GO-OPERATIVE SEED TREATMENT TRIALS -- 1960 [1]

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Abstract

Twenty seed-treatment products, 10 powders and 10 liquids, were tested in experimental plots against bunt of wheat (mixed Tilletia foetida (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 promoted by mechanical injury to the seed. The products were also tested under greenhouse conditions for their phytotoxicity to stored seed, and some of the commercial products were tested further at more than one dosage to determine whether the rate now used could be safely reduced. The results obtained showed that all but one treatment controlled bunt of wheat, five treatments controlled smut of oats, eight treatments controlled smut of barley, and six treatments controlled seed rot of flax, A few products were found to be phytotoxic to wheat but not to oats or barley.

Materials and Methods

The seed-treatment products tested in 1960 were:

Aabiton-- A liquid containing 1.5% mercury as methyl mercury benzoate, Obtained from Leytosan (Canada) Ltd., Winnipeg, Manitoba.

Aagrunol VBS 20 -- A liquid containing 2.0% mercury as methyl mercury benzoate. Obtained from N. V. Aagrunol Chemical Works, Groningen, Holland.

Aagrunol VTF 100 RCE -- A liquid containing 34.0% heptachlor and 1.0% mercury as methyl mercury benzoate. Obtained from N. V. Aagrunol Chemical Works, Groningen, Holland.

Ceresan M -- A powder containing 3.2% mercury as ethyl mercury-p-toluene sulfonanilide. Obtained from I. E. du Pont de Nemours, Wilmington, Delaware.

Dual Purpose Bunt-No-More -- A powder containing 40.0% heptachlor and 13.0% hexachlorobenzene. Obtained from Green Cross Products, Montreal, Quebec.

Gallodual -- A liquid containing 30.8% aldrin and 1.43% mercury as phenyl mercury acetate. Obtained from Gallowhur Chemicals Canada Ltd., Lachine, Quebec.

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Liqui -San Metasol -- A liquid containing 1.4% mercury as methyl mercury 8-hydroxyquinolinate. Obtained from Green Cross Products, Montreal, Quebec.

Liqui-San Metasol Concentrate -- A liquid containing 4.2% mercury as methyl 8-hydroxyquinolinate. Obtained from Green Cross Products, Montreal, Quebec.

Nuodex PMA-5 -- A powder containing 5.0% mercury as phenyl mercury acetate. Obtained from Nuodex Products of Canada Ltd., Toronto, Ontario.

Nuodex PMA-4.2 -- A liquid containing 4.2% mercury as phenyl mercury acetate. Obtained from Nuodex Products of Canada Ltd., Toronto, Ontario.

Omadine No. 2129 -- A powder containing a derivate of pyridinethione ("Omadine thiourea"). Obtained from Olin Mathieson Chemical Corporation, Port Jefferson Station, New York.

Omadine No. 1563 -- A powder containing a zinc salt of pyridinethione. Obtained from Olin Mathieson Chemical Corporation, Port Jefferson Station, New York.

Ortho LM Seed Protectant (dry) -- A powder containing 3.2% mercury as methyl mercury 8-hydroxyquinolinate , Obtained from California Spray-Chemical Corporation, Maryland Heights, Missouri.

Ortho Seed Guard Wettable -- A powder containing 17.0% lindane and 50.0% captan. Obtained from Ortho Agricultural Chemicals Ltd., Vancouver, British Columbia.

Pandrinox -- A liquid containing 24.4% heptachlor and 0.5% mercury as methyl mercury dicyandiamide, Obtained from Morton Chemical Company, Woodstock, Illinois.

Panogen 15 -- A liquid containing 1.5% mercury as methyl mercury dicyandiamide. Obtained from Morton Chemical Company, Woodstock, Illinois.

Panogen 42 -- A liquid containing 4.2% mercury as methyl mercury dicyandiamide. Obtained from Morton Chemical Company, Woodstock, lllinois,

Puradrin XL -- A powder containing 30.070 lindane and 1.85% mercury as phenyl mercury formamide. Obtained from Gallowhur Chemicals Canada Ltd. , Lachine, Quebec,

Puraseed -- A powder containing 3.85% mercury as phenyl mercury formamide. Obtained from Gallowhur Chemicals Canada Ltd., Lachine, Quebec.

Trisanide -- A powder containing 50.0% auramine dimethyl dithiocarbamate and 25.0% hexachlorobenzene. Obtained from Niagara Brand Chemicals, Burlington, Ontario.

The seed used for 1960 trials was as follows:

Wheat bunt trials -- Wheat variety Red Bobs. The seed was artificially contaminated (1:200, by weight) with mixed dry spores of Tilletia foetida and T. caries.

Oat smut trials -- Oat variety Vanguard. A light natural inoculum on seed supplemented by mixed spores of Ustilago avenae and U. kolleri. The extra inoculum (1:600) was applied by the partial vacuum method and the inoculated seed was dried at room temperature for a week before it was treated.

Barley smut trials -- Barley variety Herta. The light natural inoculum was supplemented with spores (1:600) of Ustilago hordei applied by the partial vacuum method. The seed was then dried for a week at room temperature.

Flax seed-rot trials -- Flax variety Redwood. About 50% of the seeds were cracked during threshing.

The seed was treated by mixing predetermined quantities of fungicide and seed in closed half-gallon glass jars shaken vigorously 200 times by means of a specially built laboratory device. This gave an excellent mix with fungicides in powder form and good mix with liquids. The treated seed was left in the jars for 24 hours, after which four 200-seed lots for each experiment were withdrawn from each jar for sowing in the field and the two 100-seed lots for sowing in the greenhouse. The jars with the treated seed were then set aside for about 4 1/2 months after which two other 100-seed lots were withdrawn for a second sowing in the greenhouse. The field sowings provided information concerning the effectiveness of the different fungicides against smut in wheat, oats, and barley, and against seed rot in flax, while the sowings in the greenhouse yielded data concerning the phytotoxicity of each product in the test.

Experimental Results

The data obtained from the field plots in 1960 are summarized in Table 1. This table shows that all of the treatments tested, except Ortho LM Seed Protectant (dry) and Omadine No. 2129, gave a good control of bunt in wheat; that Ceresan M, Nuodex PMA-5, Aagrunol VTF 100 RCE and Pandrinox gave good control of the oat smuts; and that Ceresan M, Puradrin XL, Aagrunol VTF 100 RCE, Gallodual, Liyui-san, Pandrinox, and Panogen 15 gave good control of barley smut. Several of the materials tested controlled seed rot of flax, Table 1 shows also that some of the products in the trials were used at too low a dosage, resulting in inadequate control of disease.

Tests in the greenhouse of stored treated seed showed that Nuodex PMA-5, Puradrin XL, and Aagrunol VTF 100 RCE could be, under some conditions at least, severely phytotoxic to wheat. Ceresan M, Gallodual, and Pandrinox under the same conditions caused only moderate injury. Oats and barley showed only light injury or none at all.

Treatment	Dose (oz./bu.) [b]				Percentage smut			Percentage germination
	Wheat	Oats	Barley	Flax	Wheat	Oats	Barley	Flax
Control (dry untreated seed)	0.00	0.00	0.00	0.00	22.3	13.0	6.4	41.9
Ceresan M (powder)	0.50	0.00	0.50	1.50	0.0	2.2	1.1	55.7
*Dual Purpose Bunt-No-More (powder)	2.00	1.40	1.40	5.00	0.1	12.1	6.0	36.0
Nuodex PMA-5 (powder)	1.30	1.30	1.30	1.30	0.2	2.3	0.5	50.6
Omodine No. 2129 (powder)	0.50	0.50	0.50	1.50	1.2	11.5	4.9	43.7
" No. 1563 (powder)	1.50	1.50	1.50	1.50	0.3	7.8	2.6	51.8
Ortho LM Seed Protectant (powder)	0.50	0.50	0.50	1.50	8.0	9.8	5.9	42.3
Ortho Seed Guard Wettable (powder)	1.50	1.50	1.50	3.00	1.2	8.5	3.6	60.1
*Puradrin XL (powder)	2.00	1.40	1.40	5.00	0.3	2.7	1.3	48.5
Puraseed (powder)	0.50	0.50	0.50	1.50	1.0	4.8	2.2	51.5
Trisanide (powder)	2.00	1.13	1.60	1.80	0.1	8.6	3.9	39.4
Aabitan (liquid)	0.75	0.75	0.75	1.50	0.1	5.3	2.9	50.7
Aagrunol VBS 20 (liquid)	0.75	0.75	0.75	1.50	0.1	3.7	2.0	57.3
" VTF 100 RCE (liquid)	2.00	2.00	2.00	2.00	0.1	1.2	0.1	55.6
Gallodual (liquid)	2.00	2.00	2.00	6.00	1.2	3.9	1.2	40.6
Liqui-son (liquid)	0.75	0.75	0.75	1.50	0.1	2.8	1.6	49.5
" concentrate (liquid) [c]	0.20	0.20	0.20	0.60	0.2	3.8	3.7	49.2
"	0.25	0.25	0.25	0.75	0.1	3.6	2.7	50.5
Nuodex PMA-42 (liquid)	0.75	0.75	0.75	1.50	0.1	6.4	1.8	51.9
Pondrinox (liquid)	2.12	2.12	2.12	5.00	0.3	2.2	1.6	46.3
	3.75	3.75	3.75	6.00	0.1	1.2	0.2	45.7
Panogen 15 (liquid)	0.50	0.50	0.50	1.50	0.1	4.8	3.0	60.9
	0.75	0.75	0.75	2.25	0.2	2.6	1.4	60.2
Panogen 42 (liquid) [c]	0.20	0.20	0.20	0.60	0.2	4.1	2.3	52.4
	0.25	0.25	0.25	0.75	0.1	2.9	1.8	55.0

[a] Means of 6 Stations for wheat, 10 Stations for oats, 11 Stations for barley, and 9 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.

The writers wish to thank the following for their active interest in this work:

Dr. M.C. Shurtleff, Ames, Iowa; Mr. D.S. McBean, Swift Current, Sask.; Mr. J.S. Horricks, Lethbridge, Alta.; Dr. R. O. Lachance, Ste. Anne de la Pocatiere, Que.; Mr. A.A. Guitard, Beaverlodge, Alta.; Prof. T.C. Vanterpool, Saskatoon, Sask.; Mr. T. C. Chiasson, Fredericton, N.B.; Dr. R. C. Russell, Saskatoon, Sask.; Mr. H. R. Ballantyne, Melfort, Sask.; Mr. J. E. Campbell, Charlottetown, P. E.I.; Mr. M.B. Moor, St. Paul, Minn.; Dr. W. P. Campbell, Edmonton, Alta.; Mr. W. H. Johnston, Brandon, Man.; Dr. S. G. Fushtey, Guelph, Ont.; Dr. R. V. Clark, Ottawa, Ont.; Dr. M.L. Kaufmann, Lacombe, Alta.; Mr. I.L. Connors, Ottawa, Ont.; Dr. D.C. Arny, Madison, Wisc.; Dr. L.H. Purdy, Pullman, Wash.; Dr. W. Crosier, Geneva, N.Y.; Dr. A. W. Henry, Edmonton, Alta.; Mr. W. L. Crowle, Scott, Sask.

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