ISSN-1991-3036 (Online) & ISSN-2075-1621 (Optical)
Int. J. Sustain. Crop Prod. 5(3):35-42 (August 2010)

ECO-FRIENDLY SEED TREATMENTS IN CONTROLLING BLACK POINT (*Bipolaris sorokiniana*) OF WHEAT

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Accepted for publication on 15 July 2010

ABSTRACT

Zaman R, Aminuzzaman FM, Islam MR, Chowdhury SR (2010) Eco-friendly seed treatments in controlling black point (*Bipolaris sorokiniana*) of wheat. *Int. J. Sustain. Crop Prod.* 5(3), 35-42.

Effect of different eco-friendly seed treatments against of black point of wheat under lab and field condition was studied during the period from December-2007 to March-2008 at the laboratory and farm of Sher-e-Bangla Agricultural University. Twelve treatments were explored in this experiment namely farmers saved seed ((T_1), apparently healthy seed (T_2), farmer's saved seed treated with brine solution (T_3), apparently healthy seed treated with brine solution (T_4), sun drying of farmer's saved seed (T_5), sun drying of apparently healthy seed (T_6), farmer's saved seed treated with hot water (T_7), apparently healthy seed treated with hot water (T_8), polythene solarization of farmer's saved seed (T_9), polythene solarization of apparently healthy seed (T_{10}), farmer's saved seed treated with Bavistin 50WP (T_{11}) and Apparently healthy seed treated Bavistin 50WP (T_{12}).The experiment was laid out in the Randomized Complete Block Design (RCBD) with three replications. The highest reduction of incidence of black point (*Bipolaris sorokiniana*) was recorded in the treatment T_{12}. Among the eco-friendly treatments the highest reduction of incidence of seed infection over control was found in treatment T_8 (apparently healthy seed treated with hot water) in blotter test. Brine solution, sundrying and polythene solarized farmer's and apparently healthy seeds also resulted significantly reduced black point severity over control. The treatments, T_6 also gave good result in reducing seed infection and increasing seed germination. Treatment T_4 and T_{10} also increased seed germination and reduced the seed infection in field condition. Farmer's saved seed treated with hot water, polythene solarization, brine solution and apparently healthy seeds showed moderate performances reducing black point severity over control (T_1). The treatment T_2 decreased 66.15% disease incidence though the maximum germination was increased up to 98.20% over untreated control under chemical seed treatment (T_{12}) where eco-friendly seed treatment (T_8) increased seed germination up to 90.67%.

Key words: *eco-friendly, seed treatment, black point (Bipolaris sorokiniana) wheat*

INTRODUCTION

Wheat (*Triticum aestivum* L.) is the second food crop in Bangladesh due to its high nutritive value and low cost of production. But its yield is too low (1.85 t/ha) in compare to the world wheat production (2.54 t/ha). There are many constraints limiting the quality yield of wheat in Bangladesh. Among them use of poor quality or diseased seeds is one of the major constraints. Wheat plants at all growth stages prone to the attack of numerous diseases. Wheat suffers from as many as 26 seed borne pathogens causing 14 seed borne diseases. Among them leaf blight and black point caused by *Bipolaris sorokiniana* has become a serious concern in the recent years in Bangladesh (Fakir 1988). *Bipolaris sorokiniana* is reported highly seed transmitted causes seedling blight, Bipolaris leaf blight (BpLB) and black point in growing crop (Bazlur Rashid *et al*. 1994). General observations indicate that BpLB appears at the seedling stages & increased with increasing plant age and finally the pathogens attacks wheat grain causing black point (Alam *et al*. 1994). The fungi that causes black point are generally considered to be highly seed transmitted and considered a potential pathogenic threat to the subsequent crops produced from the infected seed but it's practically impossible to obtain black point free seeds (Fakir 1999). The black point has in adverse effect on seed weight, germination and grain yield. The germination of black point affected seed was reduced to a great extent compared to the healthy grains (Khanum *et al*. 1987). Moreover, the reduction of germination was found in respect to the severity of black point infection (Dhurj 1991 and Chowdhury 2008). Since the black point disease of wheat causes significant yield loss, reduces the quality of the seed and has appeared as a potential threat for seed producer as well as to the farmers in Bangladesh.

In controlling black point disease, several approaches have been practiced, such as use of resistant variety, cultural control, chemical control, biological control and use of plant extract etc. Cultivation of resistant variety is the most acceptable method for controlling this disease. But none of the wheat varieties in the country is found resistant against this disease (Hossain and Azad, 1992). The most acceptable method for controlling this disease is sowing of pathogen free seeds. Therefore along with routine seed health testing, seed treatment before sowing is necessary. Treatment of seed with seed-dressing fungicides was found to improve germination and decrease infection of seedling growth from the black pointed seeds. Indiscriminate uses of chemicals are creating health hazard and environmental pollution. Use of alternate methods instead of seed treating chemicals is of great concern now a day to save our environment.

Therefore, it is judicious to explore less expensive, less risky non-chemical components to treat seeds for freedom of the seed-borne pathogens. In this perspect, seed treatment with hot water, solar heat, polythene solarization and brine solution could be use to control seed borne fungal pathogens. Considering the above facts, the present investigation has been focus to find out evaluate the effect of some selected eco-friendly treatments on black point (*Bipolaris sorokiniana*) and some yield of parameters of wheat in field condition.

MATERIALS AND METHODS

Experimental site and treatments

The experiment was carried out to determine the effect of different eco-friendly treatments on black point (*Bipolaris sorokiniana*) of wheat during the period from December-2007 to April-2008 in Seed Pathology Laboratory, Department of Plant Pathology and the farm of Sher-e-Bangla Agricultural University. The experiment was laid out in the Randomized Complete Block Design (RCBD) with three replications. Twelve treatments were explored in this experiment namely: T_1= Farmer's saved seed, T_2= Apparently healthy seed, T_3= Farmer's saved seed treated with brine solution, T_4= Apparently healthy seed treated with brine solution, T_5= Sun drying of farmer's saved seed, T_6= Sun drying of apparently healthy seed, T_7= Farmer's saved seed treated with hot water, T_8= Apparently healthy seed treated with hot water, T_9=Polythene solarization of farmer's saved seed, T_{10}= Polythene solarization of apparently healthy seed, T_{11}= Farmer's saved seed treated with Bavistin 50WP, T_{12}= Apparently healthy seed treated Bavistin 50WP.

Preparation of the seed sample for different treatments

Apparently healthy seeds were obtained by manual separation of seeds from the contamination and abnormal seeds of the lot of original farmer stored seeds. At first 2% brine solution was prepared by mixing 100 ml tap water with 2g edible salt (NaCl) and seeds were soaked in the solution for 1 hour. After treating seeds the excess water was removed and the seeds were air dried in the laboratory prior to sowing. Apparently healthy and farmer's saved seeds were sun dried for 15 hours before sowing. Apparently healthy and farmer's saved seeds were also covered by transparent polyethylene paper and sun dried for 15 hours before sowing. Apparently healthy and farmer's saved seeds were treated with hot water at 52-56^{o}C for 20 minutes. After treating seeds the excess water was removed and the seeds were air dried in the laboratory prior to sowing. Seeds were taken in a beaker and the specific amount of chemical was added into the seeds. The chemical was mixed thoroughly by a stick. Both apparently healthy seeds and original farmers saved seeds were treated with Bavistin 50 WP (0.3%).

Seed health study

Seed health study of treated seeds were done following ISTA (1996). Good seeds were tested for each treatment maintaining three replications of each treatment. In this method 3 layers of blotter were soaked in sterilized water and placed at the bottom of the glass petridish. Then 25 seeds were set up on the blotting paper in a petridish maintaining equal distance and covered with lid. Seeds thus plated were incubated in an air cooled room at about 20^{o}C temperature for 7 days in Seed Pathology Laboratory, Department of Plant Pathology, Sher-e-Bangla Agricultural University, Dhaka. After 7 days of incubation the seeds were observed for the presence of seed-borne *Bipolaris sorokiniana* fungi under stereo binocular microscope. Germination of the seeds was also recorded.

Land preparation and layout of experiment

The field was fertilized at the rate of 220 Kg urea, 180 Kg TSP, 50 Kg MP, 120 Kg Gypsum and 10 tons cow dung per hectare (Krishi Projukti Hatboi, 2005). Two third of urea, full dose of TSP, MP, Gypsum and cow dung were applied at the time of final land preparation. Remaining one third of urea was applied at 21 days after seed sowing. The field was divided into three blocks. Each block was divided into 12 unit plots in which treatments were applied at random and there were 36 unit plots in the experiment. The size of the each plot was 2.4m x 4m and each plot was separated by 0.75 m wide drain and the distance between the blocks were 1.0 m.

Sowing of seeds

Wheat seeds were sown in the field on 5th December 2007 at the rate of 120Kg/ha. The seeds were sown in broadcast method and covered by soil with the help of hand.

Intercultural operation

Irrigation was done once after 25 days and another after 45 days of sowing. Irrigation was generally followed by weeding. Weeding was performed twice during the growing period of the crop for better soil aeration and conservation of soil moisture.

Recording of data

Randomly thirty plants were selected from each plot and tagged. So, 30 plants /plot were tagged for rating and mean values were determined to get rating score of the material of each treatment. Data on number of spike/m^2 was taken at the time of ripening stage.

Statistical analysis

The data on various parameters were analyzed using analysis of variance to find out variation obtained from different treatments. Treatment means were compared by DMRT (Duncan's Multiple Range Test).

RESULTS

Incidence of *Bipolaris sorokiniana* and seed germination of wheat was presented in Table 1. Significant variation was found in percentage of seed germination among the treatments. The highest (98.20%) seed germination was counted in the treatment T_{12} (apparently healthy seeds treated with Bavistin 50WP) which was statistically identical (90.67 %) with treatment T_8 (apparently healthy seed treated with hot water). The lowest seed germination (76.57%) was counted in farmer's saved seed (T_1). Among the other treatments methods, T_{11} (farmer's saved seed treated with Bavistin (50WP) gave 87.39% seed germination which was followed by T_{10} (85.59%), T_7 (85.58%), T_6 (84.83%), T_4 (84.23%), T_5 (83.47%) and T_2 (82.53%). The prevalence of *Bipolaris sorokiniana* was varied significantly depending on the different of seed treatment methods.

Table 1. Effect of eco-friendly seed treatments on seed germination and seed yielding *Bipolaris sorokiniana* of wheat in the Laboratory

Treatments	% Germination	% Incidence of *Bipolaris sorokiniana*	% Incidence decreased over control
T_1	76.57 j	24.40 a	----------
T_2	82.53 h	8.26 b	66.15
T_3	81.23 i	7.67 c	68.56
T_4	84.23 f	5.98 de	75.49
T_5	83.47 g	7.31 c	70.00
T_6	84.83 e	5.68 e	77.13
T_7	85.58 d	6.40 d	73.77
T_8	90.67 b	5.02 f	79.43
T_9	81.44 i	7.36 c	69.84
T_{10}	85.59 d	5.68 e	76.72
T_{11}	87.39 c	5.11 f	79.05
T_{12}	98.20 a	2.26 h	90.73

T_1= Farmer's saved seed, T_2= Apparently healthy seed, T_3= Farmer's saved seed treated with brine solution, T_4= Apparently healthy seed treated with brine solution, T_5= Sun drying of farmer's saved seed, T_6= Sun drying of apparently healthy seed, T_7= Farmer's saved seed treated with hot water, T_8= Apparently healthy seed treated with hot water, T_9=Polythene solarization of farmer's saved seed,T_{10}= Polythene solarization of apparently healthy seed, T_{11}= Farmer's saved seed treated with Bavistin 50WP, T_{12}= Apparently healthy seed treated Bavistin 50WP.

Highest incidence of *Bipolaris sorokiniana* (24.40%) was counted the heighest in the untreated seeds which differed significantly from all other treatments. Among all the treatments, T_{12} (apparently healthy seed treated with Bavistin 50 WP) yielded significantly the lowest prevalence (2.20%) of *Bipolaris sorokiniana* which was 90.73% reduction of incidence over untreated control (T_1). Among the eco-friendly treatment apparently healthy seeds treated with hot water (T_1) reduced 79.43% incidence of *Bipolaris sorokiniana* over untreated control. Incidence of *Bipolaris sorokiniana* was also reduced over control when farmer's seed as well as physically sorted seeds were treated with brine solution, sun drying, hot water and polythene solarization. Apparently healthy seeds obtained by manual seed sorting reduced 66.15% incidence of *Bipolaris sorokiniana* over untreated control. Apparently healthy seed, brine solution and polythene solarized seeds also gave good results in reducing the incidence of *Bipolaris sorokiniana* in comparison to control.

Table 2. Effect of eco-friendly seed treatment on germination, plant height, spike length and length between the point of flag leaf initiation and base of ear

Treatments	% Germination		Plant height (cm)	Spike length* (cm)	Distance between the point of flag leaf initiation and base of ear* (cm)
	10DAS	15DAS			
T_1	49.42 j	59.27 j	78.48 i	13.32	13.25
T_2	68.39 f	74.91 e	81.23 gh	14.01	14.0
T_3	53.92 i	60.48 i	80.60 gh	13.56	13.30
T_4	55.90 h	66.63 g	84.62 h	13.68	13.67
T_5	64.59 g	69.19 f	82.60 fg	13.67	13.73
T_6	71.89 h	76.28 d	86.55 bc	13.74	14.86
T_7	69.67 e	75.09 d	85.40 cd	13.75	14.31
T_8	79.49 c	84.23 c	87.95 ab	14.40	14.98
T_9	55.58 h	61.19 h	83.45 ef	13.54	13.86
T_{10}	64.59 g	75.98 e	84.60 de	13.89	13.87
T_{11}	80.98 b	85.59 b	88.50 b	14.03	14.29
T_{12}	84.89 a	88.95 a	89.32 a	14.93	14.99

T_1= Farmer's saved seed, T_2= Apparently healthy seed, T_3= Farmer's saved seed treated with brine solution, T_4= Apparently healthy seed treated with brine solution, T_5= Sun drying of farmer's saved seed, T_6= Sun drying of apparently healthy seed, T_7= Farmer's saved seed treated with hot water, T_8= Apparently healthy seed treated with hot water, T_9=Polythene solarization of farmer's saved seed, T_{10}= Polythene solarization of apparently healthy seed, T_{11}= Farmer's saved seed treated with Bavistin 50WP, T_{12}= Apparently healthy seed treated Bavistin 50WP

*= Not significant

Table 3. Effect of eco-friendly seed treatments on tiller number and spikelet production of wheat

Treatments	Number of tillers /plant	Number of spikelets /ear	Number of healthy spikelets/ear	Number of diseased spikelets/ear
T_1	6.01 g	21.42 h	19.11 i	1.63 a
T_2	7.12 de	22.03 fg	21.01 g	0.80 c
T_3	6.54 f	20.29 i	19.65 h	1.10 b
T_4	6.37 fg	21.95 g	21.55 f	0.55 d
T_5	6.38 fg	22.44 e	22.04 e	0.30 def
T_6	7.70 bc	23.72 d	23.45 d	0.20 ef
T_7	7.46 cd	23.68 d	23.38 d	0.25 ef
T_8	7.98 b	25.40 c	25.20 c	0.15 ef
T_9	6.52 f	21.26 h	20.75 g	0.40 de
T_{10}	6.95 e	22.39 ef	21.98 e	0.35 de
T_{11}	8.08 b	26.52 b	26.20 b	0.15 ef
T_{12}	8.90 a	28.63 a	28.52 a	0.05 f

T_1= Farmer's saved seed, T_2= Apparently healthy seed, T_3= Farmer's saved seed treated with brine solution, T_4= Apparently healthy seed treated with brine solution, T_5= Sun drying of farmer's saved seed, T_6= Sun drying of apparently healthy seed, T_7= Farmer's saved seed treated with hot water, T_8= Apparently healthy seed treated with hot water, T_9=Polythene solarization of farmer's saved seed, T_{10}= Polythene solarization of apparently healthy seed, T_{11}= Farmer's saved seed treated with Bavistin 50WP, T_{12}= Apparently healthy seed treated Bavistin 50WP

The number of tillers/plant differed significantly among the treatments (Table 3).The lowest number (6.01) of tillers/plant was recorded in T_1 treatment (farmer's saved seed) which was statistically similar to that of T_3 treatment (6.37). The highest number of tillers/plant (8.90) was recorded in the treatment T_{12} followed by T_8, T_{11}, T_6, T_7, T_5, and T_{10}. Result obtained from number of spikelets/ear indicated that there were significant differences among the treatment (Table 3). Treatment T_{12} scored the maximum number of spikelets (28.63) that was followed by treatment T_3 (26.52) whereas control gave minimum number of spikelets/ear (20.29). Among the rest of the seed treatments T_8 (apparently healthy seed treated with hot water) gave maximum count of spikelets/ear which was 25.40. In case of number of healthy spikelets/ear, the effect of different treatments differed significantly. The

highest number of healthy spikelets/ear was recorded (28.52) in case of treatment T_{12} (apparently healthy seeds treated with Bavistin 50WP) followed by T_{11} (farmer's saved seed treated with Bavistin 50WP) and T_{10} (apparently healthy seed treated with hot water). The lowest number of healthy spikelets/ear was recorded (19.11) in case of T_1 (farmers saved seed). Considering the number of diseased spikelets/ear different seed treatments did not differ significantly. However, the highest number of diseased spikelets/ear (1.63) was recorded at the treatment T_1 (farmer's saved seed). On the other hand the lowest number of diseased spikelets /ear (0.05) was recorded at the treatment T_{12} followed by $T_{11,}$ T_8, T_6, $T_{7,}$ T_5, and T_{10} respectively.

Table 4. Effect of eco-friendly seed treatments on grain formation and weight of grains of wheat

Treatments	Number of grains/ear	Number of healthy grains/ear	Number of diseased grains/ear	Weight of grains/ear (g)	Weight of healthy grains/ear(g)	Weight of diseased grains/ear (g)
T_1	31.18 h	29.60 i	3.27 a	1.35 g	1.20 g	0.15 a
T_2	31.93g	30.10 h	1.25 b	1.45fg	1.30 f	0.06 bcd
T3	31.35 h	29.87 hi	2.05 b	1.39 fg	1.25 fg	0.10 ab
T_4	32.12 fg	30.98 fg	1.14 b	1.48 ef	1.40 e	0.07 bc
T_5	32.37 f	33.20 e	0.83 cde	1.58 de	1.44 de	0.08 bc
T_6	34.94 d	33.89 d	1.05 bc	1.63 cd	1.50 cd	0.06 bcd
T_7	34.33 e	33.29 e	1.04 bc	1.67 bcd	1.55 bc	0.04 bcd
T_8	35.77 c	35.07 c	0.70 cd	1.75 ab	1.59 b	0.02 cd
T_9	32.23 fg	30.73 g	1.50 b	1.40 fg	1.40 e	0.05 bcd
T_{10}	34.49e	31.22 f	1.58 b	1.60 cd	1.48 d	0.07 bcd
T_{11}	37.05b	36.50 b	0.55 d	1.70 abc	1.60 b	0.02 cd
T_{12}	38.32a	38.03 a	0.29 d	1.80 a	1.70 a	0.01 d

T_1= Farmer's saved seed, T_2= Apparently healthy seed, T_3= Farmer's saved seed treated with brine solution, T_4= Apparently healthy seed treated with brine solution, T_5= Sun drying of farmer's saved seed, T_6= Sun drying of apparently healthy seed, T_7= Farmer's saved seed treated with hot water, T_8= Apparently healthy seed treated with hot water, T_9=Polythene solarization of farmer's saved seed, T_{10}= Polythene solarization of apparently healthy seed, T_{11}= Farmer's saved seed treated with Bavistin 50WP, T_{12}= Apparently healthy seed treated Bavistin 50WP

In case of different eco-friendly and chemical seed treatment, number of grains/ear, number of healthy grains/ear, number of diseased grains/ear varied significantly (Table 4). The lowest number of grains/ear (31.18) was recorded under the treatment T_1 (farmer's saved seed). On the other hand the highest number of grains/ear (38.32) was recorded in the treatment T_{12}. Though apparently healthy seeds (T_2) and farmer's saved seed (T_1) produced statistically similar number of grains/ear but the result differed significantly when apparently healthy seeds treated with hot water (T_8). A significant variation was recorded among the treatment under the present trial considering number of healthy grains/ear (Table 4). The lowest number of healthy grains/ear (29.60) was recorded in the treatment T_1 (farmer's saved seed). On the other hand the highest number of healthy grain (38.03) was recorded in the treatment T_{12} which was followed by $T_{11,}$ T_8, T_6. From these results it was observed that Farmer's saved seed gave the lowest healthy grain in wheat and eco-friendly treated seeds, like hot water treated seeds and sun drying gave the highest number of healthy grains. A significant variation was also recorded among the treatment under the present trial in number of diseased grain (Table 4). The highest number of diseased grains /ear (3.27) was recorded under the treatment T_1 and the lowest number of diseased grain (0.29) was recorded in the treatment T_{12} From these results it was observed that farmer's saved seed gave the highest diseased grains/ear of wheat. On the other hand eco-friendly measures, like hot water treated seeds and sun drying gave the minimum number of diseased grains. Considering weight of grains/ear there were slightly significant variations found among the different methods of seed treatments (Table 4). However the minimum weight of grains (1.35 g) was recorded in the treatment T_1 and the maximum weight of grains (1.80 g) was recorded in the treatment T_{12}. In case of healthy grains /ear there were slightly significant variations found among the different methods of seed treatments (Table 4).However, the minimum weight of healthy grains (1.20 g) was recorded in the treatment T_1 and the maximum weight of grains (1.70 g) was recorded in the treatment T_1. In case of weight diseased grains /ear there was significant variations among the different methods of seed treatments (Table 4). But the maximum weight of diseased of grains/ear (0.15g) was recorded in the treatment T_1 and the minimum weight of diseased grains/ear (0.01g) was recorded in the treatment T_{12}.

Table 5. Effect of seed eco-friendly treatments on the formation of seeds of different grades of wheat cv. Kanchan

Treatments	Grading of seeds (0-5 scale)					
	0	1	2	3	4	5
T_1	28.31 g	0.90 a	0.713 a	0.41 a	0.22 bc	0.63 a
T_2	30.62 f	0.50 bc	0.22 de	0.15 c	0.11 de	0.33 b
T_3	30.06 f	0.53 b	0.19 de	0.17 c	0.09 de	0.31 b
T_4	30.92 f	0.45 c	0.15 ef	0.20 c	0.10 de	0.30 b
T_5	31.22ef	0.15 g	0.55 b	0.30 b	0.05 de	0.10 bc
T_6	33.89cd	0.20 fg	0.35 c	0.40 a	0.10 de	0.00 c
T_7	33.39 d	0.30 de	0.25 cde	0.30 b	0.05 cd	0.04 c
T_8	35.12bc	0.20 fg	0.30 cd	0.15 c	0.10 a	0.00 c
T_9	30.83 f	0.30 de	0.30 cd	0.40 a	0.50 cd	0.10 bc
T_{10}	32.76de	0.20 fg	0.24 cde	0.30 b	0.15 b	0.10 bc
T_{11}	36.26b	0.35 d	0.08 fg	0.04 d	0.30 de	0.02 c
T_{12}	37.99 a	0.24 ef	0.03 g	0.00 d	0.06 e	0.00 c

T_1= Farmer's saved seed, T_2= Apparently healthy seed, T_3= Farmer's saved seed treated with brine solution, T_4= Apparently healthy seed treated with brine solution, T_5= Sun drying of farmer's saved seed, T_6= Sun drying of apparently healthy seed, T_7= Farmer's saved seed treated with hot water, T_8= Apparently healthy seed treated with hot water, T_9=Polythene solarization of farmer's saved seed, T_{10}= Polythene solarization of apparently healthy seed, T_{11}= Farmer's saved seed treated with Bavistin 50WP, T_{12}= Apparently healthy seed treated Bavistin 50WP

It was found that grading of seeds (0-5 scale) of wheat varied significantly among the treatments (Table 10). The highest number of grains under grade-0, was recorded in T_{12}, which was 37.99, followed by T_{11}, T_8, T_6, T_7, and T_{10} lowest was recorded in T_1 (farmer's saved seed), which was 28.30. The highest number of grade-1 grains/ear (0.90) was recorded in T_1 treatment and the lowest number of grade-1 grains/ear (0.24) was recorded in T_{12} treatment which was followed by $T_{11,}$ T_8, and T_6. Considering grade-2 grains/ear the number of grains ranged from 0.03 to 0.71 where the highest and lowest counts were made under the treatments T_1 (0.71) and T_{12} (0.03), respectively. Considering grade-4 grains/ear it was found that the highest number of grains (0.22) was recorded in T_1 treatment and the lowest counts (0.06) was recorded in T_{12}. In case of grade-5 grains (shrivelled and completely discolored) the number of grains differed significantly among the treatments. The highest number of grade-5 grains (0.63) was recorded in T_1 treatment (farmer's saved seed). No/least grade- 5 grains were observed in T_{12} treatment which was followed by T_8, T_6 and also close to T_{11} (farmer's saved seed treated with Bavistin 50WP).

DISCUSSION

From the present study it has been found that highest seed germination and lowest incidence of *Bipolaris sorokiniana* was recoeded under apparently healthy seeds treated with Bavistin 50WP. Farmer's saved seed always resulted significantly lower seed germination and higher incidence of *Bipolaris sorokiniana*. All the eco-friendly seed treatments significantly increased seed germination and reduced incidence of *Bipolaris sorokiniana*. The present findings corroborate with the findings of Islam, 2005. He reported that phomopsis blight and fruit rot of egg plant could be contributed by seed treatment with Bavistin 50 WP increasing germination. Most of the researcher found Vitavax-200 either most effective or controlled completely the seed borne infections of damaging pathogens of wheat. Mironova (1991) found that Vitavax-200 was most effective in reducing seed borne infection of *Bipolars sorokiniana* and *Fusarium* spp. Similar reduction of seed borne *Drechslera* sp. *(*syn *Bipolaris sorokiniana)* with Vitavax-200 was also reported by Dey *et a1*. (1992). The results of the present study corroborates with the findings of Hasan (2000). In a similar type of experiment with rice, he found the highest incidence (3.5%) of *Bipolaris sorokiniana* in discolored and diseased seeds. These findings are also supported by Zobaer (2006). He counted highest seed germination and lowest incidence of *Bipolaris sorokiniana* in apparently healthy seed treated with vitavax-200 followed by sun drying of apparently healthy seed and apparently healthy seed treated with hot water. Among eco-friendly seed treatments, apparently healthy seeds treated with hot water gave the highest seed germination. Yesmin (2007) was found the highest germination in hot water seed treatment followed by farmer's saved seed treated with hot water over control. The findings of the present study corroborates with the findings of Fakir and Jahan (1998), Nega *et al*. (2000) and Uddin (2005). Fakir and Jahan (1998) reported that solar heat treatment increased 9.0% seed germination. Hot water treatment of wheat seeds at 52°C for 20 min increased seed germination by 68.76% and 74.90% at 10 and 15 DAS, respectively that was statistically similar to that of the treatment T_7 (Hot water treatment of farmer's

saved seed) and T_2 (apparently healthy seeds). Uddin (2005) reported that germination percentage was higher in physically sorted lentil seeds over control (untreated seeds). All the eco-friendly seed treatments apparently healthy seeds treated with sun drying significantly increased at different plant growth parameters and seed formation by controlling black point severity of wheat. The findings of the present study keep with accordance study of Zobaer *et al.* (2007). He found that sundried of physically sorted seeds also reduced the balck point severity at different plant growth parameters of wheat. Among the eco-friendly seed treatments apparently healthy seeds treated with brine solution also gave good result at different plant growth parameters and grain formation by reducing black point severity of wheat. The findings of the present study accordance with the study of Kabir *et al.* (2007). He recorded that farmer's stored seed (T_1) always resulted a significantly highest black point at plant growth different parameters, seed formation and apparently healthy seeds treated with brine solution (@ 2% NaCl)gave the highest result.

CONCLUSION

Apparently healthy seeds treated with Bavistin 50 WP revealed to be effective for controlling black point of wheat among the treatments employed in the experiments. It was also observed that uses of apparently healthy seed, brine solution, sundried and hot water treated seed can be reduced black point severity of wheat.

ACKNOWLEDGEMENTS

We thank anonymous reviewer for his kind review and editing the manuscript. The research was financially supported by University Grants Commission (UGC), Bangladesh to Dr. F.M. Aminuzzaman, Assistant Professor, SAU, Dhaka.

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