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CHARACTERS ASSOCIATION ANALYSIS OF MORPHO-PHYSIOLOGICAL TRAITS IN SPRING WHEAT (*Triticum aestivum*) UNDER DROUGHT STRESS

A. Chowdhury[1]*, A. Akter[2], M.S. Hossain[1] and J. Rahman[1]

[1]Department of Genetics and Plant Breeding;[2]Department of Horticulture, Sher-e-Bangla Agricultural University, Dhaka-1207, Bangladesh

ABSTRACT

The major objective of most of the wheat breeding program is to developed of drought tolerant and high yielding varieties. In the present study 14 agro-physiological traits studied on thirty wheat genotypes. Mean performance, Variability, correlation matrix and path analysis were estimated on yield and different yield contributing characters in wheat genotypes. Phenotypic coefficient of variation was higher than the genotypic coefficient of variation for all the yield contributing traits. In correlation study, significant negative association was recorded in days to starting of heading (DSH) , days to starting of maturity (DSM) and root number (RN) while the non significant negative association for number of grains/spike (NGS) ,chlorophyll content (CC) , dry matter content (DMC) and root length (RL).Grain yield per plant (GYPP) with plant height (PH) , number of spike/m^2 (NSM), number of spikelet/spike (NSS) , peduncle length (PL) and weight of 1000 grains (TSW) show significant positive association, while leaf area index (LAI) show non significant positive association Path analysis revealed that DSH, PH, NSM, NSS, NGS, DMC, PL and TSW had positive direct effect on yield per plant, on the other hand, DSM, CC, LAI, RL, and RN had negative direct effect on yield per plant. Variety Sonalika performed better under lower moisture content in the soil followed by BD-7617, BARI Gom 25, BARI Gom 23 and BD 7650.

Keywords; Characters association, drought, heritability, genetic advance, yield potential

INTRODUCTION

Wheat (*Triticum aestivum L.*) belongs to the family Graminae is an important food crop and primarily grown across the exceptionally diverse range of environments WRC (2003). It covers about 42% of total cropped area in rice-wheat system in South Asia (Iqbal*et al.* 2002).In Bangladesh, wheat occupies above 4% of the total cropped area and 11% of the area cropped in rabi and contributes 7% to the total output of food cereals BBS (2008). At present about 429.61 thousand hectares of land in our country is covered by wheat with the annual production of 1302998 M tons BBS. 2014. The lower production of wheat in Bangladesh is not an indication of low yielding potentiality of this crop.Instead of high yielding varieties different stresses are the major reasons for yield reduction.

Among all the abiotic stresses of the world, drought is an arising alarming threat which can reduce grain yield. The average yield loss of grain can be 17-70% due to the insufficiency of water (Nouri-Ganbalani *et al.*2009).Fischer (1999) showed that under drought, yield reduction in spring wheat is on average of 60% of productivity. So efforts to identify drought tolerance characters among the existing varieties/lines to incorporate the tolerance character into the newly developed varieties are an important aspect to increase the yield of wheat in the climatic condition of Bangladesh. Wheat drought tolerance is affected by different

*Corresponding author: A. Chowdhury, Department of Genetics and plant breeding, Sher-e-Bangla Agricultural University, Dhaka-1207, Bangladesh. E-mail:aysha42sau@gmail.com

morphological characters for instant, plant height, spikelets per spike, thousand seed weight etc. (Ahmadizadeh*et al*. 2011a,b). For selecting high yielding genotypes, chlorophyll content and yield and yield component's relationship has great significance (Nori*et al.* 2011).

The knowledge of relationship between yield and yield contributing characters is important to select suitable wheat variety. In breeding program, correlation study provides reliable and useful information for the nature, extent and direction of selection. The path coefficient analysis helps the breeder to explain direct and indirect effects and it has been extensively used by various researchers (Ali *et al*. 2002). Find out the selection indices which would give the most appropriate weightage to the phenotypic values of each of two or more characters are important for selection. Discriminate function for selecting simultaneously several characters, has proved to be very useful in such situation in crop improvement program.

So in the context of the above mentioned situation and in respect of wheat cultivation in Bangladesh, the present piece of work was undertaken with thirty wheat genotypes to study genetic variation among the genotypes for yield and different morpho-physiological traits in drought stress condition, the genetic variability of the genotypes in drought condition and identify the potential drought tolerant genotype(s) for future breeding program.

MATERIALS AND METHOD

The present research work was conducted in the experimental field of Sher-e-Bangla Agricultural University, Sher-e-Bangla Nagar, Dhaka during the period from November 2013 to April 2014 in rabi season. In this experiment 30 wheat genotypes were Akber, Kanchan, Sonalika, BARI Gom 20, BARI Gom 21, BARI Gom 22, BARI Gom 23, BARI Gom 24, BARI Gom 25, BARI Gom26, BD 478, BD 479, BD 481, BD 489, BD 492 , BD 7544, BD 7551, BD 7552, BD 7560, BD 7591, BD 7592, BD 7599, BD 7605, BD 7614, BD 7617, BD 7618, BD 7621, BD 7622, BD 7624, BD 7650. The purity and germination percentage of these seeds were leveled as 98% and 95%, respectively. These genotypes were collected from Wheat Research Centre (WRC) of Bangladesh Agricultural Research Institute (BARI), Joydebpur, Gazipur. Randomized Complete Block Design (RCBD) was used with 3 replications of the material. There were 90 unit plots altogether in the experiment. The size of the each plot was 2.0 m × 1.0 m. The distance maintained between two blocks and two plots were 1.0 m and 0.5 m, respectively. Seeds were sown continuously with maintaining 20 cm line to line distance and plant to plant 5 cm. Cowdung was applied @ 10 t ha^{-1} during 15 days before seeds sowing in the field. The entire amount of TSP, MoP and Gypsum, $2/3^{rd}$ of urea (180, 50, 120, 220 kg/ha respectively) were applied during the final preparation of land. Rest of urea was top dressed after first irrigation (BARI, 2011). Fresh weight of grain was recorded plot wise from 1 m^2 area. After harvesting the grains were dried, cleaned and weighed for individual plot. The weight was adjusted to a moisture content of 14%. Data was recorded on days to starting of heading, days to starting of maturity, plant height (cm), number of spikes/m^2, number of spikelets/spike, number of grains/spike, chlorophyll content of 10 selected leaves, dry matter content, leaf area, peduncle length, root length, root number, weight of 1000 grains and grain yield per plant.

Statistical analysis: The mean values of all the characters were calculated and analysis of variance was performed. The significance of the difference among the treatment means was estimated by the Duncan Multiple Range Test (DMRT) at 5% level of probability (Gomez and Gomez 1984). Genotypic and phenotypic variances, heritability were estimated with the help of the formula suggested by Johnson *et al*. (1955). Genetic advance and genetic advance in percentage of mean were estimated with the help of the formula of Allard (1960) and Comstock and Robinson (1952). Genotypic coefficient of variation (GCV) and phenotypic coefficient of variation (PCV) were calculated by Burton (1952). Simple correlation was estimated of the 14 traits with the following formula (Singh and Chaudhary 1985). Path co-efficient analysis was done according to the procedure employed by Dewey and Lu (1959) also quoted in Singh and Chaudhary (1985) using simple correlation values.

RESULTS AND DISCUSSION

Mean performance and analysis of variance was found highly significant variation among 30 wheat genotypes in terms of all the studied characters (Table 1). Significantly high level of variation for yield and different yield contributing characters indicates possibilities of improving the genetic yield potential of wheat genotypes under drought stresses. The range of the co-efficient of variation (CV) was ranged from 4.08% to 15.50%. It was revealed that the best genetic influence and potential was found in the wheat genotypes. The results indicated that there was ample scope for selecting high yield potential lines for future breeding program.

Genotypic and phenotypic variance, heritability and genetic advance in percentage of mean were estimated for 14 traits in 30 collected genotypes of wheat genotypes which presented in Table 2. The higher phenotypic variance than the genotypic variance suggested that there was influence of environment over the yield and yield contributing characters. It was revealed that the variation among the characters was not only due to genotypes but also for the considered environment as the phenotypic co-efficient of variation (PCV) was higher than the genotypic co-efficient of variation (GCV). Sharma and Garg (2002) found high heritability coupled with high genetic advance for number of days to heading that partially supports the estimated result of the present study.Kumar and Shukla (2002) observed high heritability coupled with high genetic advance while Wang *et al*. (2003) reported very high broad sense and narrow sense heritability for plant height and both supported the heritability result but not the genetic advance of our analysis. Ghimiray and Sarkar (2000) estimated high heritability coupled with high genetic advance for spikes per plant which is similar to present experiment.Sarkar et al. (2001) observed high broad sense heritability for spikelets per spike. Pramad Kumar and Mishra (2004) found high heritability with high genetic advance in percentage of mean for spikelets per spike of wheat which is partially supportive for the current study.Kumar and Shukla (2002) supported the present study as they also found high heritability coupled with high genetic advance for 1000-kernel weight. Gupta and Verma (2000) observed high heritability and genetic advance for grain yield per plant. Sharma and Garg (2002) found high heritability coupled with high genetic advance for grain yield per plant that partially supports the result studied here.

To measure the mutual relationship among yield and yield contributing characters of wheat genotypes correlation matrix analysis was done and also to determine the component characters on which selection could be based for improvement in yield of 30 genotypes of wheat presented in Table 3. Correlation matrix shows that significant positive association was recorded for days to starting of heading of wheat genotypes with days to starting maturity (0.434) and number of grains/spike (0.493), while the non significant positive association for number of spikelets/spike (0.033), chlorophyll content (0.183), dry matter content (0.074) and root number (0.023). On the other hand, significant negative association was recorded for days to starting of heading with plant height (-0.334), number of spikes/m^2 (-0.641), leaf area index (-0.365), peduncle length (-0.253), weight of 1000 grains (-0.258) and grain yield per plant (-0.265) and non significant negative association was observed only with root length (-0.009). From the correlation matrix analysis it was revealed that increase of days to 50% flowering decreases most of yield contributing characters and yield in wheat. Patel and Jam

Table 1. Mean performance of yield and yield contributing characters of spring wheat under drought condition

Wheat genotypes	Days to heading	Days to maturity	Plant height (cm)	Number of spikes m^{-2}	Number of spikelets Spike^{-1}	Number of grains Spike^{-1}	Dry matter content (%)	Leaf area index	Peduncle length (cm)	Weight of 1000-grains (g)
Akber	47.33 d-h	112.00 d	71.10 b-g	257.00 de	42.00 b-e	57.00 f	5.33 a-d	2.32 e-k	15.67 f-i	31.10 l
Kanchan	46.33 e-h	114.67 b-d	68.67c-g	320.00 a	39.33 b-i	60.00 ef	5.33 a-d	3.23 a-c	16.27 d-h	33.20 j-l
Sonalika	46.33 e-h	111.67 d	84.00 a	240.00 ef	42.33 b-d	66.00 c-f	5.33 a-d	2.66 c-f	18.67 a	51.47 a
BARI Gom-20	47.00 e-h	114.67 b-d	69.67 b-g	282.67 b-d	37.33 c-j	59.67 ef	4.67 cd	3.70 a	16.50 c-g	46.83 bc
BARI Gom-21	45.33 gh	111.33 d	67.60 c-g	318.67 a	34.67 g-j	62.00 d-f	5.33 a-d	2.16 e-k	15.63 f-i	43.53 cd
BARI Gom-22	47.00 e-h	114.00 b-d	75.97 a-d	105.33 k	40.00 b-h	64.67 c-f	5.00 b-d	1.40 lm	17.00 b-e	30.50 l
BARI Gom-23	45.33 gh	111.33 d	82.67 a	311.67 ab	38.67 b-i	65.33 c-f	4.67 cd	2.08 f-k	18.00 ab	49.10 ab
BARI Gom-24	45.67 f-h	112.00 d	76.00 a-d	278.67 cd	39.00 b-i	61.33 d-f	6.67 a	2.59 d-g	17.73 a-c	40.00 d-h
BARI Gom-25	45.00 h	110.33 d	81.00 ab	307.00 a-c	40.00 b-h	64.00 c-f	6.33 ab	3.42 ab	17.67 a-c	46.80 bc
BARI Gom-26	45.67 f-h	110.33 d	83.33 a	324.00 a	36.00 d-j	64.67 c-f	4.67 cd	3.13 a-d	17.43 a-d	42.17 de
BD-478	56.00 bc	110.33 d	71.00 b-g	159.33 gh	35.33 f-j	66.00 c-f	6.00 a-c	2.81 b-e	17.00 b-e	36.17 g-k
BD-479	55.00 bc	112.67 cd	61.33 gh	180.00 g	44.00 b	65.33 c-f	5.67 a-c	2.51 d-i	15.00 h-j	46.40 bc
BD-481	53.00 c-f	119.00 a-d	61.83 f-h	181.67 g	44.00 b	68.67 a-f	6.00 a-c	1.76 j-l	18.00 ab	37.33 f-j
BD-489	53.00 c-f	119.33 a-d	53.33 h	145.67 h-j	34.67 g-j	70.00 a-f	6.33 ab	3.24 a-c	15.33 g-i	41.90 de
BD-492	56.00 bc	126.00 a-c	64.33 d-g	122.67 i-k	34.00 h-j	72.00 a-e	4.00 d	2.53 d-h	14.13 j	36.33 g-k
BD-7544	54.67 b-d	127.00 ab	68.33 c-g	215.33 f	38.67 b-i	69.67 a-f	6.00 a-c	2.41 e-j	17.27 b-e	36.50 g-k
BD-7551	53.67 c-e	121.33 a-d	60.67 gh	131.67 h-k	42.33 b-d	70.33 a-f	5.00 b-d	1.83 j-l	14.00 j	38.17 e-i
BD-7552	52.00 c-h	119.33 a-d	68.00 c-g	105.67 k	35.33 f-j	66.67 b-f	6.33 ab	1.86 h-l	16.07 e-h	32.27 kl
BD-7560	54.67 b-d	116.00 a-d	73.33 a-f	178.00 g	34.67 g-j	69.33 a-f	4.67 cd	1.96 g-l	15.47 f-i	47.07 bc
BD-7591	53.33 c-e	118.67 a-d	74.00 a-e	127.33 h-k	43.00 bc	65.00 c-f	5.33 a-d	1.98 g-l	16.67 c-f	47.33 bc
BD-7592	53.33 c-e	117.33 a-d	68.67 c-g	118.67 jk	33.33 ij	80.00 ab	5.33 a-d	1.89 h-l	17.43 a-d	40.37 d-g
BD-7599	52.00 c-h	115.33 b-d	66.00 d-g	117.00 jk	39.33 b-i	64.00 c-f	5.67 a-c	1.73 kl	15.70 f-i	35.70 h-k
BD-7605	53.00 c-f	116.00 a-d	73.00 a-f	135.67 h-k	41.00 b-g	76.67 a-c	6.33 ab	1.85 i-l	18.00 ab	32.97 j-l
BD-7614	53.00 c-f	114.67 b-d	70.33 b-g	123.00 i-k	42.67 bc	69.33 a-f	4.67 cd	1.40 lm	17.10 b-e	37.37 f-j
BD-7617	52.67 c-g	122.00 a-d	78.33 a-c	158.67 gh	51.00 a	68.33 a-f	6.33 ab	1.99 g-l	16.07 e-h	41.67 d-f
BD-7618	55.00 bc	123.00 a-d	67.33 c-g	114.33 jk	41.33 b-f	70.33 a-f	5.67 a-c	1.04 m	16.73 b-f	34.13 i-l
BD-7621	61.67 ab	129.33 a	65.67 d-g	104.33 k	32.00 j	72.33 a-e	6.33 ab	2.11 f-k	14.67 ij	38.00 e-i
BD-7622	61.67 ab	120.00 a-d	76.00 a-d	151.67 g-i	44.67 b	74.67 a-d	6.67 a	2.52 d-h	14.07 j	30.33 l
BD-7624	66.33 a	123.33 a-d	63.33 e-h	106.33 k	35.67 e-j	81.33 a	5.00 b-d	1.05 m	16.00 e-h	37.00 g-j
BD-7650	65.00 a	119.67 a-d	70.67 b-g	107.00 k	44.33 b	74.00 a-d	5.00 b-d	1.76 j-l	17.67 a-c	37.33 f-j
Mean	52.53	117.09	70.52	184.30	39.36	67.96	5.52	2.23	16.43	39.30
Range	45.00-66.33	110.3-129.3	53.33-84.00	104.3-324.0	32.00-51.00	57.00-81.33	4.00-6.67	1.04-3.70	14.00-18.67	30.33-51.47

Table 2. Genetic parameters of different yield and yield contributing characters spring wheat under drought condition

Characters	Genotypic variance (σ^2g)	Phenotypic variance (σ^2p)	Genotypic coefficient of variation (%)	Phenotypic coefficient of variation (%)	Heritability (%)	Genetic advance (GA)	GA in percentage of mean
Days to heading	29.02	43.54	10.25	12.56	66.65	11.61	22.10
Days to maturity	12.02	59.91	2.96	6.61	20.07	4.10	3.50
Plant height (cm)	40.47	74.69	9.02	12.26	54.18	12.36	17.53
Number of spikes m^{-2}	6094.63	6393.63	42.36	43.39	95.32	201.22	109.18
Number of spikelets $spike^{-1}$	14.73	25.93	9.75	12.94	56.81	7.64	19.41
Number of grains $spike^{-1}$	17.00	64.89	6.07	11.85	26.20	5.57	8.20
Chlorophyll content	14.89	30.75	7.94	11.41	48.40	7.09	14.57
Dry matter content (%)	0.34	0.83	10.55	16.52	40.82	0.98	17.80
Leaf area index	0.41	0.53	28.74	32.64	77.53	1.49	66.80
Peduncle length (cm)	1.49	1.93	7.42	8.46	76.82	2.82	17.16
Root length (cm)	3.03	3.55	32.61	35.29	85.38	4.25	79.54
Root number	3.08	3.38	13.80	14.47	90.90	4.41	34.73
Weight of 1000-grains (g)	32.94	38.62	14.60	15.81	85.30	13.99	35.61
Grain yield per plant (g)	0.83	1.06	13.01	14.72	78.17	2.12	30.37

Table 3. Correlation matrix of different yield and yield contributing characters of spring wheat under drought condition

Characters	Days to heading	Days to maturity	Plant height (cm)	Number of spikes/m^2	Number of spikelets/spike	Number of grains/spike	Chlorophyll content	Dry matter content (%)	Leaf area index	Peduncle length (cm)	Root length (cm)	Root number	Weight of 1000-grains
Days to maturity	0.434**	1.00											
Plant height (cm)	-0.334**	-0.342**	1.00										
Number of spikes/m^2	-0.641**	-0.436**	0.361**	1.00									
Number of spikelets/spike	0.033	0.003	0.163	-0.035	1.00								
Number of grains/spike	0.493**	0.300**	-0.186	-0.473**	-0.148	1.00							
Chlorophyll content	0.183	0.159	-0.014	-0.159	-0.079	0.083	1.00						
Dry matter content (%)	0.074	0.084	-0.070	-0.064	0.067	-0.014	0.022	1.00					
Leaf area index	-0.365**	-0.295**	0.143	0.591**	-0.134	-0.345**	-0.052	0.042	1.00				
Peduncle length (cm)	-0.253*	-0.192	0.397**	0.276**	0.120	-0.059	-0.069	0.037	-0.019	1.00			
Root length (cm)	-0.009	0.074	-0.165	-0.158	0.070	-0.092	0.242*	-0.037	-0.105	-0.062	1.00		
Root number	0.023	0.203*	-0.404**	-0.218*	-0.083	-0.160	0.185	0.168	-0.005	-0.205*	0.162	1.00	
Weight of 1000-grains (g)	-0.258**	-0.239**	0.242*	0.399**	-0.047	-0.131	0.021	-0.143	0.333**	0.183	-0.266**	-0.183	1.00
Grain yield per plant (g)	-0.265**	-0.267**	0.688**	0.269**	0.630**	-0.183	-0.097	-0.003	0.007	0.640**	-0.058	-0.343**	0.201*

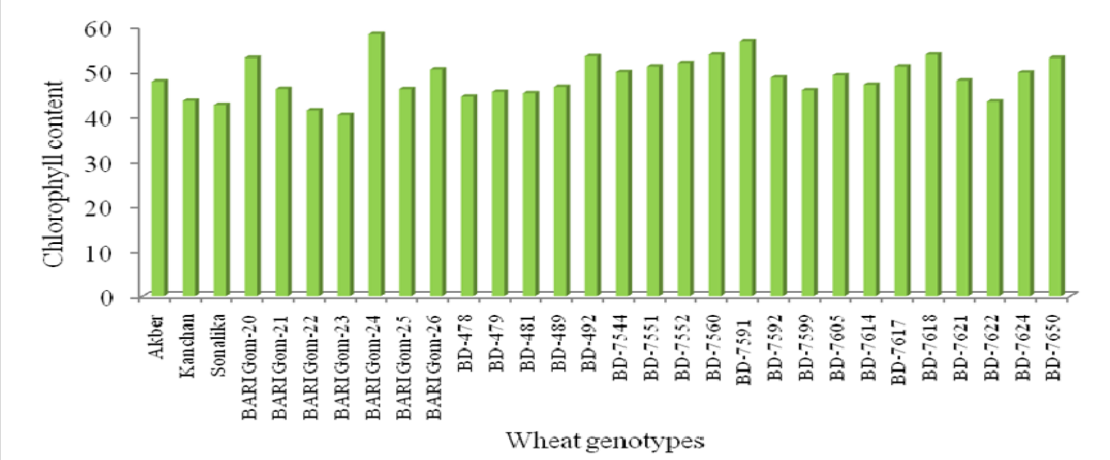

Figure 1. Chlorophyll content for different wheat genotypes

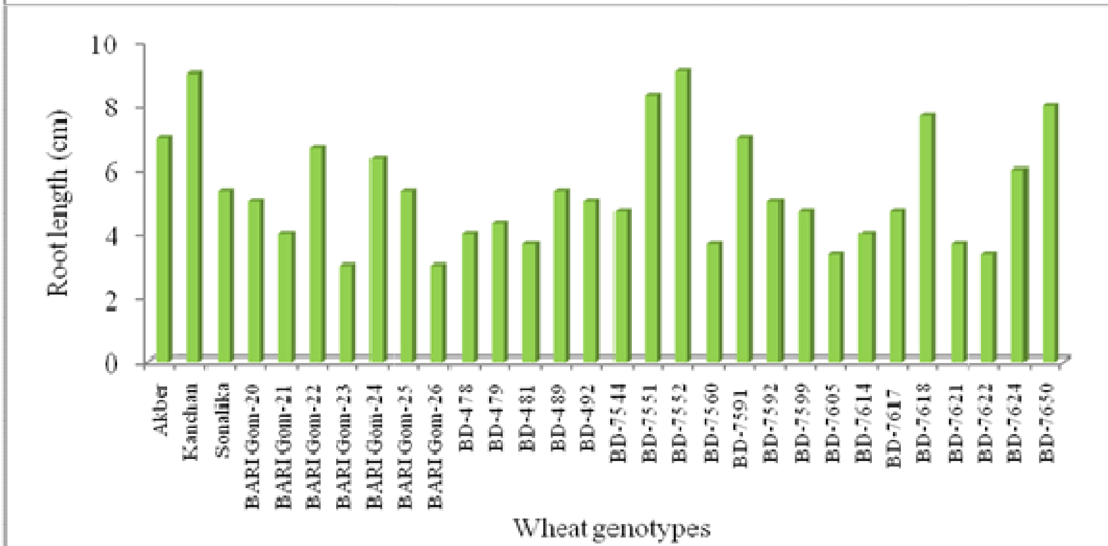

Figure 2. Root length for different wheat genotypes

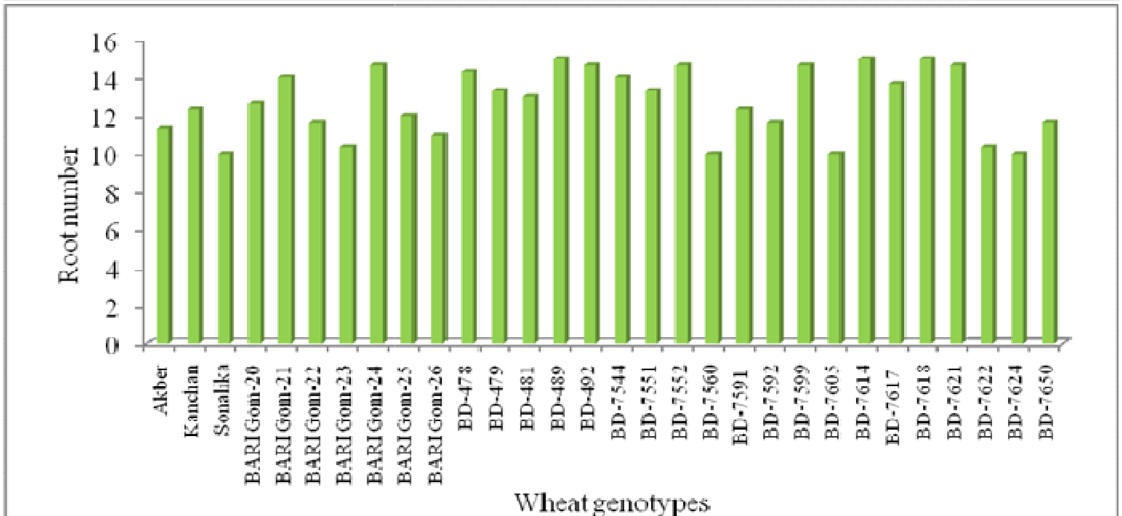

Figure 3. Root number for different wheat genotypes

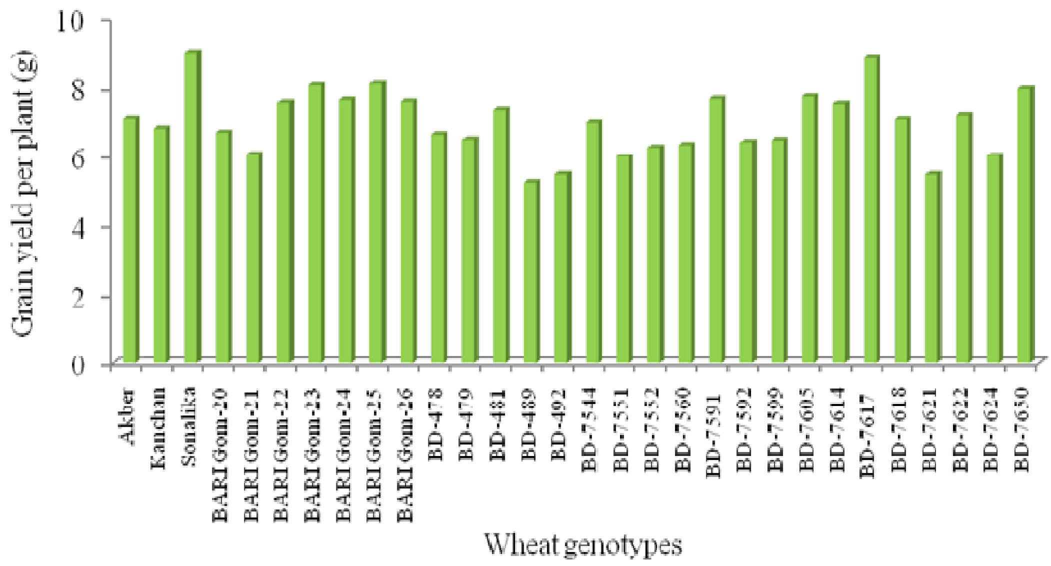

Figure 4. Grain yield per plant for different wheat genotypes

(2002) found that kernel yield had a positive and highly significant correlation with days to heading.

The results revealed that plant height increase considerably with highest yield and yield contributing characters. This suggested that plant height for different genotypes were more potential to allocate their photosynthesis towards highest yield. Kumar *et al*. (2002) reported that grain yield per plant had direct positive correlation with plant height. For Number of spikes/m^2 of wheat genotypes Kumar *et al*. (2002) reported that grain yield per plant had direct positive correlation with number of spikes per plant and 1000-grain weight in some advanced wheat lines. Ayccek and Yldrm (2006) reported that grain yield was negatively and significantly correlated with time to heading. Inamullah*et al.* (2006) reported that yield per plant was positively correlated with number of spikes per plant, number of kernels per spike.

Path analysis revealed that days to of heading (0.205), plant height (0.163), number of spike/m^2 (0.113), number of spikeklets/spike (0.243), number of grains/spike (0.056), dry matter content (0.138), peduncle length (0.157) and weight of 1000 grains (0.184) had positive direct effect on yield per plant, on the other hand, days to starting of maturity (-0.134), chlorophyll content (-0.119), leaf area index (-0.218), root length (-0.246) and root number (-0.078) had negative direct effect on yield per plant (Table 4). These results is similar with Subhani and Khaliq (1994) that there is a high positive direct effect of spikes per plant, grains per spike and 100-ays grain weight on yield per plant. Esmail (2002) reported that number of spike per plant had the highest direct effects on grain yield per plant followed by grain weight per spike and plant height. Mahak*et al*. (2003) reported that the number of grains per spike exhibited the greatest direct effect on grain yield followed by spike length and 1000-grain weight. They proposed that number of grains per spike, spike length and 1000-grain weight were the major yield contributing characters. Ayccek and Yldrm (2006) recorded positive direct effects of plant height, grain number per spike and 1000-kernel

Table 4. Path coefficients of yield and yield contributing characters of spring wheat under drought condition

Characters	Days to heading	Days to maturity	Plant height (cm)	Number of spikes/m^2	Number of spikelets/spike	Number of grains/spike	Chlorophyll content	Dry matter content (%)	Leaf area index	Peduncle length (cm)	Root length (cm)	Root number	Weight of 1000-grains	Yield (g/plant)
Days to heading	<u>0.205</u>	0.129	-0.456	0.038	0.104	0.122	-0.298	0.186	0.025	0.106	-0.145	-0.345	0.064	-0.265
Days to maturity	-0.133	-0.134	0.155	-0.168	0.214	-0.207	0.133	0.265	-0.097	-0.159	-0.139	0.142	-0.139	-0.267
Plant height (cm)	0.243	-0.148	0.163	0.255	-0.169	-0.146	0.348	0.136	-0.161	0.168	-0.078	0.169	-0.092	0.688
Number of spikes/m^2	0.105	0.054	0.134	0.113	-0.168	0.137	-0.111	0.201	-0.156	-0.075	0.161	0.087	-0.213	0.269
Number of spikelets/spike	-0.233	-0.059	0.227	-0.165	0.243	0.135	-0.132	0.275	-0.095	0.356	-0.046	0.266	-0.142	0.630
Number of grains/spike	0.128	-0.344	-0.016	0.138	-0.072	0.056	-0.165	0.123	-0.078	0.121	-0.295	0.167	0.054	-0.183
Chlorophyll content	-0.133	0.092	-0.145	0.236	-0.123	0.045	-0.119	0.008	0.032	0.175	0.134	-0.431	0.132	-0.097
Dry matter content (%)	0.118	-0.135	-0.469	0.048	-0.088	0.075	0.143	0.138	-0.032	0.296	0.181	-0.305	0.033	0.003
Leaf area index	0.194	0.182	0.067	-0.202	0.299	-0.133	0.108	0.097	-0.218	0.117	-0.309	0.015	-0.210	0.007
Peduncle length (cm)	-0.058	0.104	-0.281	0.054	0.398	-0.221	-0.156	0.365	0.142	0.157	0.106	0.068	-0.038	0.640
Root length (cm)	0.161	0.117	-0.209	0.155	-0.078	0.021	-0.289	0.145	-0.178	0.143	-0.246	-0.034	0.234	-0.058
Root number	-0.275	0.033	0.114	0.089	-0.234	0.033	-0.265	-0.199	0.032	0.175	0.134	-0.078	0.098	-0.343
Weight of 1000-grains (g)	0.151	-0.038	0.234	-0.265	0.044	-0.213	-0.145	0.195	0.056	-0.246	0.066	0.178	0.184	0.201

Residual effect = 0.2514

weight and negative direct effects of time to heading on grain yield. Saktipada *et al*. (2008) was observed that number of spikelets per panicle, days to flowering and 1000-grain weight had high direct effects on grain yield per plant. According to this days to heading, plant height,number of spike/m^{2}number of spikeklets/spike,number of grains/spike,peduncle length,weight of 1000 grains are the most important traits on which selection can be done.

CONCLUSION

In consideration of yield and yield contributing characters of Sonalika perform better under drought condition followed by BD 7617, BARI Gom 25, BARI Gom 23 and BD 7650. Phenotypic coefficient of variation was higher than the genotypic coefficient of variation for all the yield contributing traits indicating that high environmental influence on the studied characters. High heritability with high genetic advance in percentage of mean was found in number of spikes m^{-2}, root length (cm), root number and grain yield per plant (g). Correlation analysis revealed that the characters plant height, number of spike/m^2, number of spikelts/spike, peduncle length and weight of 1000 grains had highly positive correlation with yield per plant and path analysis also showthat the characters plant height, number of spike/m^2, number of spikelts/spike, peduncle length and weight of 1000 grains had direct positive effect with yield per plant indicated that the further wheat crop improvement would be effective by selecting the characters .

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