CO-OPERATIVE SEED TREATMENT TRIALS - 1966[1]

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Introduction

Forty-nine seed treatment chemicals were tested in 1966 against common bunt of wheat (Tilletiafoetida (Wallr.) Liro), covered smut of oats (Ustilago kolleri Wille), covered smut of barley, (U. hordei (Pers.) Lagerh.), and seed rots of flax and rye caused by a complex of soil-borne and seed-borne microorganisms.

The object of these experiments was to determine the effectiveness of new formulations of chemicals for use as seed treatments.

Materials and methods

One gram of smut spores of T. foetida, U. kolleri and U. hordei were dusted on 200 grams of clean 'Red Bobs' wheat, naturally smutted 'Vanguard' oats, and naturally smutted 'Plush' barley, respectively. 'Prolific' spring rye, hand-picked to remove broken kernels, and 'Marine' flax were used for emergence tests.

The source, formulation, and composition of the seed treatment materials used in the 1966 tests are given in Table 1. About half of the unidentified materials were drillbox formulations and non-mercurials. Each chemical was applied to the 200 grams of seed at the indicated dosage (Table 2) in a sealer and well shaken. Two days later 200 seeds were packaged in envelopes, placed in polyethylene bags and stored at a cool temperature until seeded (27 to 41 days later). The slurries were prepared by adding 4.2 cc of water to each gram of wettable powder.

All crops were sown at Brandon, Morden and except the 'bunt' test, at Winnipeg. The plots, which were 12 feet long and 9 inches apart were replicated 4 times at each station. Two hundred seeds were sown in each plot and all' seedlings of flax and rye counted. The percentage of smutty heads (Table 2) is based on counts of all heads in the row.

Results and discussion

The barley test at Winnipeg failed to head, possibly because the soil was waterlogged. Hence, the values in Table 2 for bunt and barley smut are for two stations, and for the other tests three stations. As indicated by the non-treated checks, bunt infection was good (13-20 percent); barley smut was erratic as shown by 4.3 percent smutty heads for the first check and 10.4 percent for the second; oat smut was higher than in 1965 (8.1 to 11.4 percent compared to 2.4 percent in 1965). Flax and rye emergence was not improved by the seed treatments, and both crops showed toxic effects from several of the test materials. Generally, all the chemical treatments gave fair to good control of smut diseases.

Several materials warrant additional comment:

Co-op Liquid Wireworm Treatment (#35) is not designed to control plant diseases. Emergence of flax and rye was not affected.

Although the higher dosages used of materials 279 (#3) and 279A (#5) reduced smut infection, they also reduced emergence of flax and rye. A dosage that can control smut without affecting germination may be difficult to obtain.

The 2- and 3-ounce dosage of Chemagro 4497 controlled smut infection, but all three dosages reduced the percentage emergence of flax and rye seedlings.

In the 1966 Co-operative Seed Treatment Trials, Tillex gave good control of barley smut. However, in the 1965 test (2) Tillex failed to control barley smut, although good control of other smuts was obtained. Since samples of all treated seed were kept for subsequent storage effects, samples from the 1965 test were plated using Machacek's agar-sheet test (1). This test indicated that the barley had not been treated.

Acknowledgment

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Literature cited

1. Machacek, J. E. 1950. An agar-sheet method of testing the efficiency of seed treatment machinery. Can. J. Research, C, 28: 739-744.
2. Wallace, H. A. H. 1965. Co-operative seed treatment trials - 1965. Can. Plant Dis. Surv. 45: 124-126.

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

Treatment No.	Source	Formulation		Composition
1	---	---		Untreated check
2-3	Morton	EP-279	WP	Identity not available
4-5	"	EP-279A	L	"
6	"	EP-301-B	D	"
7	"	EP-301-C	D	"
8	"	EP-301-D	D	"
9	"	EP-301-E	D	"
10-12	"	EP-308	D	"
13	Niagara	Me C 791	L	Phenylmercuric acetate 2.40% t aldrin 30.86%
14	"	Niadual MP	L	Identity not available
15	"	" MC Conc.	L	"
16	"	Puraseed	L	"
17	Merck (Metasol)	124A	L	"
18-19	" "	124B	L	"
20	" "	124C	L	"
21-22	" "	124D	L	"
23	" "	124E	L	"
24-25	" "	124F	L	"
26-28	Chemagro	4497 (50%)	WP	Bis (1, 2, 2-trichloroethyl) sulfide 50%
29	Diamond Alkali	2787 t Captan	WP	Tetrachloroisophthalonitrile 35% t captan 35%
30	" "	2787-W75	WP	75%
31	Green Cross	Tillex	L	Alkoxy-alkyl-mercury hydroxide 5%
32	" "	"	L	" 3.3%
33	co-op	Liquid Mercury	L	Oxine-methylmercury 2.25%
34	"	XL Dual Purpose	L	" 1.36 oz./gal. t heptachlor 2.5 lb./gal.
35	"	Wireworm	Sn	Heptachlor 2.5 lb./gal.
36	Green Cross	KMC 324	D	Identity not available
37	" "	MHC 324	D	"
38	" "	PHC 324	D	"
39	" "	XHC 324	D	"
40	" "	BHC 324	D	"
41	" "	DHC 324	D	"
42	" "	THC 324	D	"
43	" "	MHC 223	D	"
44	" "	TMHC 175	D	"
45	" "	TMHC 2222	D	"
46	Chipman	Agrosol-B29	L	Methylmercury dicyandiamide (2.36 oz./gal. Hg)
47	"	Mergamma B-33	L	" " (0.89 oz./gal. Hg) and heptachlor 2.5 lb./gal.
48	"	65-S-1	D	Identity not available
49	"	65-S-7	D	"
50	"	66-S-1	D	"
51	"	66-S-2	D	"
52	"	66-S-3	D	"
53	"	66-S-4	D	"
54	"	66-S-5	D	"
55	Niagara	Polyram 7D	D	Polyram 7% mixture
56	"	" 80	WP	" 80% mixture
57	"	ZMC5-80	WP	Identity not available
58	Morton	Panogen 15B		Methylmercury dicyandiamide (2.5 oz./gal. Hg)
59	Du Pont	Ceresan M		Ethyl mercury-p-toluene sufonanilide (3.2% Hg)
60	---	---		Untreated check

Table 2. Co-operative seed treatment trials - 1966

Treatment No.	Dosage Cereals oz./bu.	Dosage Flax oz./bu.	Disease rating (%) Bunt	Barley Smut	Oat Smut	Flax Emergence	Rye Emergence
1	CHECK		20.13	4.30	11.40	69.0	58.3
2	*1.00	*2.00	0.00	4.84	0.42	49.7	57.8
3	*2.00	*4.00	0.00	0.06	0.00	41.0	41.3
4	1.30	2.60	0.13	5.56	0.98	49.1	56.4
5	2.60	5.20	0.00	1.88	0.04	29.0	48.3
6	2.12	4.24	0.00	0.00	0.17	68.4	63.4
7	1.41	2.82	0.13	0. 31	0.87	71.4	68.3
8	2.00	4.00	0.00	1.81	1.08	70.0	67.4
9	2.00	4.00	0.63	1.56	1.58	67.6	67.3
10	1.42	2.84	0.00	0.00	0.12	72.5	57.0
11	0.71	1.42	0.00	0.19	0.21	66.6	60.1
12	0.35	0.70	0.06	0.50	0.50	72.0	60.6
13	2.00	4.00	0.13	1.56	0.43	66.7	66.8
14	2.00	4.00	2. 88	1.50	0.08	71.3	65.3
15	0.75	1.50	0.25	1.45	0.05	67.0	67.5
16	0.75	1.50	0.06	4.38	0. 38	73.0	65.1
17	0.50	1.00	0.61	2.00	0.00	72.0	65.9
18	0.50	1.00	0.69	3. 25	0.33	70.9	61. 3
19	0.75	1.50	0.06	1.88	0.17	72.9	57.8
20	2.00	4.00	2.00	0.74	0.12	69.5	68.1
21	0.50	1.00	0.13	0.88	0.00	67.0	62.9
22	0.75	1.50	0. 13	1.94	0.04	69.0	62.1
23	2.00	4.00	2.00	1.44	0.26	70.3	66.3
24	0.50	1.00	0.06	2.81	2. 17	68.8	62.8
25	0.75	1.50	0.19	3.44	1. 17	68.7	64.3
26	*1.00	*2.00	2.19	4.19	0.42	49.4	53.3
27	*2.00	*4.00	0.25	0. 13	0.00	48.2	53.4
28	*3.00	*6.00	0.00	0.00	0.00	48.2	48.7
29	*2.00	*4.00	0.38	1.95	0.67	66.3	55.8
30	*1.00	*2.00	0.13	1.75	2.12	64.7	60.9
31	0.50	1.00	0.13	0.88	0.46	67.4	63.6
32	0.75	1.50	0.00	0.69	0.42	72.3	60.8
33	0.75	1.50	0.25	3.03	0.25	72.4	63.2
34	2.00	4.00	1.31	1.94	0.33	72.1	69.8
35	2.00	4.00	18.06	7.73	11.43	62.8	64.5
36	2.00	4.00	0.00	7.48	1.85	66.8	57.5
37	2.00	4.00	0.06	0.56	0.34	67.5	61.9
38	2.00	4.00	0.19	3.19	0.87	67.0	60.3
39	2.00	4.00	0.00	6.39	1.76	70.9	59.5
40	2.00	4.00	0.06	7.06	0.79	74.1	61.7
41	2.00	4.00	0.00	3.98	1.89	68.3	62.3
42	2.00	4.00	0.00	5.31	0.47	64.0	64.2
43	2.00	4.00	0.19	0.94	1.01	67.7	60.3
44	2.00	4.00	0.00	1.44	0.58	68.0	64.0
45	2.00	4.00	0.06	1.69	0.33	67.0	60.0
46	0.75	1.50	0.25	1.63	0.12	64. 2	63. 1
47	2.00	4.00	1.31	0.60	0.00	66.0	66.1
48	2.00	4.00	0.00	0.06	0.09	72.4	58.4
49	2.00	4.00	0.00	0.06	0. 17	68.4	58.3
50	2.00	4.00	0.00	0.00	0.04	72. 6	65.3
51	2.00	4.00	0.00	0.06	0.38	71.9	65.9
52	2.00	4.00	2.00	3. 13	0.39	66.7	60.8
53	2.00	4.00	0.06	2.63	1.66	71.0	63.5
54	2.00	4.00	0.00	4.31	1.95	73.5	65.4
55	9.60	19.20	0.06	2.75	3.23	67.9	56.9
56	*2.00	*4.00	0.00	1.19	a. 37	63.6	59.6
57	2.00	4.00	0.00	0.50	0.21	60.2	61.6
58	0.75	1.50	0.00	1.63	0.08	65.5	65.8
59	0.50	1.00	0.25	1.69	0.00	64.9	59.9
60	CHECK		13.19	10.46	8.16	65.8	61.3
Least Significant Difference			2.97	4.25	2.22	7.0	8.0

*Applied as a slurry.