International Journal of Science, Environment and Technology, Vol. 13, No 4, 2024, 272 - 278
ISSN 2278-3687 (O)
2277-663X (P)

THE EFFECT OF DATES OF SOWING AND VARIETIES ON GROWTH, YIELD ATTRIBUTES & YIELD OF WHEAT(*Triticum aestivum* L.*)* UNDER IRRIGATED CONDITION OF CENTRAL PLAIN ZONE OF UTTAR PRADESH

Nitish Tiwari, S. S. Chanda, Sudhakar Singh, Deepak Pandey, P.K. Singh and Gajendra Singh
Department of Agronomy, Chandra Bhanu Gupta Agriculture Post Graduate College, Bakshi Ka Talab, Lucknow (U.P.) - 266201

Abstract: The present investigation was carried out in *Rabi* (Winter) season 2021-22 at Shradhay Bhagwati Singh Agriculture Research Farm, Hajipur, Chandra Bhanu Gupta Agriculture Post Graduate College, BKT, Lucknow, (U.P.) To find out the effect of dates of sowing and varieties on growth, yield and economics of wheat. The 9 treatment comprises of three dates of sowing and three varieties, were tested in split plot design with three replications. Wheat sown on November 27 recorded significantly highest growth parameters, yield attributes, yield and net profit followed by December 7 and December 17 sown crop. Variety HD 2967 was observed the highest values of growth parameters, and yield followed by HD 3086 and lowest being with PBW 502. In case of different dates of sowing, the highest benefit cost ratio (2.11) was obtained from 27th November sown crop but in case three different varieties, highest benefit cost ratio (2.11) was obtained from variety HD 2967.
Keywords: Varieties, Date of sowing, yield, wheat

Introduction

One of the most significant cereal crops worldwide is wheat (*Triticum aestivumL.*), which isa member of poaceae family. Wheat is also considered as a vital cereal crop for majority of global population. Since ancient times, wheat has been regarded as the „King of Cereals " and it now holds this title with honour. Wheat is a feeding bowl to mankind occupies a premier position of all the staple food grain crops and an intellectual challenge that possess in a range of biological disciplines, archaeology, social and economic history. It is grown around the world across a wide range of environments and more land is devoted to more wheat is produced than any other crop. Wheat is the major food grain consumed directly by human beings and is estimated that more than 35% worldwide production population depends on wheat, as it supplies more nutrients particularly, essential amino acids than any other single crop. It is one of the staple food crop of nearly about two billion people, 36%of total world population, which comprises of 55% of carbohydrates and food calories about 20%

*Received July 16 , 2024 * Published August 2, 2024 * www.ijset.net*

consumed throughout the entire world (Beiman and Gaur, 1995).

Sowing date being a non-cash input plays an awfully critical part in harnessing the maximum possible yield potential of any crop. The photosynthesis environment during sowing affects a plants potential. When a plant is sown at theideal time, it yields the most. The ideal time may change depending on the location and variety. Sowing at optimum date prevent pathogen attack and weed infestation. Effect of seeding after the best time lead to significant diminishes in grain yield because the day spent in vegetative growth reduction in yield are caused by growth slowdown, declines in certain growth parameters and deviations in yield components. Because of the winter month of December and January low temperature, no other crop is so competitive and remunerative as short duration high yielding wheat. The assortment HD 3086, HD 2967 and PBW 502 have been found promising beneath watered conditions in Eastern Uttar Pradesh region. As a result of concerted and persistent effort several high yielding strains of wheat have been developed. Newer high yielding varieties being relatively, thermo-sensitive, perform better even under late sown condition.

Materials and Methods

The experiment was carried out during Rabi 2021-22 at Shradhay Bhagwati Singh Agriculture Research Farm, Hajipir, Chandra Bhanu Gupta Krishi Mahavidyalya, Bakshi Ka Talab, Lucknow, (U.P.). The field was leveled having good soil condition. Geographically, experimental site falls under subtropical zone is situated at $26^0$56 N latitude and $80^0$52 E longitude with an average altitude of 111m above the mean sea level. The experimental site situated on airforce road, perpendicular to Lucknow- Sitapur about 21kms away from Lucknow.

The climate of Lucknow is typical subtropical with hot summers and chill dry winter. There was great variation in seasonal temperatures. Summer season prevails during April to June. The temperature during summer month goes up to 47^0C and the climate becomes very hot and scorching. Hot dry winds generally called "loo" blow in the summer month. Monsoon sets in the month of July with the arrival of south western monsoon winds and lasts till September. Lucknow receives annual rainfall about 101 cm. Winters starts from October and lasts till February. The mean temperature of winter generally season in Lucknow. The minimum temperature during winter seasons in the month of December and January goes down up to 6^0C. Rainy season in is known for high temperature and high humidity (85-95%) and is very much suitable for vertical crop growth of wheat crop.

The data given in the table indicates that weekly minimum and maximum temperature during the crop season ranged from 4.2 ℃ to 41.1 ℃ respectively and minimum and maximum relative humidity (%) ranged from 10.6 to 96.1 respectively, evaporation (mm) ranged from 0.7 to 7.4 and sunshine (hrs.) 2.2 to 9.1 hrs. Rainfall received during crop season was 5.6 mm very much suitable for vertical crop growth of wheat crop.

Result and Discussion

Table (1) Effect of dates of sowing and varieties on growth, yield and yield attributes.

Treatments	**Plant height(cm)**	**Dry matter Accumulation (g/m^2)**	**Leaf aera index**	**Length of spike (cm)**	**No. of grain/ spike**	**Grain weight/ spike (g)**	**Test weight(g)**
Date ofsowing							
27-11-2021	94.90	1349.8	3.90	12.58	44.13	1.54	41.18
07-12-2021	89.70	1033.3	3.87	10.45	40.83	1.44	38.58
17-12-2021	87.65	949.9	3.39	8.60	39.34	1.38	36.64
SEm±	1.23	0.382	0.006	0.06	0.375	0.006	0.20
CD at 5%	4.97	1.53	0.025	0.25	1.51	0.02	0.80
Varieties							
HD-2967	92.02	1113.0	3.74	10.60	42.72	1.47	40.31
HD-3086	89.54	1111.4	3.73	10.52	41.37	1.46	38.46
PWD-502	90.68	1108.5	3.70	10.52	40.21	1.44	37.64
SEm±	1.19	0.35	0.01	0.05	0.36	0.005	0.14
CD at 5%	NS	1.11	0.03	NS	1.12	0.01	0.45

The data presents in table 1 reveled that increasing date of sowing increased the growth parameters like plant height, dry matter accumulation, effective tillers/m^2 and leaf area index significantly crop sown on November 27 and December 07 caused superiority over December 17 due to favourable temperature resulted in better germination and other growth parameters as compare to crop sown in December. Dry matter accumulation is the result of better plant growth in terms of plant height, more number of plants/ unit area and higher number of leaves which was highest in November sown crop and reduced drastically due to low temperature in initial stage of crop under delay sown crop December. Number of tillers m^{-2}, plant height and leaf area index also exhibited similar trend and recorded the highest with sown crop in November. These results are in corroborated with the findings of Olsen, S.R.,

Cole, C.V., Watanabe, F.S., Dean, L.A. (1954) The lower production of dry matter under delay sown crop in December might be adverse effect of low temperature and high temperature at the time of seed setting in the month of March and April. Therefore, crop suddenly shifted from vegetative phase to reproductive phase under crop sown inDecember, consequently produced lesser tillers, plant height, leaf area index and dry matter accumulation.

Significantly variations caused due to different varieties have been observed regards of plant height, dry matter accumulations and leaf area index was observed variety HD2967showed its superiority over HD-2967, and PBW-502.Thus, it is inferred that November sown crop gave an excellent growth as compare to December sown crop where-as HD 2967 proved to be the best in terms of growth parameters followed by HD 3086 and PBW 502.

Table -2 Grain, straw and biological yield (q/ha) and harvest index (%) asaffected by as affected by date of sowing and varieties.

Treatments	**Grain yield (qha^{-1})**	**Straw yield (qha^{-1})**	**Biologicalyield (q/h)**	**Harvest index (%)**
Date of Sowing				
27-11-2021	44.61	53.47	98.08	45.48
07-12-2021	43.83	50.40	94.24	46.51
17-12-2021	39.72	43.81	83.65	47.61
SEm±	0.079	0.128	0.186	0.030
CDat5%	0.317	0.514	0.748	0.121
Varieties				
HD2967	43.88	50.68	94.68	46.52
HD 3086	42.33	48.71	91.05	46.55
PBW 502	41.94	48.30	90.24	46.52
SEm±	0.091	0.080	0.139	0.018
CDat5%	0.283	0.250	0.434	NS

Dates of sowing played an important role in influencing yield contributing characters viz. no. of effective tillers m-^{2}, length of spike, grain weight of spike, grains per spike and test weight. Crop sown on November 27 recorded higher grain yield (44.61 q/ha) followed by December 7 and December 17 sowing with grain yield (43.83q/ha) and (39.72 q/ha)

respectively. Thus delay in sowing beyond November 27 resulted reduction in grain yield significantly. However, crop sown on November 27 reduced the grain yield to the tune of (25.42%) and (32.20%) over December 7 and December 17 sown crop, respectively. The reduction in yield attributes under late sowing in December might be due to poor growth in terms of number of tillers, plant height,dry matter production and leaf area index owing to low temperature and shorten in vegetative phase coupled with rise in temperature in reproductive phase which resulted poor source photosynthesis under delayed sown crop The maximum values all yield attributes was significantly highest with November 27 sown crop over (December 7 andDecember17) sown crop.

Grain yield of the crop is manifestation of growth characters. The low yield under delayed sowingin December may partially due to the lesser growth period available to the crop which might have adversely affected the normal growth and development of crop. It may also be noted that there was an abrupt rise in the mean temperature from the end of March and up to end of April recoded in reduction in yield under delayed sowing. The early flowering and grain filling phase during the hotmonth of April was recorded under delayed sown crop. The high temperature particularly in the month of April coupled with hot western wind hastens maturity and does not permit proper manufacture and translocation of food to the developing grain. This has also produced immature and shriveled grain and lower thousand grain weight under late sown crop. Therefore, early sowing(November) was at the advantage because after having completed its vegetative growth satisfactory, it had come in the month of January when the temperature remained quite favorable. The grain development and maturity kept a favorable imbalance with the steady rise in temperature during the mid-growth period (before ear emergence) with the normal sowing at November 27. The adverse effect of weather was associated more with late sowing (December 7and December 17) resulted in significantly lower no. of effective tillersm^{-2}, no. of grains, grain weight/ spike and 1000 grain weight which ultimately reflected in reduced per hectare grain yield. These results are in close conformity with finding of **Dube *et al* (2008) and Naniwal and Singh (2000).**

Similar to grain yield, straw yield was also exhibited same trend and decrease significantly as the sowing was delayed beyond November 27 over, December 7 and December17, respectively**. Dhaka *et al* (2006), Dubey *et al.*** have also reported that straw yield was decreased as the sowing of wheat was beyond November. This reduction in straw yield as a result of delayed sowing was mainly due to reduction in crop growth parameters like plant height, tillers m^{-2}, dry matter accumulation and leaf area index which continued to be declined

with the delay in sowing.

Alike growth, yield attributes, per hectare grain, straw yield and total yield affected significantly due to different varieties. A critical examination of data presented in (Table-8) showed clear cut understanding that variety HD 2967, produced significantly highest grain yield of (43.88q/ha), straw yield (50.68q/ha) and total biological yield (94.68q/ha) followed by HD-3086 with (42.33 q/ha) grain yield, (48.71q/ha) straw yield and (91.05q/ha) total biological yield. The higher yield with HD2967 was mainly attributed due to higher growth and yield attributes owing to their own genetic capability. The lower growth and yield attributes with HD 3086 and PBW 502 was mainly responsible for lower yield with these varieties under present investigation. These results are in close conformity with those of **Brijkishor (1998).**

Overall, November sown crop (November 27) was found to be the most conducive time of sowing for wheat crop. Variety HD 2967 was found to be the highest yielder followed by HD- 3086.

CONCLUSION

1. Wheat crop may be sown on November 27 to obtain, growth, yield attributes, yield and net profit and benefit cost ratio.
2. Variety HD-2967 may be sown to obtain higher growth parameter, yield attributes, yield andprofit followed by HD-3086 and PBW-502.

REFERENCES

[1] Ali, A., Ullah, Z., Ali, N. and Anjum, M.M. (2017). Evaluation of Wheat Advanced Lines for Agronomic Traits under Vary Sowing Dates. *Agri Res & Tech,*7(1): 01-011.

[2] Akram, M. (2016). Growth and yield components of wheat under water stress of different growth stages. *Bangladesh J. Agril. Res*, 36 (3):455- 468.

[3] Bachhao, K.S., Kolekar, P.T., Nawale, S.S. and Kadlag, A.D. (2018) Response of different wheat varieties to different sowing dates. *Journal of Pharmacognosy and Phytochemistry.* 7(1): 2178- 2180.

[4] Brijkishor, (1998). To assess the performance of newly developed strain of wheat under zero tillage condition with varying nitrogen levels. M.Sc. (Ag.) thesis submitted to N.D.U.A.&T., Kumarganj, Faizabad.

[5] Dhaka, A.K., Bangarwa, A.S., Pannu, R.K., Malik, R.K. and Garg, R. (2006). Phenological development, yield and yield attributes of different wheat genotypes as influenced by sowing time and irrigation levels. *Agricultural Science Digest,* 26(3): 174-177.

[6] Dubey, A.P., Singh, C.B., Khan, N., Yadav, P.N. and Tiwari, A.N. (2008). Influence of weather parameters on wheat yield under varying sowing dates. *CAB Abstracts Journal of Agrometeorology*, 10(2):457-461.

[7] Dar, S.B., Kanth, R.H., Raja, W., Bangroo, S.A. and Mir, S.A. (2018). Performance of Wheat in Relation to Sowing Dates and Nitrogen Levels under Rainfed Conditions of Kashmir. *Int. J.Curr. Microbiol. App. Sci*, 7(4): 2600-2608.

[8] Gizawy, B.E. and Nasser, K.h. (2009). Effect of Planting Date and Fertilizer Application on Yield of Wheat under No till System. *World J. Agric. Sci*, 5 (6): 777-783.

[9] Olsen, S.R., Cole, C.V., Watanabe, F.S., Dean, L.A. (1954). Estimation of available phosphorus in soils by extraction with sodium bicarbonate. United States Department of Agriculture Circular no. 939. Washington DC: USDA.

[10] Thorat, T.N., Bhan, M. and Agrawal, K.K. (2015). Effect of sowing date on weed infestation and yield of wheat (*Triticum aestivum*L.) varieties under different irrigation schedules. *Jawaharlal Nehru Krishi VishwaVidyalaya Research Journal*, 49 (1): 41-45.

[11] Tubiello, F.N., Rosenzweig, C., Goldberg, R.A., Jagtap, S and Jones, J.W. (2000). U.S. National Assessment Technical Report Effects of Climate Change on U.S. Crop Production Part I: Wheat, Potato, Corn, and Citrus.

[12] Verma, P., Rawat, A., Singh, D., and Agrawal, S.D. (2016). Effect of different sowing dates on growth and yield of wheat (*Triticum aestivum* L.) varieties in district Jabalpur of Madhya Pradesh. *Environmentand Ecology*, 34(3):845-849.

[13] Walkley, A., Black, C.A., (1934). An examination of Degtjareff method for determining soil organic matter and a proposed modification of the chromic acid titration method. *Soil Sci*. 37, 29–38.