CO-OPERATIVE SEED TREATMENT TRIALS -- 1961[1]

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Abstract

In 1961, twenty-eight seed-treatment products were tested at a number of stations against common bunt of wheat (mixed Tilletia toetida (Wallr.) Liro and T. caries (DC.) Tul.), oat smut (mixed Ustilago avenae (Pers.) Rostr. and U. kolleri Wille), covered smut of barley (U. hordei (Pers.) Lagerh.) and seed rot of flax, All but four were effective against bunt, all but eight were effective against oat smut, and all but six against barley smut. Seven of the treatments significantly reduced seed rot of flax,

Materials and Methods

Kind of Treatment Tested

1. Control -- Seed not treated.
2. Ceresan M -- A powder containing 3.2% mercury as ethyl mercury p-toluene sulfonanilide. Obtained from E.I, duPont de Nemours, Wilmington, Delaware.
3. Leytosan Dual Seed Dressing -- A powder containing 40.0% heptachlor and 2.0% mercury as mixed phenyl mercury acetate and ethyl mercury chloride, Obtained from Leytosan (Canada) Limited, Winnipeg, Manitoba.
4. ACS Mercury Seed Treatment -- A powder containing 5.0% mercury as mixed phenyl mercury acetate and ethyl mercury chloride. Obtained from Allied Chemical Services, Calgary, Alberta.
5. Thiourea Omadine -- A powder containing 50.0% of a derivative of pyridinethione. Obtained from Olin Mathieson Chemical Corporation, Port Jefferson Station, New York.
6. Zinc Omadine -- A powder containing 50.0% of a zinc salt of pyridinethione. Obtained from Olin Mathieson Chemical Corporation, Port Jefferson Station, New York.
7. Ortho LM Dry -- A powder containing 3.2% mercury as methyl mercury 8-hydroxyquinolinate, Obtained from Ortho Agricultural Chemicals Ltd., Vancouver, B.C,
8. Fairview Mercury Compound -- A powder Containing 5.0% mercury as mixed phenyl mercury acetate and ethyl mercury chloride. Obtained from Fairview Chemical Company Ltd., Regina, Sask.

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9. Seventy-Seven Mercury Seed Dressing -- A powder containing 5.0% mercury as mixed phenyl mercury acetate and ethyl mercury chloride. Obtained from Seventy-Seven Oil Company Ltd., Lethbridge, Alberta.
10. Aagrunol LS 200 -- A liquid containing 2.0% mercury as methyl mercury benzoate. Obtained from N. V. Aagrunol Chemical Works, Groningen, Holland.
11. Aagrunol LSV 150 -- A liquid containing 1.5% mercury as methyl mercury benzoate. Obtained from N. V. Aagrunol Chemical Works, Groningen, Holland.
12. Aagrunol LS 175 -- A liquid containing 1.75% mercury as methyl mercury benzoate. Obtained from N. V. Aagrunol Chemical Works, Groningen, Holland.
13. Aagrunol LSA 175 -- A liquid containing 1.75% mercury as methyl mercury benzoate. Formula different from that of Treatment 12, Obtained from N, V. Aagrunol Chemical Works, Groningen, Holland.
14. Canuck Mercury-Heptachlor -- A liquid containing 25.0% heptachlor and 1.08% mercury as phenyl mercury acetate. Obtained from Gallowhur Chemicals Canada Ltd., Lachine, Quebec.
15. Standard Formaldehyde -- A liquid containing 37.0% formaldehyde. Obtained from Standard Chemical Ltd., Montreal, Quebec.
16. Panogen 15 -- A liquid containing 1.5% mercury as methyl mercury dicyandiamide. Obtained from Morton Chemical Company, Woodstock, Illinois.
17. Pandrinox -- A liquid containing 24.4% heptachlor and 0.5% mercury as methyl mercury dicyandiamide. Obtained from Morton Chemical Company, Woodstock, Illinois,
18. EP-193 -- A liquid containing a mixture of pentachlornitrobenzene and heptachlor. Obtained from Morton Chemical Company, Woodstock, Illinois.
19. Liquid Mergamma -- A liquid containing 2 5/8 lb. heptachlor per Imp. gal. and 0.5% mercury as methyl mercury dicyandiamide. Obtained from Chipman Chemicals Ltd., Hamilton, Ontario,
20. Agrosol -- A liquid containing 1.5% mercury as methyl mercury nitrile. Obtained from Chipman Chemicals Ltd., Hamilton, Ontario.
21. Metasol MP -- A liquid containing 1.25% mercury as methyl mercury propionate. Obtained from Metalsalts Corporation, Hawthorne, New Jersey,
22. ACS Liquid Mercury ST (concentrate) -- A liquid containing 4.2% mercury as methyl mercury'8-hydroxyquinolinate. Qbtained from Allied Chemical Services Limited, Calgary, Alberta.
23. ACS Liquid Mercury ST -- A liquid containing 1.25% mercury as methyl mercury 8-hydroxyquinolinate. Obtained from Allied Chemical Services Ltd., Calgary, Alberta.
24. Fairview Liquid Mercury SD -- A. liquid containing 1.25% mercury as methyl mercury 8-hydroxyquinolinate. Obtained from Fairview Chemical Company Limited, Regina, Saskatchewan.
25. Niadual -- A liquid containing 25.0% aldrin and 1.45% mercury as phenyl mercury acetate. Obtained from Niagara Brand Chemicals Ltd,, Burlington, Ontario.
26. New Gallotox -- A liquid containing 4.1% mercury as phenyl mercury acetate. Obtained from Niagara Brand Chemicals Ltd., Burlington, Ontario.

27. Canuck Liquid Mercury -- A liquid containing 3.88% mercury as phenyl mercury acetate. Obtained from Gallowhur Chemicals Canada Ltd., Lachine, Quebec.
28. Memmi -- A liquid containing 10.0% methyl mercury chlorendimide. Obtained from Velsicol Chemical Corporation, Chicago, Illinois.
29. Morven -- A liquid containing 27.4%, 2,4,5-trichlorophenate. Obtained from Dow Chemical Company, Midland, Michigan.

Kinds of Seeds Used in Trials

Wheat bunt trials -- Variety Red Bobs. Seed artifically contaminated (1:200, by weight) with mixed spores of Tilletia tritici and T. foetida.
Oat smut trials -- Variety Vanguard. Seed naturally contaminated with mixed spores of loose and covered smut.
Barley smut trials -- Variety Plush. Seed naturally contaminated with spores of covered smut.
Flax seed-rot trials -- Variety Redwood. About 50% of the seeds cracked during threshing.

Kinds of Plots and Analysis of Experimental Data

The field plots used in the comparison of treatments were single-row units with the rows 10 to 14 feet long and 9 to 12 inches apart. The units were arranged in randomized blocks with four replicates for each treatment. In supplementary tests under greenhouse conditions the plots were single-row units with the rows about 30 inches long and about 2 inches apart. The field plot experiments were used for the determination of the amount of surface-borne smut in wheat, oats and barley, and for the measurement of non-emergence in flax. The greenhouse tests were used principally for the determination of phytotoxicity of the various treatments to treated seed which was stored in closed glass jars for about 4 1/2 months.

Experimental Results

The data obtained from field plots during 1961 are summarized in Table 1. They show that Thiourea Omadine, Pandrinox and Memmi were moderately effective against wheat bunt while Morven was, ineffective. All the other products tested gave good control. With oat smut, Memmi and Morven gave poor control; Thiourea Omadine, Canuck Mercury-Heptachlor, EP-193, Niadual, New Gallotox and Canuck Liquid Mercury gave moderate control, while the remainder of the products tested gave good control. Thiourea Omadine, EP-193 and Morven gave poor control of barley smut, while Niadual, New Gallotox and Memmi showed moderate control. All the other products were satisfactory. In the case of flax, seven of the products tested controlled seed rot fairly well but in most cases there was only a slight control.

In seed that was treated and sown after 4 1/2 months in closed storage some phytotoxicity to wheat was shown by Canuck Mercury-Heptachlor, and severe phytotoxicity by Formaldehyde. None of the treatments seemed to be phytotoxic to oats, barley or flax.

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Table 1. Co-operative Seed Treatment Trials - 1961, Summary of results[a/]

Treatment NO.	Abbreviated name of seed dressing	Dose (oz./bu.)[b/] Wheat	Oats	Barley	Flax	Percentage smut Wheat	Oats	Barley	Percentage non-emergence Flax
1	Control (dry, untreated seed)	0.00	0.00	0.00	0.00	33.7	11.8	7.4	63.0
2	Ceresan M (powder)	0.50	0.50	0.50	1.50	0.1	0.1	0.2	56. 2
3	*Leytosan Dual Seed Dressing (powder)	2.00	1.40	1.40	5.00	0.3	0.3	0.5	58.0
4	ACS Mercury Seed Treatment (powder)	0.50	0.50	0. 50	1.50	0.2	0.2	0.2	55.3
5	Thiourea Omadine (powder)	0.50	1.00	1.00	3.00	1.2	3.1	6.5	58.7
6	Zinc Omadine (powder)	1.50	2.00	2.00	6.00	0.1	0.5	0.1	57.3
7	Ortho LM Dry (powder)	0.50	0.50	0.50	1.50	0.0	0.1	0.2	50.8
8	Fairview Mercury Compound (powder)	0.50	0.50	0.50	1.50	0.1	0.4	0.3	54.5
9	Seventy-seven Mercury Seed Dressing (powder	0.50	0.50	0.50	1.50	0.2	0.0	0.5	54.6
10	Aagrunol LS 200 (liquid)	0.75	0.75	0.75	1.50	0.0	0.1	0.1	46.2
11	Aagrunol LSV 150 (liquid)	0.75	0.75	0.75	1.50	0.1	0.1	0.2	49.6
12	Aagrunol LS 175 (liquid)	0.75	0.75	0.75	1.50	0.0	0.1	0.1	49.5
13	Aagrunol LSA 175 (liquid)	0.75	0.75	0.75	1.50	0.0	0.1	0.3	53.3
14	*Canuck Mercury-Heptachlor (liquid)	3.00	2.25	3.00	5.00	0.4	1.4	0.5	62.6
15	Formaldehyde (liquid)	:Ten-minute soak 1/320 solution)			Flax not reated)	0.1	0.2	0.7	63.6
16	Panogen 15 (liquid)	0 75	0.75	0.75	1.50	0.0	0.0	0.1	53.2
17	Pandrinox (liquid)	2. 12	2.12	2.12	4.00	1.1	0.1	0.1	57.7
18	EP-193 (liquid)	2.25	2.25	2.25	6.00	0.4	3.9	7.8	63.2
19	Liquid Mergamma (liquid)	3.00	1.88	1.88	7.50	0.1	0.1	0.1	57.8
20	Agrosol (liquid)	0.75	0.75	0.75	1.50	0.1	0.1	0.1	48.9
21	Metasol MP (liquid)	0.75	0.75	0.75	1.50	0.0	0.1	0.2	50.4
22	ACS Liquid Mercury ST (Concentrated) (liquid)[c/]	0.25	0.25	0.25	0.75	0.0	0.0	0.1	59.0
23	ACS Liquid Mercury ST (liquid)	0.75	0.75	0.75	1.50	0.1	0.1	0.8	50.4
24	Fairview Liquid Mercury SD (liquid)	0.75	0.75	0.75	2.00	0.1	0.1	0.1	48.2
25	Niadual (liquid)	2.00	1.40	1.40	5.00	0.1	2.7	2.1	55.9
26	New Gallotox (liquid)	0.75	0.75	0.75	1.50	0.3	1.0	1.1	54.8
27	Canuck Liquid Mercury (liquid)	.75	.75	.75	2.25	0.2	1.2	0.2	51.2
28	Memmi (liquid)[c/]	.75 oz. f 1:7 fo cereals)		—	75 oz. of 3 for flax)	1.8	6.9	1.1	59.8
29	Morven (liquid)	.75	.75	.75	1.50	10.7	7. 1	9.1	63.6
	significant difference (5%)					3.08	0.80	3.88	4. 56

a/ Means of 7 Stations for wheat, 10 Stations for oats, 11 Stations for barley, 10 Stations for flax.

b/ For treatments marked by asterisk (*) the dosage was based on the following seeding rates: 1.25 bu./acre for wheat, 1.75 bu./acre for oats and barley, and 0.50 bu./acre for flax.

c/ Diluted with water before use.