International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
www.chemijournal.com
IJCS 2021; 9(2): 183-186

Received: 12-12-2020
Accepted: 24-01-2021

**Neeraj Singh**
Department of Agronomy, A.N.D.U.A. & T, Kumarganj, Ayodhya, Uttar Pradesh, India

**Shashank Shekher Singh**
Department of Agronomy, A.N.D.U.A. & T, Kumarganj, Ayodhya, Uttar Pradesh, India

**Gajendra Singh**
Department of Agronomy, A.N.D.U.A. & T, Kumarganj, Ayodhya, Uttar Pradesh, India

**Raghvendra Singh**
Department of Agronomy, A.N.D.U.A. & T, Kumarganj, Ayodhya, Uttar Pradesh, India

**Shivendra Pratap**
Department of Genetics and Plant Breeding, ANDUAT, Kumarganj, Ayodhya, Uttar Pradesh, India

**Surendra Kumar Yadav**
Department of Genetics and Plant Breeding, ANDUAT, Kumarganj, Ayodhya, Uttar Pradesh, India

**Corresponding Author:**
**Neeraj Singh**
Department of Agronomy, A.N.D.U.A. & T, Kumarganj, Ayodhya, Uttar Pradesh, India

# To access the performance of different varieties of wheat in terms of growth and yield of wheat

**Neeraj Singh, Shashank Shekher Singh, Gajendra Singh, Raghvendra Singh, Shivendra Pratap Singh and Anand Singh**

**DOI:** https://doi.org/10.22271/chemi.2021.v9.i2c.11803

**Abstract**
A field experiment was conducted during the *Rabi* season of 2019-20 at the Agronomy Research Farm of A.N.D. University of Agriculture & Technology Kumarganj, Ayodhya (UP) to find out the effect of dates of sowing and different varieties on growth and yield of wheat. The experiment consisted of 16 treatment combinations comprised of four dates of sowing and four varieties, tested in split plot design with three replications. The observation on different growth and yield parameters were recorded and analyzed statistically. The maximum values all yield attributes was significantly highest with November 28 sown crop being at par with November 18 sown crop but significantly superior over December 8 and December 18 sown crop.

**Keywords:** Observation, superior, combinations

## Introduction
In India, wheat occupies second place after rice. It is cultivated on an area of 29.58 million ha with the production of 99.70 million tones having productivity of 3.37 tonnes ha-1(Anonymous, 2018) [1]. As per Indian Council of Agricultural Research, the demand for wheat in the country will reach 140 million tonnes by 2050. Most of this demand in production will have to manage by increasing productivity as the land area under wheat is not expected to expand. Efficient input management along with varietal improvement are the two basic element that can help in achieving the target.

India is blessed with both the rich land and extremely suitable weather climate for crop production. Therefore, the rate of wheat production is second highest in the world. There are still many factors, which are responsible for low average yield of wheat in this country. One of such environmental factors is untimely planting which affects the yield of wheat crop considerably. Another important aspect is lack of improved varieties which are having short maturity and suitable under late sown condition due to relatively shorter growing period available to the crop. Moreover, varieties also vary both in yield and nutrient uptake under late sown condition.

Wheat area is decreasing every year and there is a very little scope for expansion of area in future. So, there is urgent need to vertical increase in yield per hectare to insure household food security. This yield increase requires a continuing supply of improved germplasm an appropriate agronomy in order to sustain enhanced productivity and preserve the natural resource base. However, global warming, as a result of climate change, may negatively affect wheat grain yields potentially increasing food insecurity and poverty, although it should be noted that current effects of climate change in relation to wheat are inconclusive and model dependent (Tubiello *et al.* 2000). More recent and extensive research on climate change effects predicts marked increases in both rainfall and temperature, with temperatures projected to rise by as much as 3-4°C by the end of the century in South Asia (DEFRA, 2005). Predicted effects on wheat production include reduced grain yield over most of India, with the greatest impacts in the lower potential areas, for example in the eastern plains.

The time of sowing & different varieties are of greater significance & these are the main factors which determines the good crop stand which in turn influences the yield & returns (Kabesh *et al*, 2009) [6] The ear length, grains ear-1, ear weight and test weight were influenced significantly by the dates of sowing.

The highest ear length, grains ear-1, ear weight and test weight were recorded in 20th November sown wheat, followed by 6th December. All these attribute significantly decreased with delay in date of sowing. It might be due to longer and favourable period of ear formation resulting more spikelet's development and greater chances of producing long ears containing a large number of grains.

**Materials and methods**

The experiment was conducted at the Agronomy Research Farm of the Acharya Narendra Deva University of Agriculture & Technology, Kumarganj, Ayodhya, (UP). The experimental site is situated in the main campus of the university, about 42 km away from Ayodhya district head quarter on Ayodhya-Raibareili road at 26047 N latitude and 82012 E longitude and an altitude of 113 meters above mean sea level.

**Summary and Conclusion**

Some interesting variations caused by the various cultivars have been noticed where significant trends of plant height, no. of tillers m-2, dry matter accumulations and leaf area index was observed by showing its superiority in DBW-187 followed by HD-2967, which being at par with each other but exhibited statistical superiority over NW-5054 and NW-1014.

Overall, wheat sown in November gave an excellent growth as compare to crop sown in December whereas DBW-187 and HD-2967 proved to be the best in terms of growth parameters followed by NW-5054 and NW-1014. Therefore these varieties may be selected for obtaining higher growth point of view.

**Yield and yield attributes**

The maximum values all yield attributes was significantly highest with November 28 sown crop being at par with November 18 sown crop but significantly superior over December 8 and December 18 sown crop.

Grain yield of the crop is manifestation of growth characters. The low yield under delayed sowing in December may partially due to the loss 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 which reduced the yield under delayed sowing. Delay in sowing means early flowering and grain filling phase during the hot month of April. 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 which resulted in lower thousand grain weight in the 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 28 and November 18. The adverse effect of weather was associated more with late sowing (December 8 and December 18) which resulted in significantly lesser no. of effective tillers m-2, no. of grains, grain weight spike-1and 1000 grain weight which ultimately reflected in reduced per hectare grain yield. These results are in close conformity with those of Dube *et al* (2008) and Naniwal and Singh (2000) [17].

Similar to grain yield straw yield was also decrease significantly as the sowing was delayed beyond November 28 over November 18, December 8 and December 18, respectively. Dhaka *et al.* (2006), Dubey *et al.* (2018), Thorat *et al.* (2015), Akram *et al.* (2016) [3] have also reported that straw yield was decreased as the sowing of wheat was beyond November. The 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.

**Varieties**

Alike growth and yield attributes, per hectare grain, straw yield and total yield affected significantly due to different varieties. A critical examination of data presented in (Table 7) gave clear cut understanding that variety DBW-187, produced significantly highest grain yield of (56.00 q/ha), straw yield (72.40 q/ha) and total biological yield (138.84 q/ha) followed by HD-2967 which gave (52.05 q/ha) grain yield, (68.28 q/ha) straw yield and (110.33 q/ha) total biological yield. The higher yields with DBW-187 was mainly attributed due to higher growth and yield attributes owing to their own genetic capability as compare to HD-2967. The lower growth and yield attributes with NW-1012 and NW-5054 were mainly responsible for lower yield with these varieties under present investigation. These results were in close conformity with those of Brijkishor (1998).

Overall, November sown crop (November 18, and November 28) was found to be the most optimum time of sowing of wheat crop.

**Table 1:** Plant height (cm) as affected by date of sowing and varieties at successive growth stage.

| | | Days after sowing | | |
|---|---|---|---|---|
| **Treatments** | | **Plant height (cm)** | | |
| | **30** | **60** | **90** | **At harvest** |
| **Date of Sowing** | | | | |
| 18-11-2019 | 25.53 | 69.20 | 86.50 | 88.23 |
| 28-11-2019 | 26.03 | 72.40 | 90.50 | 92.31 |
| 08-12-2019 | 24.53 | 64.56 | 80.63 | 82.24 |
| 18-12-2019 | 23.98 | 61.05 | 76.25 | 77.84 |
| S.Em± | 0.52 | 1.72 | 2.31 | 2.36 |
| CD at 5% | 1.33 | 4.34 | 5.85 | 5.98 |
| **Varieties** | | | | |
| HD 2967 | 25.28 | 70.18 | 87.59 | 89.35 |
| NW 1012 | 24.38 | 59.00 | 73.75 | 75.23 |
| NW 5054 | 24.73 | 63.00 | 78.75 | 80.39 |
| DBW 187 (Karan Vandana) | 25.68 | 75.03 | 93.78 | 95.66 |
| S.Em± | 0.46 | 1.32 | 1.25 | 1.72 |
| CD at 5% | 0.99 | 2.82 | 2.68 | 3.67 |

**Table 2:** Dry matter accumulation ($gm^{-2}$) as affected by date of sowing and varieties at successive growth stage

| **Treatments** | | **Days after showing** | | |
|---|---|---|---|---|
| | | **Dry matter accumulation** | | |
| | **30** | **60** | **90** | **At harvest** |
| **Date of Sowing** | | | | |
| 18-11-2019 | 62.20 | 690.62 | 1151.04 | 1308.00 |

| | | | | |
|---|---|---|---|---|
| 28-11-2019 | 63.24 | 713.46 | 1189.10 | 1351.25 |
| 08-12-2019 | 59.59 | 547.29 | 912.14 | 1036.53 |
| 18-12-2019 | 58.23 | 504.50 | 840.86 | 955.53 |
| S.Em± | 1.36 | 14.91 | 24.59 | 30.40 |
| CD at 5% | 3.46 | 37.79 | 62.29 | 77.01 |
| **Varieties** | | | | |
| HD 2967 | 61.42 | 635.05 | 1058.42 | 1202.75 |
| NW 1012 | 59.20 | 547.47 | 912.45 | 1036.88 |
| NW 5054 | 60.01 | 593.09 | 988.48 | 1123.28 |
| DBW 187 (Karan Vandana) | 62.39 | 680.28 | 1133.79 | 1288.40 |
| S.Em± | 1.47 | 12.64 | 18.36 | 24.22 |
| CD at 5% | 3.16 | 27.00 | 39.22 | 51.74 |

**Table 3:** Numbers of tillers/$m^2$ as affected by Dates of sowing and varieties at successive growth stage.

| Treatments | Days after showing | | | |
|---|---|---|---|---|
| | Number of tillers m-2 | | | |
| | 30 | 60 | 90 | At harvest |
| **Date of Sowing** | | | | |
| 18-11-2019 | 218.70 | 321.92 | 402.40 | 394.51 |
| 28-11-2019 | 223.20 | 327.24 | 409.05 | 401.03 |
| 08-12-2019 | 210.30 | 270.18 | 337.44 | 330.83 |
| 18-12-2019 | 205.50 | 255.72 | 319.37 | 313.37 |
| S.Em± | 4.51 | 7.46 | 10.43 | 10.39 |
| CD at 5% | 11.44 | 18.90 | 26.42 | 26.34 |
| **Varieties** | | | | |
| HD 2967 | 216.60 | 298.25 | 372.26 | 364.96 |
| NW 1012 | 209.10 | 277.89 | 347.36 | 340.55 |
| NW 5054 | 211.80 | 289.36 | 361.71 | 354.87 |
| DBW 187 (Karan Vandana) | 220.20 | 309.55 | 386.94 | 379.35 |
| S.Em± | 3.96 | 5.55 | 5.47 | 7.03 |
| CD at 5% | 8.46 | 11.86 | 11.68 | 15.02 |

**Table 4:** Leaf Area Index (LAI) as affected by Dates of sowing and varieties at successive growth stage

| Treatments | Days after showing | | |
|---|---|---|---|
| | 30 | 60 | 90 |
| **Date of Sowing** | | | |
| 18-11-2019 | 1.55 | 5.44 | 3.88 |
| 28-11-2019 | 1.58 | 5.61 | 3.92 |
| 08-12-2019 | 1.49 | 4.85 | 3.40 |
| 18-12-2019 | 1.46 | 4.45 | 3.11 |
| S.Em± | 0.034 | 0.120 | 0.088 |
| CD at 5% | 0.087 | 0.304 | 0.222 |
| **Varieties** | | | |
| HD 2967 | 1.53 | 5.30 | 3.71 |
| NW 1012 | 1.46 | 4.71 | 3.29 |
| NW 5054 | 1.50 | 4.90 | 3.44 |
| DBW 187 (Karan Vandana) | 1.56 | 5.44 | 3.81 |
| S.Em± | 0.037 | 0.102 | 0.065 |
| CD at 5% | 0.079 | 0.217 | 0.138 |

**Table 6:** Yield attributing characters of wheat as affected by Dates of sowing and varieties

| Treatments | Effective | Length of spike | No. of grain | Grain weight(g) | Test |
|---|---|---|---|---|---|
| | Tillers/$m^2$ | (cm) | spike$^{-1}$ | /spike | weight (g) |
| **Date of Sowing** | | | | | |
| 18-11-2019 | 358.64 | 10.10 | 43.31 | 1.59 | 36.60 |
| 28-11-2019 | 364.57 | 10.40 | 43.70 | 1.62 | 36.94 |
| 08-12-2019 | 300.75 | 8.90 | 40.71 | 1.46 | 35.88 |
| 18-12-2019 | 284.65 | 8.00 | 39.91 | 1.40 | 35.18 |
| SEm± | 8.37 | 0.19 | 1.10 | 0.042 | 0.96 |
| CD at 5% | 21.21 | 0.49 | 2.78 | 0.105 | 2.44 |
| **Varieties** | | | | | |
| HD 2967 | 331.78 | 9.70 | 42.28 | 1.56 | 36.88 |
| NW 1012 | 309.59 | 8.60 | 40.50 | 1.41 | 34.85 |
| NW 5054 | 322.38 | 8.90 | 41.70 | 1.48 | 35.49 |
| DBW 187 (Karan Vandana) | 344.87 | 10.20 | 43.15 | 1.61 | 37.38 |
| SEm± | 6.67 | 0.17 | 0..84 | 0.022 | 0.72 |
| CD at 5% | 14.24 | 0.36 | 1.78 | 0.047 | 1.55 |

## Conclusion

Variety DBW-187 was found to be the highest yielder followed by HD-2967.

## References


1. Anonymous. Agricultural statistics at glance. Directorate of economics and statistics, DAC & FW, Govt of India 2018, 78.
2. Ali A, Ullah Z, Ali N, Anjum MM. Evaluation of Wheat Advanced Lines for Agronomic Traits under Vary Sowing Dates. Agri Res & Tech 2017;7(1):01-011.
3. Akram M. Growth and yield components of wheat under water stress of different growth stages. Bangladesh J Agril. Res 2016;36(3):455-468.
4. Jat LN, Singh SM. Growth, yield attribute and yield of wheat (*Triticum aestivum* L.) under different planting pattern of cropping system and varieties. Indian Journal of Agronomy 2004;49(2):111-113.
5. Kamrozzaman MM, Khan MAH, Ahmed S, Sultana N. Growth and yield of wheat at different dates of sowing under chrland ecosystem of Bangladesh. J Bangladesh Agril. Univ 2016;14(2):147-154.

6. Kabesh MO, El-Kramany MF, Sary GA, El-Naggar HM, Gehan SHB. Effects of sowing methods & some bioorganic fertilizations treatments on yield and yield components of wheat. Res. J Agric. Biol. Sci 2009;5:97102.
7. Kulhari SC. Studies on the effect of sowing dates and nitrogen levels on productivity of durum wheat (*Triticum aestivum* L.) varieties. Ph. D. Thesis, Rajasthan Agricultural University, Bikaner 2000.
8. Kumar R, Sharma SN. Effect of levels of nitrogen on wheat as influenced by date of sowing. Annals of Agricultural Research, 2003;24(1):104-110.
9. Kumar S, Alam P, Ali N. Response of wheat varieties to sowing dates. Journal of Research (BAU), 2013;25(1):56-59.
10. Kumar D, Singh RA, Singh Y. Influence of sowing dates and nitrogen scheduling on growth behaviour and productivity of late sown wheat (*Triticum aestivum* L.) in north Indian plains. Annals of Agriculture Research New Series 2016;37(1):61-65.
11. Madhu U, Begum M, Salam A, Sarkar SK. Influence of sowing date on the growth and yield performance of wheat (*Triticum aestivum* L.) varieties. Arch. Agr. Environ. Sci 2018;3(1):89-94.
12. Mahajan AY, Mohite AB, Jadhav YR, Patil JB. Effect of varieties (*Triticum aestivum* L.) under extended sowing times on yield, protein content, nutrients uptake and soil properties of wheat. International Journal of Chemical Studies 2018;6(6):55-58.
13. Maurya P, Kumar V, Maurya KK, Kumawat N, Rakesh Kumar R, Yadav MP. Effect of potassium application on growth and yield of wheat varieties, Department of Agronomy, CSAU & T, Kanpur, India 2014;9(4):1371-1373.
14. Mishra V, Mishra RD, Singh M, Verma RS. Dry matter accumulation at pre and post- anthesis and yield of wheat (*Triticum aestivum* L.) as affected by temperature stress and genotype. Indian Journal of Agronomy 2003; 48(4):277-281.
15. Mishra DK, Khan RA, Baghel MS. Stability of wheat varieties under various dates of sowing. Annals of Agricultural Research 2000;21(4):564-566.
16. Mumtaz MA, Aslam M, Nasrullah HM, Akhtar M, Ali B. Effect of Various Sowing Dates on Growth, Yield and Yield Components of Different Wheat Genotypes. American-Eurasian Journal of Agriculture & Environment Science 2015;15(11):2230-2234.
17. Nainwal K, Singh M. Varietal behaviour of wheat to dates of sowing under tarai of Uttar Pradesh. Indian Journal of Agronomy 2000;45(1):107-113.
18. Olsen SR, Cole CV, Watanabe FS, Dean LA. Estimation of available phosphorus in soils by extraction with sodium bicarbonate. United States Department of Agriculture Circular no. 939. Washington DC: USDA 1954.
19. Pandey IB, Paswan S, Sinha NK, Pandey RK. Response of late sown wheat (*Triticum aestivum* L.) varieties to nitrogen levels. Indian J. Agrill. Scie 2008;78(6):537-539.
20. Prabhakar BN, Halephati AS, Pujari BT, Desai BK. Pattern of dry matter accumulation in wheat genotypes as influenced by sowing dates. Karnataka Journal of Agricultural Sciences 2003;16(1):26-30.
21. Soomroat UA, Brahman MU, Odhano EA, Gul S, Tareen A. Effect of sowing method and seed rate on growth and yield of wheat (*Tiriticum aestivum*L.). World J. Agri. Sci 2009;5:159-162.
22. Sardana V, Sharma SK, Randhawa AS. Performance of wheat cultivars under different sowing dates and level of nitrogen under rainfed condition. Ann. Agri. Res. 1999;20(1):60-63.
23. Sharma, Karambir, Ram Niwas, Singh M. Effect of sowing time on radiation use efficacy of wheat cultivars. Journal of Agro meteorology. 2000;2(2):166-169.