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CHARACTERISTICS OF THE SEEDLINGS AND GRAIN YIELD OF WHEAT ON FUNGICIDAL STORAGE OF SEEDS

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Increasing concentrations of fungicidal treatment to the seeds of wheat (*Triticum aestivum* L.) var. Sonalika 308 were found to be gradually more injurious with respect to the total chlorophyll content, length and dry weight of the seedlings and dry weight of grain per five ears as the RH level of storage of seeds increased from 60 to 80%. Captan was found to be the least injurious and Difolatan to be the most.

Keywords : Chlorophyll; Dry weight; Fungicidal storage; Grain yield; Length; Seedlings, Wheat seeds.

Introduction

Fungicidal storage of seeds has been the common practice to protect them against their microbial deterioration and maintenance of viability[1-4]. Baylis[5] and Evans[6] reported adverse effect on germination of fungicide treated seeds stored at high RH. Detailed observations to substantiate the statement were found to be lacking. The present paper deals with fungicidal storage of wheat seeds at varying RH and characteristics of the seedlings and the grain yield.

Materials and Methods

Fifty g of seeds of wheat (*Triticum aestivum* L) var. Sonalika 308 having 6.28% moisture, in triplicate, were smeared after four month of harvest in April 2000 with Captan (50% N-trichloromethyl mercapto-4 cyclohexane-1,2-dicarboximide pthalimide), Dethane M-45 (Zn+Mn ethylene bisdithiocarbamate), Benlate (Methyl-N (1-butylcarbamoyl)-2-benzimidazole carbonate) and Difolatan (Cis-N (1,1,2, 2-tetrachloroethylthio) 4-cyclohexane-1, 2-dicarboximide so as to make their conentrations 0.1, 0.2 and 0.3% and stored over 60,70 and 80% RH maintained by glycerol at 30 ± 1°C in sealed desiccators for a period of 3 months.

Seeds were sown in the first week of November 2000 in a plot close to the department. The plots for the seeds having different concentrations of fungicides and RH levels of storage were maintained 30 cm apart. The plant to plant and row to row distance were maintained 20 cm. One seed was sown at one spot nearly 1 cm deep from the surface of soil. Watering was maintained per 8th day lightly.

The second leaf of 30 day old seedlings were taken randomly at 2.00 PM for estimation of total chlorophyll (TC)[8]. Ten seedlings were randomly taken out for determining the total length in cm and their dry weight in mg on drying them at 80°C for 24 hr and desiccating them over fused calcium chloride for next 72 hr. Remaining seedlings were permitted to grow to their maturity to harvest. 10 ears in triplicate were taken for each treatment and grains were extracted, and dried as noted for the seedlings. The dry weight of the grains per five ears was calculated. The data were statistically analysed for determining C.D. value.

Results and Discussion

As the RH level increased, The effect of increasing concentrations of fungicides on stated parameters decreased significantly. In this way 60% RH level proved most beneficial in the sense the TC (Table 2) content increased with increase in the concentration of fungicides. Reverse was the trend in the seedlings raised from the seeds stored at 70 and 80% RH. The latter RH level was found to be the most

Table 1. Total length of the seedlings (in cm) of wheat var Sonalika 308 and their dry weight (in mg) raised from the seeds stored with different concentrations of fungicides at varying RH (%) (Expressed as Mean of 5 replicated).

Fungicides	Conc. (%)	Length of the seedlings RH (%)			Dry weight of the seedling RH (%)		
		60	70	80	60	70	80
Captan	0.1	20.4	19.4	17.1	111	104	64
	0.2	24.3	19.0	12.1	118	98	43
	0.3	28.2	18.1	8.5	139	91	22
Thiram	0.1	20.7	18.8	16.3	98	100	62
	0.2	23.6	18.2	12.3	116	94	43
	0.3	27.8	17.4	8.2	135	86	25
Dithane M-45	0.1	19.4	18.5	15.4	92	96	58
	0.2	23.2	17.7	11.9	112	92	43
	0.3	27.6	16.4	7.6	129	88	21
Di thane Z-78	0.1	19.1	18.2	14.8	88	80	57
	0.2	22.8	17.4	10.5	106	74	36
	0.3	27.7	15.8	6.4	125	70	18
Benlate	0.1	18.4	17.4	15.1	82	85	55
	0.2	22.1	16.6	10.3	102	81	33
	0.3	26.4	15.3	6.4	123	77	20
Difolatan	0.1	18.3	17.1	14.3	78	82	51
	0.2	21.6	16.4	10.3	96	78	29
	0.3	25.7	15.3	6.2	116	72	13
Control		35.0	25.0	22.0	150	110	78

C.D Value : At 1% = 31.11
C.D Value : At 1% = 7.91 C.D Value : At 1% = 31.11

Table 2. Total chlorophyll content (mg /g fresh leaf) in the seedlings and dry weight of seeds (in g) every 5 ears of wheat var Sonalika 308 raised from the seeds stored with different concentrations of fungicides at varying RH (%).

Fungicides	Conc. (%)	Total Chlorophyll RH (%)			Dry weight of seeds RH (%)		
		60	70	80	60	70	80
Captan	0.1	0.43	0.75	0.39	5.12	7.63	4.52
	0.2	0.61	0.71	0.28	6.72	7.21	3.32
	0.3	0.83	0.67	0.19	8.18	6.75	1.98
Thiram	0.1	0.38	0.70	0.35	4.97	7.36	4.73
	0.2	0.58	0.69	0.26	6.28	6.53	2.81
	0.3	0.81	0.65	0.15	8.10	6.21	1.53
Dithane M-45	0.1	0.38	0.70	0.35	4.66	7.17	4.34
	0.2	0.56	0.67	0.24	6.28	6.53	2.89
	0.3	0.78	0.62	0.13	7.64	5.82	1.67
Dithane Z-78	0.1	0.36	0.68	0.33	4.43	6.69	3.49
	0.2	0.53	0.64	0.22	5.85	6.27	2.64
	0.3	0.76	0.60	0.11	7.39	5.93	1.22
Benlate	0.1	0.33	0.65	0.31	4.74	6.38	3.59
	0.2	0.52	0.60	0.20	6.12	5.85	2.37
	0.3	0.72	0.57	0.09	7.64	5.28	1.46
Difolatan	0.1	0.31	0.63	0.29	4.23	6.19	3.27
	0.2	0.49	0.59	0.18	6.24	5.43	2.11
	0.3	0.70	0.55	0.07	7.68	4.77	1.35
Control		0.90	0.81	0.42	11.28	8.83	5.78

CD at 1% = 0.296 at 5% = 0.227

CD at 1% = 5.62 at 5% = 4.31

injurious with 0.3% concentration of fungicides. Exactly similar trend was observed for the length (Table 1) and dry weight of the grains per five ears (Table 2).

For the plight of seedlings stated above Kumari[9] has reported absorption of the fungicides by the seed tissue at high RH inflicting injury to the normal functioning of the cell membrane and stimulated leaking of cations, anions, sugars and amino acids. This sort of biochemical injury is more magnified by storage of seeds at 80% RH. In similar condition of storage, Kumar[10] has reported sluggish activities of nitrate reductase and urease with less total free amino acid in wheat var Sonalika 308 besides less chlorophyll and total soluble sugar. The instances quoted here indicate that the growth physiology and productivity of the plants are unfavourably affected. The disturbance in germination physiology of the seed in comparable condition of storage has earlier been observed[1,2,11]. Baylis[5] and Evans[6] have earlier cautioned not to store fungicide treated seeds at high RH or seeds having more moisture content.

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