

To Study the Influence of the Delayed Sowing on Plant Height and Inter-Nodal Distance of Different Wheat Varieties

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Abstract: *Wheat is the major cereal crops of North India. Our study was conducted to evaluate the response on growth of different varieties of wheat plant. We observed adversely affect due to delayed sowing and environmental Variables.*

Keywords: Wheat, Plant Height and inter-nodal distance

1. Introduction

Cereals play a pivotal role to satisfy the global food demand of growing population, particularly in developing nations where cereal-based production system is the only predominant source of nutrition and calorie intake (Nikos et al., 2012; Shiferow et., al 2013). The total area under the crop is about 29.8 million hectares in the country. The productivity of wheat recorded 2602 kg/hectare in 2004-05 has increased to 3140 kg/hectare in 2011-12. The increase productivity of wheat has been observed in the states of Haryana, Punjab and Uttar Pradesh. Higher reported in MP (Former Portal, Agricultural Department, Govt. of India; 2020). Globally wheat occupies around 217 million hectares holding the position of highest acreage among all crops with an annual production hovering around 731 million tonnes (USDA., 2018). Wheat (*Triticumaestivum* L.) is one of the principal cereal crops grown worldwide. The crop has been under cultivation in about 30 million hectares (14% of global area) to produce the all-time highest output of 99.70 million tonnes of wheat (13.64% of world production) with a record average productivity of 3371 kg/ha [7]. The cereal is one of the cheapest sources of energy, provides a major share of protein (20%) and calorie intake (19%) from consumption. Wheat is accessible across the country and consumed as various processed forms from prehistoric times (Sharma et., al., 2015; Sharma et., al 2019). After independence, India was net deficit in food production and had to import wheat for domestic consumption. During 1966–1967, India adopted new strategy which led the ‘Green Revolution’, especially in the production of wheat and rice. After the Green Revolution, the nation has maintained strategic distance from famine even during unfavorable weather conditions. The impact of the All India Coordinated Research Project (AICRP) on wheat improvement is explicit and contributed significantly to the nation’s food security (MoA&FW., 2018).

2. Materials and Methods

Anthesis scheduling

Anthesis scheduling was observed keeping the ear emergence criterion in consideration. The anthesis was

recorded with value of almost 100% upon full emergence of ear and acquisition of pollens.

Plant height and internodal distance

The shoot height as recorded from the ground level to the top of the plant after emergence of ear along with internodal distance. These values were averaged and expressed as plant height per plant in centimeters.

3. Results and Discussions

Plant height (cm)

We choose four varieties of wheat for observations, our Data pertaining to different growth parameters (Plant Height, Inter-nodal distance and Leaf Area) observed from two year observations. The data obtained by clearly revealed that taller shoots were recorded in case sown early (D1) as compare to delayed sown i.e., (D2) as well as it was found significantly higher in timely sown cultivars as compare to late sown one. The intervarietal differences of plant height were found significant. The longest shoot length was found in variety C-306 (114.6 cm). The percentage reduction in shoot length was found to be maximum in PBW-373 (12.80%), in case sowing delayed for about three weeks. The cultivars C-306 (1.92%) was less affected in expressing their plant height followed by PBW-396 (4.99).

Inter-nodal distance

It is the distance between two nodes, or the distance between two successive leaves. Different Inter-nodal distance were found highly affected by date of sowing, as late sown cultivars have shorter distance compared to timely sown cultivars. All varieties have shown differential inter-nodal distance. The first inter-nodal distance i.e., distance between flag leaf and successive leaf was found maximum incase sown in time (i.e., D1 time period) in C-306 (19.9 cm) while it was recorded minimum in PBW-373 (15.4 cm). However original inter-nodal distance was found affected incase C-306 sown delayed (at D2 time phase) i.e., 18.3cm. The percent reduction in inter-nodal distance is quite random. The first internodal distance reduced maximum in PBW-396 (37.02%) while minimum reduction was observed in C-306 (6.63 %), PBW-373 (22%). The analysis of variance in the

inter-nodal distance shows that interaction between sowing dates and varieties was found to be significant in 2nd and 3rd and non significant in 1st internode.

Varieties	D1	D2
PBW 396	100±3.5	95.2±3.3
PBW-373	93.6±3.2	81.6±2.6
C-306	114.6±4.0	112.4±3.5
VL-738	104.2±3.8	101.1±3.5

Table 1: Effect of date of sowing on plant height (cm) in different wheat cultivars

Cultivar	From top to base		
	D1	D2	
PBW396	I st internode	18.1±0.45	11.4±0.29
	II nd internode	10.2±0.22	8.2±0.47
	III rd internode	6.5±0.24	5.7±0.26
VL 738	I st internode	19.0±0.98	13.6±0.15
	II nd internode	9.6±0.34	7.4±0.13
	III rd internode	7.0±0.05	6.1±0.29
C 306	I st internode	19.9±0.13	18.3±0.14
	II nd internode	12.5±0.26	10.4±0.19
	III rd internode	7.25±0.25	6.3±0.11
PBW 373	I st internode	15.4±0.09	11.9±0.40
	II nd internode	9.8±0.34	8.1±0.60
	III rd internode	5.6±0.40	4.9±0.23

Table 2: Effect of date of sowing on internodal distance in different wheat cultivars. The values expressed in cm. D1 and D2 indicate time and delayed sowing schedules

The sowing schedule has affected plant height and spike length. Indeed, delayed sown cultivars minimized their shoot length and spike length due to imposition of adverse environmental variables i.e. high temperature, dry air coupled with sharp irradiance and loss in humidity. The similar findings or trends has been already been reported by Deng *et al.*(2002).

The maintenance of internodal distance is associated with the plant height. The data shown in fig. 4.2 indicates differential loss for the internodal length. The first internodal distance seems to be more affected in case sown delayed. However, in contrast to the observations reported here, increase in the internodal length has been reported by Singh and Singh (2001).



Figure 1: Effect of Differential dates of sowing on plant height of different wheat cultivars. D1 and D2 indicates timely and delayed sown schedule. Data represents the mean values of five independent measurements

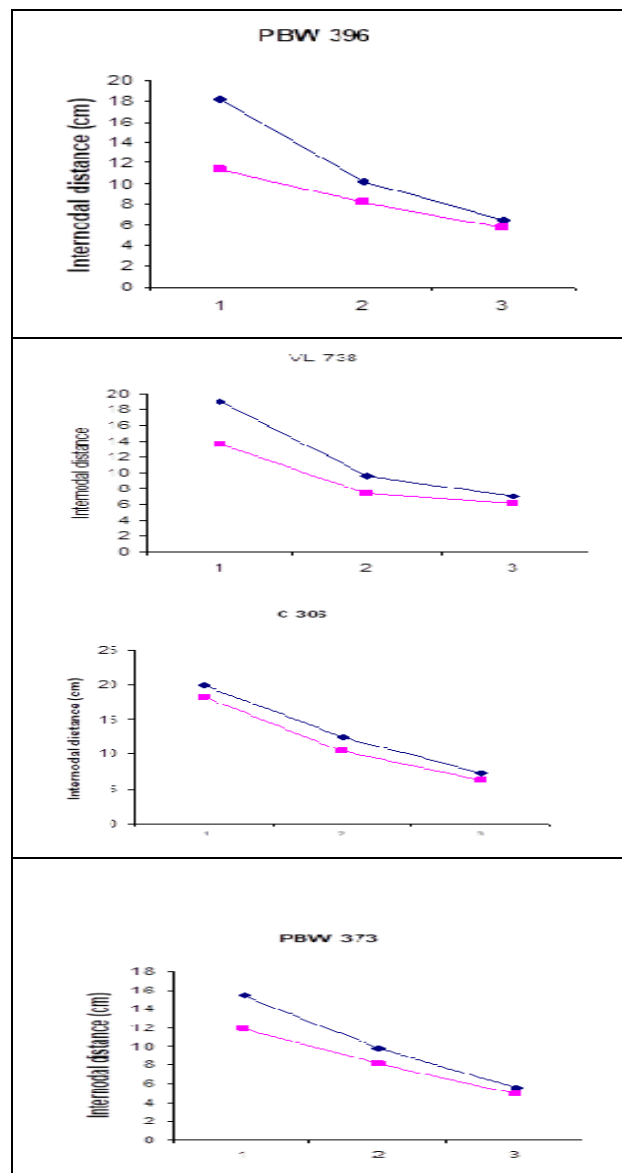


Figure 2: Effect of Differential dates of sowing on internodal distance of different wheat cultivars. D1 and D2 indicates timely and delayed sown schedule. Data represents the mean values of five independent measurements.

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