International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
www.chemijournal.com
IJCS 2021; 9(1): 200-202

Received: 14-11-2020
Accepted: 25-12-2020

Battula Sai Kumar Reddy
Department of Agronomy, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Umesha C
Department of Agronomy, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Chilukuri Navya Sree
Department of Agronomy, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Marri Prasanthi
Department of Agronomy, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Corresponding Author:
Battula Sai Kumar Reddy
Department of Agronomy, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Agronomic evaluation of wheat (*Triticum aestivum* L.) genotypes under north eastern plain zones

Battula Sai Kumar Reddy, Umesha C, Chilukuri Navya Sree and Marri Prasanthi

DOI: https://doi.org/10.22271/chemi.2021.v9.i1c.11234

Abstract
A field experiment was conducted during *Rabi* 2018 at Wheat Breeding experimental Field, Naini Agricultural institute, SHUATS, Prayagraj (U.P). The soil of experimental plot was sandy loam in texture, nearly neutral in soil reaction (pH 7.1). The treatments consist of eleven genotypes (NE-IR-101 to NE-IR-111) among these five check varieties included, whose evaluation was observed. There were eleven treatments each replicated four times. The experiment was laid out in Randomized Block Design. The result showed that growth parameters *viz*. Plant height (103.37 cm), Number of tillers/hill (12.2/hill) at 120 DAS were found significantly higher in Treatment T_8 (NE-IR-108). Yield Parameters *viz*. Grain yield (3.95 t/ha), Straw yield (5.42 t/ha) were also recorded significantly high in treatment T_8 (NE-IR-108) as compared to other treatments. From the above data Genotype (NE-IR-108) was found to be productive.

Keywords: Genotype, productive, evaluation

Introduction
Wheat is the second most important staple cereal crop belongs to family *Poaceae*. Wheat stands next to Rice, both in area and production. The major wheat grown in north western part of the country like States are Uttar Pradesh, Punjab, Haryana, Madhya Pradesh, Rajasthan, Bihar, Maharashtra, Gujarat and Himachal Pradesh. These States contribute about 99.5% of total wheat production in the country. Remaining States, namely, Jharkhand, Assam, Chhattisgarh Delhi and other North Eastern States contribute only about 0.5% of the total wheat production in the country. The major increase in the productivity of Wheat has been observed in the states of Punjab, Haryana and Uttar Pradesh. Higher area coverage is reported from UP in recent years. Uttar Pradesh has major share of total food grain production of 32.75 million tonnes with an area of 9.54 million ha, which makes it the major producer state in the country and share highest wheat grain production 32.75 million tonnes followed by Punjab (18.24 million tonnes), and MP (15.47 million tonnes). Uttar Pradesh shares 32.74%, Punjab accounts 12.08%, and Madhya Pradesh shares 18.95% of total wheat production in India. Punjab have the highest productivity 5.1tonnes/ha followed by Haryana 4.92 tonnes/ha, and average productivity of Uttar Pradesh is 3.43 tonnes/ha. (Annual report of Directorate of Economics & Statistics, 2018-19) [2].

Wheat is good addition for nutritional requirement of human body as it contains 8-15% protein, starch 60-68%, fat 1.5-2.0%, cellulose 2.5% and minerals 1.2-2%. Beside staple food for human beings, wheat straw is good sources of feed for a large population of cattle in our country. Because of genetic variation, different varieties of crop may differ in growth and development behaviour and response to different management practices. Taller varieties are generally less responsive to fertilizer application and give lesser yields than the dwarf varieties. As genotypes vary widely, nitrogen has got differential response (Singh *et al*., 2010) [7]. The varieties have been found to differ in their efficiency to accumulate dry matter and yield attributing characters. The development of semi-dwarf wheat cultivars which resist lodging more than conventional taller varieties have improved wheat yields by allowing greater efficient use of nitrogen (N) fertilizer. In Punjab (Singh *et al*, 1996) [8] observed that the bread wheat varieties (WH 542 and HD 2329) recorded higher dry matter production, leaf area index and effective tillers than durum wheat.

(Virk *et al*., 2003) [10] showed that varieties PDW 343 and WH 542 were significantly superior in grain yield than PBW 233 and WH 283. Mahajan and Nagarajan (2005) [5] reported that two hybrids HM 9846 and HM 9837 were significantly superior in grain yield to the best check PBW 343.

Materials and Methods

A field experiment was conducted during *rabi* 2108-19 at the Wheat Breeding Experimental Field, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj (Allahabad), Uttar Pradesh. The Wheat Breeding experimental field is situated at 25^0 24' 33" N latitude, 81^0 51' 12" E longitude (Google, 2018) and 98 m altitude above the mean sea level in North Eastern Plain Zone. The soil of the experimental field was sandy loam in texture, nearly neutral in soil reaction (pH 7.1). The total rainfall received during crop season 2018-19 was 4.83 mm. Wheat was sown on 29 November 2018 with plant geometry of 20 X 10 cm apart and evaluated in Randomized block design with eleven treatments four times replicated. The treatments are eleven genotypes (NE-IR 101 - 111) among these five check varieties are included. Optimum plant population maintained by thinning and gap filling. The thinning operation was done after 15 days of sowing. The observations were recorded on the different growth parameters *viz*. plant height, number of tillers per hill. Yield parameters *viz*. seed yield, Straw yield. The experimental crop was harvested separately from each plot on 10th April 2019. The produce from net plots were harvested in one lot and tied in bundles and allowed to complete dried material was passes through threshing operation. After threshing and winnowing the clean grains from each plot were weighed and the weight was recorded as grain yield in kg/plot and then converted in t/ha.

Results and Discussion

Growth Parameters

Plant Height

Plant height maximum at harvest (103.38 cm), was observed in treatment T8 (NE-IR- 108) over the rest of the treatments. The finding indicate that considerable variations were present among wheat genotypes for plant height which is attributed to genetic potential of certain variety and higher inheritance of this character. Similar findings have been reported by (Munsif *et al*., 2015) and (Abinasa *et al*., 2011) [4, 1].

Number of Tillers/Hill

Number of tillers per hill at harvest (12.5 tillers/plant), was found in treatment T8 (NE-IR- 108) over the rest of treatments. The development of tillers per hill is dependent on genetic background of plant and environmental conditions such as water, light, temperature and proper utilization of nutrient uptake at vegetative stage, Similar findings have been reported by (Spielmeyer and Richards 2004) [9].

Table 1: Evaluation of Wheat genotypes on the basis of growth parameters

Treatments	Plant height (cm)	No. of tillers/hill
NE-IR-101	100.13	11.05
NE-IR-102	101.73	11.47
NE-IR-103	89.12	7.985
NE-IR-104	99.1	10.01
NE-IR-105	98.88	9.48
NE-IR-106	94.3	8.57
NE-IR-107	93.05	8.29
NE-IR-108	103.38	12.15
NE-IR-109	91.2	8.03
NE-IR-110	97.73	8.92
NE-IR-111	92.03	8.08
F TEST	S	S
SEM (±)	0.19	0.10
CD (P=0.05)	0.55	0.29

Yield parameters

Grain yield: Data showed significantly maximum grain yield (3.95 t/ha) was observed with treatment T_8 (NE-IR-108) as the check variety got higher yield. However, T_2 (NE-IR-102) with grain yield (3.94 t/ha) was statistically on par with T_8 (NE-IR-108). The higher grain yield might be due to more grains per spike and grain weight which will be inherent genetic potential of the genotypes themselves. In addition, higher grain yield is probably related to the growth parameters such as the NE-IR-108 variety showed maximum tillers/hill because of more interception of solar radiation which stores further energy during photosynthesis. Enhancing grain yield potential is the most important objective in wheat breeding program. Expression of grain yield is dependent upon genetic potential and environmental factors and their interaction. Thus, it is strongly influenced by the environmental conditions. and has low to moderate heritability. Higher grain yields are usually associated with delayed maturity and lower protein content (Zhang *et al*., 2015) [11]. The genetic yield potential of a wheat varieties might be dependent on favourable conditions and suitable agronomic practices to be expressed. Thus, environmental factors such as water, fertilizer, disease and pest control also play significant role in increasing of grain yield (Knezevic *et al*., 2008) [3].

Straw yield (t/ha)

The significantly maximum straw yield (5.42 t/ha) was found under maximum grain yield producing treatment T_8 (NE-IR-108). However, T_2 (NE-IR-108) with straw yield (5.41 t/ha) was statistically on par with T_8 (NE-IR-108). Higher straw yield may be attributed to either taller plant height or higher tillers production of certain genotypes. Taller cultivars tend to produce more straw per unit of area than shorter cultivars. Other factors such as application of fertilizer, seed rate and growth habit may also be involved in the expression of this trait, such as NE-IR-108 had recorded more tillers. Shah *et al*., (2011) [6] stated that straw and grain yields increase with increase in level of nitrogen.

Table 2: Evaluation of Wheat genotypes on the basis of yield

Treatments	Grain yield (t/ha)	Straw yield (t/ha)
NE-IR-101	3.71	5.29
NE-IR-102	3.94	5.41
NE-IR-103	3.14	5.04
NE-IR-104	3.63	5.26
NE-IR-105	3.58	5.27
NE-IR-106	3.25	5.16
NE-IR-107	3.23	5.13
NE-IR-108	3.95	5.42
NE-IR-109	3.15	5.04
NE-IR-110	3.53	5.23
NE-IR-111	3.18	5.08
F TEST	S	S
SEM (±)	0.05	0.04
CD (P=0.05)	0.15	0.12

Conclusion

On the basis of one-season experimentation Genotype (NE-IR-108) was found more productive (3.95 t/ha) due to efficient utilization of nutrients and their genetic inherited characters. The conclusions drawn are based on one-season data only which requires further confirmation for recommendation.

Bibliography

1. Abinasa M, Ayana A, Bultosa G. Genetic variability, hentability and trait associations in durum wheat (*Triticum turgidum* L. var. durum) genotypes. African Journal of Agricultural Research 2011;6(17):3972-3979.
2. Annual report of Directorate of Economics & Statistics 2018-19.
3. Knezevic D, Zecevic V, Dodig D. Genetic and phenotypic variability of grain mass per spike of winter wheat genotypes. Kragujevac Journal of Science 2008;30:131-136.
4. Munsif F, Arif M, Jan MT, Ali K, Khan MJ. Influence of sowing dates on phenological development and yield of dual-purpose wheat cultivars. Pakistan Journal of Botany 2015;47(1):83-88.
5. Nagarajan SMB. Heterosis for grain yield in wheat. Crop Res 2005;29:466-68.
6. Shah WA, Khan HU, Anwar S, Nawab K. Yield and yield components of wheat as affected by different seed rates and nitrogen levels. Sarhad Journal Agriculture 2011;27(1):71-25.
7. Singh P, Singh KN, Singh FA, Bahar F, Raja W. Evaluation of wheat (Triticum aestivum L.) genotypes for productivity and economics under grades levels of nitrogen in temperate; Kashmir. Indian J Agric Sci 2010;80:380-84.
8. Singh T, Malik RC, Kumar L. Effect of varieties, seed rate and weed management on weeds in Indian Journal of Weed Science 1996;28:101-103
9. Spielmeyer W, Richards RA. Comparative mapping of wheat chromosome 1AS which contains the tiller inhibition gene (tin) with rice chromosome 5S. Theory Apply Genetics 2004;109:1303-1310.
10. Virk HK, Brar LS, Walia US. Competitive ability of wheat cultivars sown on different dates with little read canary grass; Indian Journal of Weed Science 2003;35:21-23
11. Zhang G, Wang Y, Guo Y, Zhao Y, Kong F, Li S. Characterization and mapping of QTLs on chromosome 2D for grain size and yield traits using a mutant line induced by EMS in wheat. The Crop Journal 2015,1-10.