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Yield and its attributing character as influenced by sowing date of local wheat on the farmers field of Badokhar block of Bundelkhand region

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Abstract
A survey was conducted at the farmers field of Badokhar block of district Banda, during the year 2022-23 for the effect of different sowing dates on the yield and attributing characters of Wheat. The treatment were T_1= 29 Oct 2022, T_2= 11 Nov 2022, T_3= 23 Nov 2022 and T_4= 2 Dec 2022. The yield and attributing characters of wheat were significantly affected by different sowing dates. The treatment T_2 (11 Nov) showed the best results compared T_1 (21 Oct) as the sowing date.

Keywords: Wheat, Badokhar, Banda, Bundelkhand

Introduction
Cereal crops have played a key role in agricultural progress, and thus, have been regarded as the kingpins of the transformation of global agriculture from scarcity to self-sufficiency. They are grown in 73% of the world's arable land and contribute 74% of the global calorific production. Wheat (*Triticum aestivum* L.) is the staple food of 40 percent human population across the globe and second most important cereal after rice and it meets about 61% of the protein requirement of the country. India is the second largest wheat producing country after China with an area of 29.64 million hectares, production of 92.46 million tones and average productivity of 3.12 t ha^{-1}.

Uttar Pradesh ranks first in area (36.6%) and production (39.3 %) of wheat in the country. Wheat (*Triticum aestivum* L.) is one of the important staple foods in India and is grown under diverse sets of agro-climatic conditions. In the country, it is grown under irrigated regions viz - Punjab, Haryana, Uttar Pradesh, Uttarakhand, Madhya Pradesh, Rajasthan and Bihar are the leading states of India contributing more than 90 percent of the wheat for the country. In India, wheat is next to paddy in area and production, grown over an area of 27.75 million hectares with an annual production of 80.68 million tones. India rank second after China in wheat growing countries. It is considered to be the backbone of the food security in India.

Wheat is Rabi crop hence sown during November to December and harvest during March to April. The wheat-marketing season in India is assumed to begin from April every year. Weather variables are one of the key components, which influence on growth, development and yield of the wheat crop over which man has very little control [6]. Increased climatic variabilities and aberrant variations in meteorological parameters like hailstorm, frost, high wind and extreme temperature and foggy condition during wheat growing (Rabi) season leads to natural disasters affecting wheat productivity, over the past few years, per hectare yield of wheat in India has fallen due the temperature rising steadily in January, February and March, a time most crucial for the wheat crop [1-3]. The response to temperature varies with the stage of development, mainly booting (late ear development), anthesis (pollination and fertilization) and grain growth (a week after anthesis to maturity [5]. Wheat productivity can be increased substantially by adjusting sowing date to optimum atmosphere temperature which encounters critical phenological stages of wheat.

Materials and Methods

A survey was conducted at the farmers field in the Badokhar block of district Banda in Bundelkhand U.P, who sown the same variety of wheat but at different dates during the year 2022-23 with the hypothesis that yield and its attributes are affected by different sowing dates (Fig: 1). The maximum and minimum temperature of the area varied from 48.5 °C to 6.4 °C during the year. The potential evapotranspiration of the area is high i.e. 1853.2 mm. The different dates of sowing were considered as treatment in this paper which was 29 oct, 11 Nov, 23 Nov, 2 Dec and were harvested at near about same time with the time difference of 3 days before or after 4 March 2023. Nitrogen, phosphorus and Potassium were applied by urea, SSP and Muriate of Potash @ 120, 60 and 40 kg/ha. The half dose of Urea and full dose of SSP and MOP were applied at the time of sowing in furrows as basal dose and remaining half dose of nitrogen was applied after first irrigation. Other practices such as application of pesticides, irrigation, weeding etc. were done when required. Yield and its attributing characters from each famer's field were taken by randomly selecting 5 plants from each plot. The collected data from each farmer's field were analyzed using ANOVA and the means were compared according to Least Significance Test @ 5 % level of significance.

Fig 1: Shows aerial view of Experimental Plot taken from GPS-google earth pro software

Table 1: Physico-chemical properties of initial soil

	Texture	pH	O.C (%)	Av. N (%)	P (kg ha^{-1})	K (kg ha^{-1})	S (µgg^{-1})
Soil analysis interpretation	Sandy clay loam	7.69 Alkaline	0.53 Low	0.33 Low	16.63 Medium	366 High	19.0 Low

Results and Discussion

The grain yield varied significantly from 30.99 q/ha (T_1) to 40.22 q/ha for (T_2) with an average value of 37.16 q/ha. The low yield was observed after the T_2 lowers the vegetative growth periods and grain filling period as well as it reduces the photo insensitivity [2]. However, lower yield for the T_1 was due to the fact that the farmers apply higher nutrient doze which increases the vegetative growth period and had been seen that crop pre-matures [6]. In the current year there was high wind velocity and heavy rain at the current patch thus, the problem of logging had also been the reason for the lower yield. The level of significance among the treatments at 5% varied significantly with the value of 4.01. Other yield attributing characters such as number of functional tillers, length of ear, straw yield, grain yield varied from T_4 to T_2 with 5.64 to 6.22; 8.99 to 9.69; 63.93 to 72.92; 30.99 to 40.22 respectively with the similar reason as for the yield (Table – 3). The variation among the treatments was found to be significant at 5% level of significance as represented in table 3.

Table 2: Description of treatments

S. No.	Treatment number	Description of the treatments (Various dates of sowing)
1	T1	29 Oct 2022
2	T2	11 Nov 2022
3	T3	23 Nov 2022
4	T4	2 Dec 2022

Table 3: Effect of sowing dates on yield and its attributing characters of Wheat

Treatment (Sowing dates)	Plant height (cm) at 90 DAS	Number of functional tillers/Plant	Length of Ear	Straw yield (q/ha)	Grain yield
29 oct	79.3	5.82	9.02	63.93	30.99
11 Nov	82.6	6.22	9.69	72.92	40.22
23 Nov	80.2	5.93	9.49	71.22	39.56
2 Dec	78.8	5.64	8.99	69.83	37.87
CD (0.05%)	4.01	0.29	0.60	3.45	2.15
SEm±	1.38	0.10	0.21	1.19	0.74

Conclusion

The experimental finding ecluides T_2 having the best yield and its attributing character which merely depends largely on the physiological and climatic factors. Hence, the recommendation can make as far date is concerned by choosing the suitable bio-climate from germination to maturity forecasted either by IMD or other governmental non-governmental organization.

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