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EFFECT OF DIFFERENT CHEMICAL SEED TREATMENTS ON GERMINATION GROWTH AND YIELD OF WHEAT

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The effect of different chemical seed treatments to Mexipak-65 against the foot-rot disease was evaluated for their efficacy as seed dressers. Germination, tillering, grain number and grain weight per ear, stem length, ear length, combating mortality in seedlings and yield were used as criteria. Dieldrex proved an effective seed dresser then all other treatments.

INTRODUCTION

Pre-sowing seed treatment is a routine agricultural practice against seed-borne diseases in many countries of the world. It is considered one of the cheapest method for controlling seed-borne diseases of plants and protecting seedlings against soil-borne diseases. Limited information is available on the seed treatment of wheat and the real importance of these operations has not been adequately realized in Pakistan. The available information has been reviewed by Kausar (1955) who considered the seed treatment a beneficial practice in wheat and barley. Zia (1960) considered seed treatment as one of the methods for increasing yield in wheat. Csuti (1964) controlled the foot rot disease in field and laboratory experiments by using Borax and Dithane M-22. Machacek and Greaney (1941), Iqbal and Kausar (1969) and Niazi (1968) observed that seed disinfested with chemicals gave significantly higher germination, tillering, earing, number & weight of grain per ear and significantly high yield than the seeds not treated with chemicals.

Since our old varieties of wheat viz. C591, C518, C271 and C273 are susceptible to almost all diseases and have now been replaced by Mexican wheats, the present investigation was designed to see the effect of chemical seed treatment on the performance of Maxipak-65 against the foot rot disease of wheat under Lyallpur conditions.

MATERIALS AND METHODS

Wheat plants of Var. Mexipak-65 affected by foot rot disease were

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collected from the Experimental Area of the plant Pathology Section, Punjab Agricultural Research Institute, Lyallpur. Isolations were made in a usual way (Ricker and Ricker, 1936). After washing the plants in distilled and sterilized water to remove soil particles and then small pieces of plants were cut disinfecting them by putting the pieces in 0.1% mercuric chloride solution for ½ to 2 minutes. A washing was again given with sterilized and distilled water to remove the effect of mercuric chloride. The pieces were planted on potato dextrose agar medium. Hyphae of the fungi coming out after few days were transferred on potato dextrose agar medium (Boosalis, 1960) for further growth and identification. Sufficient culture of this fungus was prepared in sterilized and distilled water and a crop of this solution was examined under the microscope to confirm the correct identification of (*Helminthosporium sativum*) and to get at least 10-15 number of lyphae or spores per microscopic lens field in the solution to cause disease to the infested seeds.

Seeds of wheat variety Mexipak-65 were treated as follows before sowing ;

1. Seed as such (control)
2. Seed disinfested with Granosan M.
3. Seed disinfested with Dieldrex.
4. Seed infested with (*Helminthosporium Sativum*).
5. Seed given hot water treatment and treated with Granosan M.
6. Seed given hot water treatment and treated with Dieldrex.
7. Seed infested with (*Helminthosporium sativum*) and treated with Granosan M.
8. Seed infested with (*Helminthosporium sativum*) and treated with Dieldrex.
9. Seed treated with solution of Granosan M.
10. Seed treated with solution of Dieldrex.

432 seeds were sown in each plot to make the plant population as uniform as possible. Net plot size was kept as 18' × 4½' (1/537.77 acre) with three replications in a randomized block design. Row to row distance was 9" and plant to plant distance was approximately 3". Sowing was done with a single row drill at the experimental area of Agronomy Department, University of Agriculture, Lyallpur.

Germination percentage, number of total tillers per plant, number of spike bearing tillers, plant length, number of grains per spike, weight of grains der spike and grain yield were recorded. The data obtained were analysed

statistically by the analysis of variance method and where a significant F value was obtained and Duncan's Multiple Range test was applied to test the significance of differences among the treatment means.

RESULTS AND DISCUSSION

Dieldrex both in dust and solution form gave the highest percentage of germination than all other treatments (Table 1). This may be due to conversion of inhibitory substance into non-inhibitory substance. Machacek and Greaney (1941), Iqbal and Kausar (1969) and Niazi (1968) have concluded similar results. More number of tillers were produced by the seed treated with dieldrex dust than all other treatments (Table 2). This may be due to the reason that the plant did suffer less from disease organism which reduces tillering. Zia (1960) and Niazi (1968) have supported the idea that disinfested seed produces more tillers than infested seeds. As a result of more vigorous growth longer stem length was obtained by seed treatment with Dieldrex dust than all other treatments. (Table 1). This may be due to better emergence of seedling, better development of root system and vigorous plant growth. The results are in accordance with the finding of Iqbal and Kausar (1969).

Better earing per plant was obtained in Dieldrex dust treated seed than the rest of the treatments (Table 1). However, no significant increase in ear length was obtained as a result of any treatment. This may be due to the hereditory character of Maxipak-65.

Number of grains per ear were significantly high in seed treated with Dieldrex both in dust and solution form than all other treatments (Table 2). A significant increase in grain weight per ear has obtained as a result of seed disinfection with Dieldrex dust as compared with all other treatments (Table 2). Niazi (1968), have given similar results.

The disease was controlled with all the treatments given to the seed but dieldrex both in dust and solution form have given the best result. The highest mortality was observed in seed infested with (*Helminthosporium sativum*). (Table 1). The results have shown the same trend as reported by Csuti (1964). A considerable increase in yield has been obtained by seed disinfection with Dieldrex dust and solution than all other treatments (Table 2). The increase may be due to more healthy plants and sound grains. Iqbal and Kausar (1969), Niazi (1968) and Zia (1960) have reported similar results.

TABLE I. *Effect of seed treatment on the germination, number of tillers, number of spikes, length of spikes, plant mortality in wheat variety Mexi-Pak 65.*

Seed Treatment	Germination Percentage	No. of tillers per plant	No. of spikes per plant	Length of spikes in inches	Plant Mortality percentage
	(1)	(2)	(3)	(4)	(5)
1. Seed disinfested with Dieldrex.	96.77a	7.31a	7.29a	5.52	0.23
2. Seed treated with solution of Dieldrex.	96.09a	6.92b	6.92b	5.55	0.24
3. Seed disinfested with Granosan M.	92.88b	6.47cd	6.47cd	5.16	1.00
4. Seed treated with solution of Granosan M.	91.83bc	6.38d	6.05e	5.16	0.84
5. Control (seed as such).	90.39bcd	6.43cd	6.43cd	5.13	2.26
6. Seed infested with *Helmin-thosporium Sativum* and treated with Dieldrex.	90.36bcd	6.73bc	6.73bc	5.25	0.34
7. Seed given hot water treatment and treated with Dieldrex.	88.94cd	6.20de	6.20de	5.22	0.35
8. Seed infested with *Helminthosporium Sativum* and treated with Granosan M.	86.75d	5.99e	5.99e	5.10	0.53
9. Seed given hot water treatment and treated with Granosan M.	80.01e	5.95e	5.95e	5.13	0.87
10. Seed infested with *Helminthosporium Sativum*	69.23f	5.28f	5.18f	4.52	17.37

(1,2,3,4,5) Duncan's multiple range test at the 5 percent probability level. Any two means not sharing a letter differ significantly.

TABLE 2. *Effect of seed treatment on plant height, no. of grains per spike, weight of grains per spike and grain yield on wheat variety Mexi-pak-65.*

Treatment	Plant Height in fect	No. of Grain per Spike	Weight of grains per spike (grams)	Yield (MNDS/ ACRE)
	(1)	(2)	(3)	(4)
1. Seed disinfested with Dieldrex.	3.60a	68.46 a	3.02 a	75.98 a
2. Seed treated with solution of Dieldrex.	3.57bc	68.42 a	2.81 ab	74.50 a
3. Seed given hot water treatment and treated with Dieldrex.	3.50 bc	65.78 b	2.03 d	44.12 d
4. Seed treated with solution of Granosan M.	3.13 d	64.92 b	2.25 cd	63.84 b
5. Seed given hot water treatment and treated with Granosan M.	3.30 cd	64.15 c	2.03 d	39.65 de
6. Seed infested with *Helminthosporium Sativum* and treated with Dieldrex.		64.13 cd	2.12 cd	41.17 de
7. Seed disinfested with Granovan M.	3.40 bc	63.12 cd	2.45 bc	59.74 b
8. Seed infested with *Helminthosporium Sativum* and treated with Granosan M.	3.17 d	63.12 cd	1.99 d	39.15 de
9. Seed as such (control).	3.40 bc	62.49 d	2.38 cd	51.30 c
10. Seed infested with *Helminthosporium Sativum*,	3.20 d	55.68 e	2.01 d	33.60 d

(1,2,3,4 Duncan's multiple range test at the 5 per cent probability level. Any two means not sharing a letter differ significantly.

The lowest germination, tillering, earing, number of grains, weight of grains, stem length, and yield was observed in seed infested with (*Helminthosporium sativum*) while highest mortality was observed in fungus Infested seed.

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