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Effect Of Seed Rate And Nutrient Management On Growth Of Wheat Under Late Sown Condition

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ABSTRACT

A field experiment was conducted during rabi season of 2019-20 on sandy loam soil at Agricultural Research Farm (Pili Kothi), Department of Agronomy, Tilak Dhari Post Graduate College, Jaunpur (U.P.). The experiment comprised of two factors namely (1) two seed rate viz.120 and 140 kg/ha^{-1} (2) four nutrient namely (i) 100% RDF, (ii) 125% RDF (iii) 75% RDF +25% N through FYM and (iv) 75% RDF +25% N through VC In RBD design with eight treatment and four replication. Variety HD-3118 recorded significantly influenced the growth characters of wheat crop. The maximum recorded growth character are as follows, plant height (87.11cm), number of tillers (592.32 m^2), dry matter accumulation (1010.01gm^2) and leaf area index (3.38). And minimum growth character was recorded are as follows, plant height (81.81cm), number of tillers (542.57 m^2), dry matter accumulation (980.90gm^2) and leaf area index (3.13). Thus sowing on 23 December, 125% RDF and 140 kg/ha^{-1} seed rate can be practiced for maximizing of growth of wheat crop.

KEYWORDS

Wheat, Nutrient management, Late Sown and Growth

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Wheat (*Triticum aestivum* L.) is a staple food of the world and falls under Poaceae family. It is primarily grown in temperate regions and also at higher altitude under tropical climatic areas in winter season. It is the single most important cereal crop that has been considered as integral component of the food security system of the several nations. It ranks first in the world among the cereals both in respect of area (220.89 mha.) and production (775.90 mt). In India, total area under wheat is 31.36 Mha with the total production of 107.86 mt and productivity of 3.44 mt. (World Agricultural Production (USDA, 2020-21). China, India, Russia, the United States, Canada, Australia, Ukraine, Pakistan, Turkey, Argentina, and Iran are the world's major wheat producers. In India, the northern states produce over 90% of total wheat output. Uttar Pradesh is the largest in terms of area (9.50 mha) and output (30.19 mt), although its productivity (3432 kg ha^{-1}) is substantially lower than Punjab's (5008 kg ha^{-1}) (Directorate of Economics & Statistics 2020-21) Wheat production in eastern Uttar Pradesh is very low, which could be attributable to the use of a cereal-cereal (Rice-Wheat) cropping pattern, late seeding, inadequate management, and insufficient fertilization, among other factors. The normal time for sowing of dwarf wheat in irrigated tracts starts in the beginning of November. Medium to long duration varieties taking 135-145 days to mature should be sown in the first fortnight of November, while, short duration varieties (120-125 days) may be sown in the second fortnight of November. For higher crop yield, with the extent of current multiple cropping system timely availability of land for wheat sowing is of remote possibility. The preceding crops such as paddy, sugarcane, potato, toria and other factors forced the wheat crop to be sown as late as in the month of December to early January and late sown crop completes their different growth phases under relatively adverse climatic conditions. The balanced nutrition plays an important role in raising the production potential of high yielding varieties of wheat have been found highly responsive to nitrogen fertilization. However, in absence of phosphorus, nitrogen becomes ineffective and most of the applied nitrogen remain un-utilized. The efficiency of both nitrogen and phosphorus is greatly enhanced in the presence of each other (Daneliya *et al*, 2018). Potassium fertilizer promotes nitrogen and phosphate utilisation while stabilizing wheat output. Mention the need for more fertilizer and the reasons for larger doses of late-sown wheat. As a result, precise proportions of N, P, and K fertilizers are required to increase wheat productivity as per Indian Council of Agricultural Research, the demand for wheat crop in the country will reach 140 million tonne 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. Wheat is more nutritive as compared to the other cereals. It has good nutrition profile with 12.1 per cent protein, 1.8 per cent lipids, 1.8 per cent ash, 2.0 per cent reducing sugars, 6.7 per cent pentose's, and provides 314 Kcal/100g of food. Wheat is also a good source of minerals and vitamins viz., calcium (37 mg/100g), iron (4.1mg/100g), thiamine (0.45mg/100g), riboflavin (0.13mg/100g) and nico-

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tinic acid (5.4mg/100mg) (USDA Standard reference). Unlike other cereals, wheat contains a high amount of gluten, the protein that provides the elasticity necessary for excellent bread making. Hard wheat is high in protein (10-17%) and yields a flour rich in gluten, making it particularly suitable for yeast breads. India is blessed with both the rich land and extremely suitable weather climate for crop production.

The experiment was conducted at Crop Research Farm (Pili Kothi) of Agronomy Department, Tilak Dhari Post Graduate College, Jaunpur. The experimental site is located on the right side of river Gomati at the latitude 25°43′58″ N along with longitude of 82°41′00″E and at an altitude of 83 meters. The weather parameters like maximum & minimum temperature, relative humidity, rainfall, sunshine and evaporation rate for the period of experimentation, as recorded in meteorological observatory of the Geo-physics Department of B.H.U., Varanasi were collected the presented in the total of 80.5 mm rainfall was recorded during the crop period. The weekly mean maximum & minimum temperature varied from 38.10 to 7.0°C.

The experiment was conducted with randomized block design which consists eight treatment and four replication for enumeration of plant growth factor viz., Plant height (cm.), No. of shoot (m^{-2}), Dry matter accumulation (gm^{-2}) and leaf area index.The experiment comprised of two factors namely (1) two seed rate viz.(S_1)120 and(S_2)140 kg/ha^{-1} and (2) four nutrient namely (1) (F_1)100% RDF, (ii) (F_2)125% RDF (iii) (F_3)75% RDF +25% N through FYM and (iv)(F_4) 75% RDF +25% N through VC. The soil for the experimental field was sandy loam having pH (7.6) NeutralpH, EC (0.889),organic carbon (0.41), available nitrogen (92.75kg/ha^{-1}), phosphorus (13.5kg/ha^{-1}) are low and potassium (121.0 kg/ha^{-1})Medium rating.

With the age of the crop, the nutrient supply system had a significant impact on plant height. Because there was a limited time available for plant growth and development at the start of the crop, there was a disparity in plant height. Enhanced cell division, on the other hand, increased plant height at later stages of crop growth due to adequate nutrient availability. These data backup Singh (2002) conclusion.

The maximum plant height (cm) were recorded in treatment (F_2) 87.11 followed by (F1) 85.925, (F_3) 85.21 and minimum was recorded in (F_4) 81.81 treatments were found statically at par from each other. There was increasing trend of plant height with the increasing level of seed rate at all stages of plant growth. The tallest plants were measured when (S_2) 85.33 was applied at all the stages of plant growth and showed statistical superiority over the sowing of (S_1) 84.69.

The maximum number of shoots (m^{-2}) were recorded in treatment (F_2) 592.32 followed by (F1) 577.14, (F_3) 566.88 and minimum was recorded in (F_4) 542.57 treatments were found statically at par with other. At all stages of plant shoots, there was an increasing trend in the number of shoots as the seed rate increased. The number of shoots were measured when (S_2) 599.47 was applied at all the stages of plant shoots and showed statistical superiority over the sowing of (S_1) 534.99.

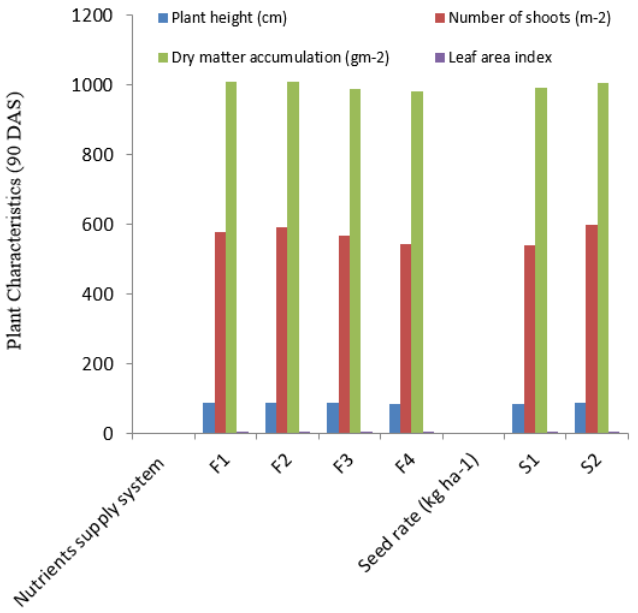

Fig. 1: Effect of seed rate and nutrient management on growth character of wheat crop

Table 1: Effect of seed rate and nutrient management on growth character of wheat crop

Treatments	Plant height (cm)	Number of shoots (m-2)	Dry matter accumulation (gm-2)	Leaf area index
Nutrients supply system				
F_1	85.92	577.14	1009.97	3.37
F_2	87.11	592.32	1010.01	3.38
F_3	85.21	566.88	987.93	3.15
F_4	81.81	542.57	980.90	3.13
SEm±	0.051	0.777	1.032	0.009
C.D. (P=0.05)	0.150	2.302	3.054	0.027
Seed rate (kg ha^{-1})				
S_1	84.69	539.99	989.89	3.22
S_2	85.33	599.47	1004.51	3.29
SEm±s	0.036	0.550	0.729	0.006
C.D. (P=0.05)	0.106	1.628	2.160	0.019

The data in Table 1 show the maximum dry matter accumulation (gm^{-2}) were recorded in treatment (F_2) 1010.01 followed by (F_1) 1009.97, (F_3) 987.93 and minimum was recorded in (F_4) 980.90 which was at per significant superiority over each other. The Seed rates also influence the dry matter accumulation (S_1) 989.89 at all the stages of crop growth. Higher values of dry matter were recorded with (S_2) 1004.51 higher seed rates. Singh *et al* (2017)reported that the application of 150

% recommended dose of fertilizer + 15 tonnes FYM ha^{-1}has maximum plant height and dry mattffiger accumulation per plant.

The maximum Leaf area index was recorded in treatment (F_2) 3.38 followed by (F_1) 3.37, (F_3) 3.15 and minimum was recorded in (F_4) 3.13 which was at per significant superiority over each other (Figure 1). The Seed rates also influence the Leaf area index recorded with (S_1) 3.22 at all the stages of crop growth. Higher values of Leaf area index were recorded with (S_2) 3.29 higher seed rates.

Field experiment was conducted at the Crop Research Farm (Pili Kothi) of Agronomy Department, Tilak Dhari Post Graduate College, Jaunpur (U.P.) during rabi season 2019-20 on the relative performance of nutrient supply system and seed rates and concluded as here under:

i. The application of 140 kg seed may be instrumental to increase the yield of wheat.

ii. The combination of S_2 F_2.140 kg seed rate + 125% RDF(NPK) and was found remunerative and feasible for the cultivation of late sown wheat

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