

Influence of Different Insecticidal Seed Treatments on Wheat

by

B. K. SRIVASTAVA,
Division of Entomology,
Indian Agricultural Research Institute,
New Delhi

During seed treatment studies of cereals (Srivastava, 1955) at Kansas Agricultural Experiment Station, Manhattan, U. S. A. some interesting results were observed with wheat which are recorded below.

Insecticides and insecticide-fungicide formulations were applied at different rates as seed treatment on wheat to determine the effect of each on germination and subsequent plant growth. The insecticides used were wettable powders of 25% lindane, 75% aldrin, and 50% heptachlor. Insecticide-fungicide combinations used included Seed Guard, a commercial wettable powder formulation, and liquid Panogen PA-1 and Panogen PA-2. A given quantity of certified Pawnee wheat was weighed and treated with different dosages of chemicals in a motordriven rotary mixer on the basis of fluid or avoirdupois ounces per 100 pounds of seed. Treated and untreated samples were then placed in individual cotton sacks and stored in a dry room to simulate farm storage conditions.

Periodically 110 seeds were removed from each sample and sent to the State seed laboratory, Topeka U. S. A., for standard tests. Identical samples were simultaneously planted in silt loam soil in metal flats placed on tables out of doors. Counts were taken of the germination rates of each sample and observations made on the initial growth of the seedlings. When the plants became stationary in height, the flats were washed, the plants removed free from the soil and oven dried at 100°C for 48 hours. The ratio of top to root was determined on the basis of weight. After keeping the values of tops constant in all treatments it was possible to compare the amount of root development in different treatments.

The statistical analyses of the results were made as followed by Srivastava and Bryson (1956), and are summarised in Tables I and II.

It is apparent from Table I that Panogen PL-1 produced an adverse effect on the germination in flats as well as in the standard tests where total germination was much lowered. All its three

dosages significantly reduced the emergence and brought about a noticeable delay in germination. Seed Guard induced early emergence of the seedlings and produced a vigorous stand as compared to the other treatments. Lindane and Seed Guard slightly lowered the total emergence in standard tests which was, however, not observed in flats.

It is further evident that all the three dosages of Panogen PA-2 were satisfactory in storage for one and a half months, but later the two higher dosages 7.0 and 8.0 fluid ounces per 100 pounds of seed, produced a significant reduction in germination. Lindane injured the total germination at each period of testing. Panogen PL-1 was similar to lindane and injured the germination after four months. Seed Guard which showed a slight reduction in total emergence in the test made immediately after treatment produced further adverse effects on germination after four months.

The data in Table II show that Panogen PL-1 gave a highly significant lower root-top ratio than all other treatments, with median and highest dosages i. e. 2.5 and 3.5 fluid ounces per 100 pounds of seed, each significantly low. No other differences observed were significant although Seed Guard apparently showed more development of roots than the normal.

REFERENCES

1. Srivastava, B. K. 1955 Insecticides as seed protectants of the important cereals of Kansas. Pub. No. 12342, Univ. Microfilms, Ann Arbor, Michigan.
2. Srivastava, B. K. 1956 Insecticidal seed treatment for control of the thief ant. *J. econ. Entomol.* 49: 329-33.

TABLE I

Effect of Insecticides on germination and rate of emergence of wheat seedlings.

Chemical and Concentration	Ounces per 100 lbs. of seed	Seeds planted in flats immediately after treatment		% Germination in standard tests (after treatment)		
		Mean emergence in days	% Germination	Immediately	1½ Month	4 Months
Aldrin 75% W. P.	2.5	5.34	92	95	98	97
	4.5	5.30	94	88	94	98
	5.5	5.32	92	97	97	97
Panogen, PA-2 (Fluid)	6.0	5.31	90	94	90	95
	7.0	5.37	89	96	93	86
	8.0	5.36	94	94	93	88

TABLE I (Contd.)

Chemical and Concentration	Ounces per 100 lbs. of seed	Seeds planted in flats immediately after treatment		% Germination in standard tests after treatment		
		Mean emergence in days	% Germination	Immediately	1½ months	4 months
Lindane 25%, W. P.	3.0	5.33	93	88	84	77
	4.0	5.34	94	92	88	79
	5.0	5.32	95	91	90	77
Panogen, PL-1 (Fluid)	2.0	7.02	83	79	63	54
	2.5	7.39	79	75	46	85
	3.5	7.36	44	3	12	44
Seed Guard	2.7	5.06	95	91	95	86
Heptachlor 50% W. P.	4.0	5.35	92	97	93	96
	5.0	5.30	91	96	97	94
	6.0	4.33	95	94	94	94
Untreated	0.0	5.38	93	97	96	97
95% C. I. limit	...	...	16-97	92-99	90-99	92-99

TABLE II

*Means of the proportional development of roots compared to tops as influenced by the Seed Treatment with various Insecticidal Dosages **

Insecticides	Initial dosage	Median dosage	Highest dosage	All dosages
Aldrin	141.5	141.5	142.0	141.27
Panogen PA-2	142.0	142.0	141.5	141.8
Lindane	143.0	141.0	141.5	141.8
Panogen PL-1	94.0	88.0	69.0	83.7
Heptachlor	141.5	141.5	142.5	141.8
All treatments	132.5	130.8	127.3	130.2
Seed Guard	...	...	...	143.5
Check	...	...	...	139.5

Analysis of Variance

Sources of Variation	df.	MS.
Treatments	6	2781.1
Concentrations	2	68.0
T x C	8	69.7
Error	17	3.6
Total	33	

* Concentration and dosages used are the same as in Table I