) Liro), covered smut of oats (Ustilago kolleri Wille), covered smut of barley, (U. hordei (Pers.) Lagerh.), seed rot of flax, rye and durum wheat caused by a complex of soil-borne and seed-borne microorganisms, and root rot of durum wheat caused by soil-borne organisms.

Materials and methods

'Red Bobs' wheat artificially contaminated (1:200 by weight) with spores of T. foetida; 'Vanguard' oats and 'Plush' barley both naturally infected with smut; 'Marine' flax, 'Antelope' fall rye, and durum wheat of unknown variety obtained from the Saskatchewan Wheat Pool, Regina, were used in these tests.

The fifty-onematerials received for testing and brief statements concerning their nature and source are given in Table 1. The required amount of chemical was applied to 200 grams of seed in a sealer and well shaken. A day or two later 200 seeds were placed in envelopes, the envelopes placed in polyethylene bags and stored at 40°F until required for seeding (7 to 40 days later). The slurries were prepared by adding 4.2 cc of water to each gram of wettable powder. The "Lanstan 20G", a granular product, was not applied to the seed, instead 0.83 grams were scattered along the Vbelt seeder and sown together with the seed, as suggested by the manufacturer. In previous years these tests were sown at many stations in United States and Canada, but in 1965 they were planted only at Morden and Brandon, Manitoba. A third series planned for Winnipeg could not be sown because of wet ground.

The seed was sown in rows 12 feet long, 9 inches apart and replicated four times. The flax, rye and durum wheat were pulled and all emerged plants counted. The durum plants were 34 - 35 days old and these were also rated for root rot using a scale of 0 to 5. The results were later converted to a percentage disease rating. The percentage smut counts are based on all heads in the row.

Chemagro Corporation, P. O. Box 4913, Hawthorne Rd., Kansas City, Missouri, U. S. A.
Chipman Chemicals Ltd., 519 Parkdale Ave. N., Hamilton, Ont.
Diamond Alkali Ltd., T. R. Evans Research Center, P. O. Box 348, Painesville, Ohio, 44077.
Dupont Company of Canada Ltd., P. O. Box 660, Montreal, Que.
F. W. Berk and Co. Ltd., P.O. Box 500, No. 8, Baker St., London W. 1. England.
Leytosan (Canada) Ltd., 345 Higgins Ave., Winnipeg, Man.
Morton Chemical Co., 11710 Lake Ave., Woodstock, Illinois, U. S. A.
Niagara Brand Chemicals, 1274 Plains Rd. E., Burlington, Ont.

Results

In 1965 bunt infection was considerably heavier than is usually obtained in experiments in this area. In contrast, the intensity of oat smut was very low and barley smut infection was moderate. Seed treatment, in some cases, increased flax emergence 25% and rye emergence 50%. No definite trend was noted in the root rot test. In 1964 the soil was very dry, germination was patchy and often delayed for several weeks, and these conditions favored root rot in treatments containing mercury (Supplementary Seed Trials - 1964). In 1965 conditions were very wet and root rot in mercury treatments was about the same as the check. Hence, the weather may account for the difference between the two years in respect to root rot infections.

The majority of the chemicals used were satisfactory against smut diseases and they improved the emergence of flax and rye. Several materials warrent further comments.

Materials numbered 5, 26 and 32 (Tables 1 and 2) were unsatisfactory for smuts but significantly increased emergence of flax and rye.

Chemagro 4497 (No. 15) (Table 2) at 2.4 oz controlled smuts but decreased emergence of rye.

The addition of captan to DAC 2797 (No. 17, Table 1) markedly increased the effectiveness of the latter (compare with No. 16, No. 18) (Table 2) against smut and increased seed germination.

The high bunt infection and low oat and barley smut infections obtained with formulation No. 28 (Table 2) is unusual. The results suggest the possibility of an escape from infection of oat and barley smuts due to reasons unknown.

The concentration of Lanstan 20G (No. 51) was too strong and greatly reduced the emergence of wheat and rye.

Formulation Nos. 2, 3, 30 and 31 were unsatisfactory.

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2 Plant Pathologist.

Table 1. Source, formulation and composition of seed treatment materials.

Treatment No.	Source	Formulation		Composition
1	--	--		Untreated check
2	Morton	EP-304	WP	Identity not available
3	"	EP-305	WP	" " "
4	"	EP-306	WP	" " "
5	"	EP-307	WP	" " "
6	"	EP-301-A	Dust	" " "
7	"	EP-301-B	Dust	" " "
8	"	EP-301-C	Dust	" " "
9	"	EP-302-A	Dust	" " "
10	"	EP-302-B	Dust	" " "
11	"	EP-302-C	Dust	" " "
12	"	EP-303-A	Dust	Pandrinox PX methylmercury dicyandiamide 0.72% t heptachlor 20%
13-15	Chemagro	4497	WP	Bis (1,2,2-trichloroethyl) sulfide 50%
16	Diamond Alkali	2787	Dust	Tetrachloroisophthalonitrile 20%
17	" "	2787	Dust	" 20% t captan 20%
18	" "	2787	WP	" 75%
19	Green Cross	65-3	Dust	Identity not available
20	" "	65-4	Dust	" " "
21	" "	65-5	Dust	" " "
22	" "	65-6	Dust	" " "
23	" "	65-14	Dust	" " "
24	" "	Tillex	Liquid	Alkoxy-alkyl-mercury hydroxide 5%
25	" "	Tillex	Liquid	" " " " 33%
26	" "	RD8684	Dust	Identity not available
27	" "	"	Dust	As above t captan
28	" "	RL/70/S/E	Dust	Identity not available
29	" "	TCNA	WP	Tetrachloronitroanisole 67%
30	" "	TRO 142	WP	Identity not available
31	" "	TRO 28	Liquid	" " "
32	Chipman	57-64	Dust	Captan 50%
33	"	53-64	Dust	Identity not available
34	"	58-64	Dust	" " "
35	"	55-64	Dust	" " "
36	Niagara	ME E 326	Dust	NIA 9130 N,N-dimethylcarbamyl N,N-dimethylthiocarbamyl disulfide 75%
37-38	"	ME E 326	Dust	" " 20%
39	Berk	Leytosan 1	Dust	Phenylmercuric acetate (1.25% Hg)
40	"	Leytosan 2	Dust	" "
41	"	Leytosan 3	Dust	" t lindane 20%
42	"	Leytosan 4	Dust	" "
43	"	Leytosan 5	Dust	t ethyl mercury chloride (1% Hg)
44	"	Leytosan 6	Dust	PMA " t lindane 20%
45-46	Niagara	NIA 102 EC	Liquid	Phenylmercuric acetate (2% Hg)
47-48	Morton	EP 254	Liquid	
49-50	Niagara	Puraseed	Liquid	Phenyl amino cadmium dilactate (2.5% cadmium) t phenyl mercury formamide (5.5% Hg)
51	Niagara	Lanstan 20G	Granules	1-chloro-2-nitropropane 20%
52	"	Guardtox	Liquid	Phenyl mercury acetate (Hg?)
53	Chipman	65-5-2	Dust	Identity not available
54	"	65-5-3	Dust	" " "
55	"	65-5-8	Dust	" " "
56	"	65-5-9	Dust	" " "
57	"	65-5-10	Dust	" " "
58	Morton	Panogen 15B	Liquid	Methylmercury dicyandiamide (2.5 oz/gal Hg)
59	Dupont	Ceresan M	Dust	Ethyl mercury-p-toluene sulfonanilide (3.2% Hg)
60	--	--		Untreated check

Table 2. Co-operative Seed Treatment Trials - 1965

Treatment No.	Dosage Cereals oz/bu	Dosage Flax oz/bu	Disease Rating (%) Bunt	Oat Smut	Barley Smut	Flax Emergence	Rye Emergence	Durum Emergence	Durum Root Rot
1	CHECK		21.44	2.42	7.07	62.8	43.7	89.1	13.2
2	1.50	3.00	24.68	1.58	7.92	70.4	37.2	86.5	10.1
3	1.50	3.00	2.96	1.27	9.98	73.6	43.7	90.8	12.1
4	1.50	3.00	0.84	0.07	2.46	71.1	36.8	89.2	16.3
5	1.50	3.00	11.50	0.53	6.95	82.0	53.7	93.3	11.4
6	3.55	7.10	0.05	0.00	0.00	77.4	38.4	86.4	14.4
7	2.12	4.24	0.57	0.09	0.23	76.5	57.4	93.8	15.0
8	1.41	2.82	0.29	0.05	0.00	85.4	57.0	92.3	14.3
9	3.25	6.50	0.00	0.00	0.00	77.2	37.7	81.2	16.3
10	2.00	4.00	0.29	0.00	0.00	82.3	49.9	91.9	16.1
11	2.00	4.00	0.09	0.00	0.21	83.3	56.9	92.1	14.5
12	2.50	5.00	1.83	0.00	0.88	79.1	68.0	92.7	15.0
13	0.60	0.60	10.83	0.23	1.40	63.4	37.1	81.1	16.3
14	1.20	1.20	2.65	0.00	0.00	60.1	40.2	86.7	12.5
15	2.40	2.40	0.14	0.00	0.00	59.9	30.9	78.0	14.5
16	2.00	4.00	3.75	0.30	1.73	73.3	39.1	91.9	14.3
17	2.00	4.00	0.57	0.27	1.82	84.3	60.1	95.9	16.5
18	*0.50	*1.50	2.65	0.61	2.43	71.5	43.8	90.8	14.4
19	2.00	4.00	0.14	0.25	0.67	83.7	62.6	97.1	14.4
20	1.50	3.00	0.19	0.00	0.79	83.8	60.1	92.6	13.0
21	1.00	2.00	0.05	0.00	0.68	81.4	61.9	93.6	13.4
22	1.00	2.00	0.10	0.07	0.31	80.9	60.7	94.1	15.8
23	1.00	2.00	0.00	0.07	0.18	79.8	54.6	89.8	11.2
24	0.50	1.00	0.14	0.00	10.71	77.9	56.5	94.4	15.4
25	0.75	1.50	0.05	0.00	9.07	74.9	52.6	92.6	14.0
26	2.00	4.00	18.37	0.68	7.74	81.1	54.8	93.6	11.6
27	2.00	4.00	2.98	0.76	10.98	74.2	51.3	93.2	10.8
28	0.50	1.00	34.37	0.25	0.76	61.1	33.5	82.3	15.5
29	*0.75	*1.50	0.19	0.68	5.53	68.8	37.1	87.5	13.1
30	*1.00	*2.00	21.97	1.32	10.49	74.6	44.2	91.6	14.6
31	0.75	1.50	18.02	1.81	7.83	65.7	45.9	88.9	14.0
32	2.00	4.00	9.64	0.41	2.11	88.3	66.2	95.4	12.2
33	2.00	4.00	0.14	0.00	0.00	80.4	57.9	92.5	14.4
34	2.00	4.00	0.71	0.46	2.08	87.3	62.0	95.8	15.0
35	2.00	4.00	0.38	0.00	0.04	83.6	65.8	92.6	16.2
36	2.00	4.00	4.68	0.17	0.69	80.0	48.4	94.5	14.0
37	8.00	8.00	0.33	0.04	0.58	75.4	34.6	87.7	14.8
38	4.00	4.00	1.71	0.28	4.27	81.7	44.9	90.2	13.1
39	2.00	4.00	0.29	0.00	0.34	74.2	58.6	94.9	16.5
40	2.00	4.00	0.71	0.00	0.41	83.6	52.1	94.2	16.9
41	2.00	4.00	0.76	0.00	0.45	74.4	52.1	93.6	18.2
42	2.00	4.00	0.19	0.00	0.05	83.8	55.5	92.9	15.0
43	2.00	4.00	0.80	0.00	0.19	81.5	56.5	91.9	15.5
44	2.00	4.00	0.76	0.21	0.13	71.3	54.4	95.1	19.4
45	1.50	3.00	0.48	0.23	0.29	81.4	57.3	93.5	16.5
46	2.00	4.00	0.00	0.00	0.00	82.0	56.2	92.1	20.0
47	0.50	1.00	0.52	0.00	1.78	85.1	59.0	93.4	15.1
48	0.75	1.50	0.24	0.00	0.60	83.6	63.5	96.1	13.0
49	0.75	1.50	0.05	0.36	1.49	82.6	51.4	92.3	17.8
50.	1.00	2.00	0.00	0.12	0.98	79.4	58.1	87.9	16.1
51	**	**	7.15	0.00	0.79	53.7	24.2	41.8	12.4
52	0.75	1.50	0.00	0.07	0.91	78.8	56.9	91.3	17.5
53	2.00	4.00	0.00	0.00	0.00	77.5	57.3	91.1	12.0
54	2.00	4.00	0.00	0.00	0.00	81.3	57.4	93.9	17.9
55	2.00	4.00	0.00	0.00	0.00	81.2	62.3	95.3	14.7
56	2.00	4.00	0.00	0.20	0.79	82.6	55.3	93.5	12.5
57	2.00	4.00	0.00	0.50	0.50	76.7	57.8	94.1	14.0
58	0.75	1.50	0.00	0.00	0.17	86.4	68.8	94.6	11.0
59	0.50	1.00	0.33	0.00	0.09	81.0	57.0	93.9	12.4
60	CHECK		31.05	2.44	8.63	62.9	41.7	87.9	14.9
Least Sign. Difference			4.78	1.36	2.69	10.2	6.4	8.4	5.5

* Applied as a slurry; ** Applied to the soil.