



PERFORMANCE OF DIFFERENT CULTIVARS OF WHEAT (*TRITICUM AESTIVUM*) ON PRODUCTIVITY AND PROFITABILITY UNDER IRRIGATED CONDITIONS OF RIVERINE TRAIT OF CENTRAL U.P.

Khalil Khan, H.G. Prakash , D.P. Singh , Anil Kumar and B.P. Singh
C.S. Azad University of Agriculture and Technology, Kanpur – 208002
Corresponding author email: khankhalil64@gmail.com

ABSTRACT

The present study was undertaken during Rabi season of 2018-19 at five villages of Kanpur Nagar and Kanpur Dehat to study the performance of different cultivars of wheat (*Triticum aestivum*) on productivity and profitability under irrigated conditions of riverine trait of central U.P. The experimental soil was sandy loam and loam, having poor fertility status. Five cultivars of wheat viz., K-1317, K-1006, K-402, K-607 and H.D. 2967 were evaluated with local check. Results revealed that among the different cultivars of wheat, K-1006 registered higher economic yield by 50.99 q/ha in comparison to other tested cultivars. The local check of wheat yielded lowest grain yield by 41.22 q/ha. Wheat cultivars K-1317, K-402, H.D. 2329 and K-607 produced grain yield by 48.19 q/ha, 47.62 q/ha, 46.12 q/ha and 45.95 q/ha, respectively. The growth and yield contributing characters were concordance to the grain yield of wheat. Wheat cultivars K-1006 registered higher gross and net returns and benefit: cost ratio of wheat as compared to other cultivars of wheat.

KEY WORDS : Irrigated situation, Genetic Variability, Photoassimilates, Translocated.

INTRODUCTION

The wheat cultivators is particularly concentrated in the Indo-gangetic alluvial soil of Uttar Pradesh as a irrigated crop with the varieties developed by C.S. Azad University of Agriculture and Technology, Kanpur. The increasing trend in area, production and productivity was found in Uttar Pradesh. At present in U.P. about 98.85 lakh ha wheat is grown with total production of 349.71 lakh mt. and productivity of 35.38 q/ha (Anonymous 2017).

The agricultural transformation which is at present taking place in India has been dependent to a large extent on the high yielding strains of cereals especially wheat. Using the scientific techniques of exploitation of hybrid vigour and other types of gene action it has been possible to develop high yielding varieties. This is very true, particularly in wheat crop. The new strains have been so evolved that they show good response to conditions of high fertility and irrigation. In wheat, most of the new plant types have been evolved due to the advent of dwarfing genes. It is well known fact that dwarf varieties require clean cultivation and fine tith for sowing. However, under multiple cropping pattern in the sequence of relay cropping, minimum tillage supplemental with frequent inter-cultural operations, has also given good result therefore, frequency of tillage operations is not very important. The important thing is to have field properly levelled for effective distribution of irrigation water and it should be free from wastes and crop stubbles.

Singh et. al (2013) reported that front line demonstration/ cluster front line demonstration with full package of practices on farmers fields is the pin point for increasing the production with improved genotypes of crops. The several wheat genotypes have been developed by

CSAUAT, Kanpur, out of which five were used in aforementioned demonstrations. Therefore the present study was conducted to the performance of their genotypes at farmers fields at Kanpur district.

MATERIALS AND METHODS

The front line demonstration/ cluster front line demonstration was carried out during winter season of 2018-2019 at Kanpur Nagar and Kanpur Dehat. The front line demonstration was under taken in 5 villages locations of Kanpur Nagar and Kanpur Dehat. The area of front line demonstration/ cluster demonstration was 40 ha, having the land of 100 participants. The improve package and practices were followed for the raising of wheat cultivars to each the wheat cultivars were sown in the second fortnight of November 2018 and harvested after 120 days of planting at full maturity in the second fortnight of March 2019. The cultivars of wheat viz., K-1317, K-1006, K-402, K-607 and H.D. 2967 were tested with local check. These cultivars were grown in operational area under front line/ cluster demonstration at Kanpur Nagar and Kanpur Dehat. The soil of operational area was sandy loam and loam with moderate pH. The analysis of soil samples indicated that the soil was low in nitrogen and organic carbon, very low in phosphorus and medium in potash, therefore, the fertility status of operational area was poor. The pH was determined by 7.5-8.2 with Electrometric glass electrode method (Piper, 1950), while organic carbon determined by colorimetric method (Datta et. al., 1962). The total nitrogen was analysed by Kjendahl's method as discussed by Piper (1950). The available phosphorus and potassium were determined by Olsen's method (Olsen et.

al. 1954) and Flame photometric method (Singh, 1971), respectively.

RESULTS AND DISCUSSION

A perusal of data on growth and yield attributes, yield and economics of wheat as effected by different cultivars of wheat have been presented in Table 1 and Table 2. Data pertaining to growth parameters viz., main shoot height and effective tillers / plant of wheat as effected by different cultivars of wheat. Tallest plants of wheat was obtained in K-607 (90 cm.) however, more number of effective tillers /

plant (6.00) in K-1006. Among the different cultivars of wheat, highest spikelet's / spike (16.00) in K-1006, grains/spike (50.25), grain weight/spike (3.50 g.), grain weight /plant (13.15 g.) and 1000 seed weight (51.00 g) was obtained with wheat cultivars of K-1006 followed by K-1317, K-402, HD-2967 and K-607. The local check of wheat displayed the lowest values of growth and yield traits in comparison to the newly tested genotypes. The differences in growth and yield traits were due to genetic variability. These results are confirm with the findings of Verma *et. al.* (2005).

TABLE 1: Growth and yield attributes of wheat under different genotypes

Cultivars	Main shoot height (cm)	Effective tillers/ plant	Spikelets/ spike	Grains/ spike	Grain weight/ spike (g)	Grain weight/ plant (g)	1000 seed weight (g)
K-1317	90.60	5.90	15.80	49.80	3.45	13.10	50.80
K-1006	90.50	6.00	16.00	50.25	3.50	13.15	51.00
K-402	90.65	5.80	15.78	49.50	3.35	13.00	50.80
K-607	90.80	5.70	15.20	48.90	3.15	12.90	50.50
HD-2967	90.75	5.75	15.50	49.00	3.20	13.00	50.70
Check	101.10	5.10	15.05	48.00	3.00	12.15	50.15

TABLE 2: Yield and economics of wheat as effected by different cultivars of wheat

Cultivars	Yield (q/ ha)	Cost of cultivation (Rs/ ha)	Gross return (Rs/ ha)	Net return (Rs./ ha)	B:C ratio
K-1317	48.19	34643	82219	48788	2.40
K-1006	50.99	34643	87193	52550	2.51
K-402	47.62	34643	81430	46787	2.35
K-607	45.95	34643	64335	29692	1.85
HD-2967	46.12	34643	64568	29925	1.86
Check	41.22	34643	55030	20387	1.59

The grain yield of wheat presented in Table 2 displayed that in frontline demonstration cultivar K-1006 registered higher grain yield by 50.99 q/ ha followed by K-1317 (48.19 q/ ha) and K-402 (47.62 q/ ha). Among the tested improved cultivars of wheat H.D. 2967 (46.12 q/ ha) and K-607 (45.95) produced lower yield as compared to K-1006, K-1317 and K-402 but superior than the local check (41.22 q/ ha). Therefore, the order of varietal performance was K-1006 (50.99 q/ ha) > K-1317 (48.19 q/ ha) > K-402 (47.62 q/ ha) > H.D. 2967 (46.12 q/ ha) > K-607 (45.95 q/ ha) and local check (41.22 q/ ha). The increase in grain yield of wheat might be due to considerable increase in effective tillers/ plant, spikelet's/ spike, grains/ spike, grain weight/ spike, grain weight/ plant and 1000-seed weight in cultivar K-1006 sown under irrigated situation over other genotypes. These results are in agreement with those reported by Singh (2005). The cultivar K-1006 of wheat maintained better source-sink relationship under irrigated situation. Under this condition the dry matter of photosynthates produced by source organs translocated towards sink organs (economic part) and produced higher seed of wheat. The sowing of K 1006 of wheat had higher number of spikelets/ spike, grains/ spike and grain weight/ spike wheat might be due to higher sink capacity to utilized the photoassimilates translocated from source

resulted in more grain weight/ plant and grain yield (q/ ha). These results are conformation with the findings of Panwar *et. al.* (1986), Shrivastava and Bharadwaj (1986), Pachpor and Shete (2010), Singh *et. al.* (2015), Singh *et. al.* (2015) and Singh *et. al.* (2016).

Highest gross return of wheat (Rs.87193.00/ ha.) was fetched with wheat cultivar K-1006 followed by K-1317 (Rs.82219/ha), K-402 (Rs.81430/ha.), HD-2967 (Rs.64568/ha.) and K-607 (Rs.64365/ha). Wheat cultivar K-1006 registered maximum net return (Rs.52550/ha) of wheat followed by K-1317 (Rs.48788/ha), K-402 (Rs.46787/ha), HD-2967 (Rs.29925/ha.) and K-607 (Rs.29692 /ha). Similar trend on benefit : cost ratio was recorded with different cultivar of wheat Minimum gross and net returns and benefit : cost ratio was registered in check cultivars of wheat. Similar results on yield and economic of different cultivar was obtained by Verma *et. al.* (2005).

On the basis of above results, it may be concluded that wheat cultivar K-1006 proved economical feasible and produced highest yield of wheat at farmer field under irrigated conditions of riverine tract of central U.P.

REFERENCES

- Annonyanous 2017. Rabi Phasalon Ke Saghan Padhatiyan Publication of Department of Agriculture, U.P. Lucknow : 110.
- Datta, N.P., Khera, M.S. and Saini, T.R. 1962, A rapid colometric procedure for determination of organic carbon in soils. *Journal of Indian Society of Soil Sciences*, 10 : 67-74.
- Olsen, S.R., Cole, C.V., Watanable, F.S. and Dean, L.A. 1954. Estimation of available phosphorus in soils by extraction with sodium bicarbonate *U.S.D.A. Circ. 939 (Washington)* : 19.
- Pachpor, N.S. and Shete, P.G. 2010. Source – Sink relationship in soybean genotypes in summer season. *International Journal of Agricultural Sciences* 6 (1) : 67-68. 1950.
- Panwar, J.D.S., Shukla, D.S. and Sirohi, G.S. 1986. Growth and development aspect in relation to yield of mungbean. *Indian Journal of Plant Physiology*, 4 : 312-3515.
- Piper, C.S. 1950, Soil and Plant Analysis. *Univ. Adelaide Aust.*
- Shrivastava, J.P. and Bhardwaj, S.N. 1986. Contribution of different photosynthesizing organ to the pod in relation to source – sink interaction in yield partitioning . *Journal of Plant Physiology* : 4 : 262-265.
- Singh, R.A. 2005. Eco-friendly input management in denuded and terminate affected fragile area for sustainable production of wheat (*Triticum aestivum L.*). *Farm Science Journal*, 14 (1) : 64-66.
- Singh, M.K., Singh, R.A., Khan, K. and Chandra, N. 2015. Response of different varieties of vegetable pea (*Pisum sativum*) on seed production under dry eco-system. *Journal of Research in Environment and Life Sciences*, 8 (2) : 397-398.
- Singh, R.A., Singh, A., Singh, I.P. and Rai, R. 2015. Groundnut – wheat cropping system under different moisture management practices in hillocks watched of Bundelkhand. *Journal of Research in Environment and Life Sciences*, 8 (2) : 397-398.
- Singh, R.A., Sharma, V.K. and Pal, S.B. 2013. Watershed based front line demonstration is a path of prosperity. *Agriculture update* 8 (142) : 42 – 44.
- Singh, R.A., Singh J., Pal, S.B. and Singh, R.K. 2016. Integrated nutrient management in companion cropping of field pea in comparison cropping of field pea (*Pisum sativum*) and Indian mustard (*Brassica juncea*) in riverine eco-system of U.P. *Research in Environment and Life Sciences*, 9 (10) : 117/4174.
- Singh, T.A. 1971. Laboratory Manual for Soil fertility and fertilizer, *U.P. Agril. Univ. Pant Nagar (Nainital)* : 71-74.
- Verma, R.N. Nirala, R.K. and Kumar, A 2005. Response of wheat (*Triticum aestivum L.*) varieties of phosphorus application under late sown condition in central U.P., *Farm Science Journal* 14 (1) : 52 – 53.