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Growth attributes of chickpea genotypes as influenced by different sowing windows

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Abstract

The study investigated the growth attributes of chickpea genotypes as influenced by different sowing windows conducted during *Rabi* 2023-24 at research farm of AICRP for Dryland Agriculture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. Nine treatment combinations including three sowing windows *viz.*, D₁- 44 MW, D₂- 45 MW and D₃- 46 MW and three genotypes *viz.*, V₁- JG-14, V₂- JAKI 9218 and V₃- Akash, all replicated thrice in a Factorial Randomized Block Design (FRBD). Among the treatments, growth characters *viz.*, plant height, number of branches, dry matter accumulation were significantly influenced due to different dates of sowing in Chickpea. Maximum values of all these characters were recorded by sowing in 44 MW and it was found comparable with sowing in 45 MW. Out of three genotypes JG-14 recorded maximum plant height (cm). JAKI-9218 was superior in respect of number of branches, dry matter accumulation. Highest value of growth attributes was recorded with JAKI-9218 and it was found comparable with Akash.

Keywords: Chickpea, sowing dates, phenology, genotypes

Introduction

Chickpea (*Cicer arietinum* L.) popularly known as “Gram” or “Bengal gram” is most important and premier pulse crop of India. Numerous environmental and genetic variables interact during the growing period of chickpea in determining its productivity. Among the various agronomic practices, sowing time is single most important factor influencing the yield of chickpea. Optimum sowing time of chickpea may vary from one variety to another and also from one region to another due to variation of agroecological conditions. Different planting dates subject the vegetative and reproductive stages of the plant to various temperature, solar radiation and day length (Yadav *et al.*, 1999) [8]. The modified environments resulting from different planting dates influence the crop growth and development by subjecting the different phenological stages *viz.*, germination, vegetative and reproductive stages of the plant to various temperature, solar radiation and day length. Chickpea is usually sown between mid-October to mid-November. However, sowings are often delayed when grown in sequence with *kharif* crops.

Materials and Methods

The field experiment was conducted at the research farm of AICRP for Dryland Agriculture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (22° 42' N latitude, 72° 02' E longitude and at an altitude of 307.42 m above MSL) in Vidarbha region of Maharashtra, during the *Rabi* season of 2023-24. The gross plot size was 3.6 m x 4.5 m and net plot size was 3.0 m x 4.1 m. The experiment was laid out in Factorial Randomized Block Design with 9 treatment combinations comprising of 3 dates of sowing *viz.*, D₁- 44 MW, D₂- 45 MW and D₃- 46 MW and three genotypes *viz.*, V₁- JG-14, V₂- JAKI 9218 and V₃- Akash, replicated three times. The respective dates of sowing during the year of investigation were 3rd Nov, 10th Nov, 17th Nov, respectively. The soil of experimental field was vertisols, almost neutral in reaction (pH 7.68), low in organic carbon (0.53%), low in available nitrogen (175.5 kg ha⁻¹), medium in available phosphorus (17.8 kg ha⁻¹) and medium in available potassium (291.7 kg ha⁻¹). Chickpea crop was sown at spacing of 30 cm x 10 cm. Recommended basal dose of nitrogen (20 kg N ha⁻¹), phosphorus (40 kg P₂O₅

ha⁻¹) and potassium (40 K₂O kg ha⁻¹) was applied through urea, di-ammonium phosphate and muriate of potash. Meteorological data viz, rainfall, relative humidity, maximum and minimum temperature, bright sunshine hours and day length were recorded from Agrometeorological observatory of Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India.

Table 1: Treatment details

Factor A- Sowing windows	
D ₁	44 MW (29 Oct – 04 Nov)
D ₂	45 MW (05 -11 NOV)
D ₃	46 MW (12-18 Nov)
Factor B- Genotypes	
V ₁	JG-14
V ₂	JAKI-9218
V ₃	Akash

Results and Discussion

Plant height (cm)

Plant height was significantly influenced throughout the crop growth period by different growing environment created through different sowing windows. The higher plant height was recorded with crop sown in 44 MW i.e. 41.04 cm which is at par with 45 MW whereas 46 MW i.e. 36.45 cm recorded least plant height at all growth stages and it was found comparable with crop sown in

45 MW. Similar results were reported by Kabier *et al.* (2009)^[4] and Neeraj *et al.* (2012)^[6]. Genotypes showed significant difference in case of plant height. JG-14 produced the higher plant height (42.19 cm) which was at par with JAKI-9218 (38.15 cm). The least plant height (36.05 cm) was found in Akash and it was found comparable with JAKI-9218. Variation among the varieties in respect of plant height appears due to genotypic variation. Similar results were obtained by Nikam *et al.* (2014)^[7], and Alamin and Abdalla (2020)^[1]. Interaction between sowing dates and genotypes was non-significant.

Number of branches plant⁻¹

Among sowing windows, higher number of branches found in 44 MW (12.34) which was at par with crop sown in 45 MW (11.53) whereas the lower number of branches in 46 MW (11.08) and it was comparable with crop sown in 45 MW. Similar results were reported by Chaitanya and Chandrika (2006)^[2]. Among the different genotypes, variations in number of branches were recorded at all the growth stages. The mean value of genotypes observed significantly higher to number of branches with JAKI-9218 (12.55) followed by Akash (11.61) and the least number of branches observed in JG-14 (10.78) and it was found at par with Akash. Interaction between sowing dates and genotypes was non-significant.

Table 2: Effect of different sowing windows and genotypes on growth attributes

Treatments	Plant height (cm)	No. of branches plant ⁻¹	Dry matter weight plant ⁻¹ (g)
Factor A- Sowing windows			
D ₁ - 44 MW (3 rd Nov)	41.04	12.34	25.08
D ₂ - 45 MW (10 th Nov)	38.90	11.53	23.72
D ₃ - 46 MW (17 th Nov)	36.45	11.08	22.21
S.E. (m)±	1.29	0.36	0.80
C. D. at 5%	3.87	1.08	2.40
Factor B- Genotypes			
V ₁ - JG-14	42.19	10.78	21.97
V ₂ - JAKI-9218	38.15	12.55	25.30
V ₃ - Akash	36.05	11.61	23.75
S.E. (m)±	1.29	0.36	0.80
C. D. at 5%	3.87	1.08	2.40
Interaction (AxB)			
S.E. (m)±	2.24	0.62	1.39
C. D. at 5%	NS	NS	NS
GM	38.80	11.65	23.67

Dry matter weight plant⁻¹ (g)

Different dates of sowing have significant influenced on dry matter accumulation plant⁻¹. Sowing in 44 MW (25.08 g) accumulated higher dry matter weight plant⁻¹. However, it was statistically at par with 45 MW (23.72 g) at all growth stages. Sowing in 46 MW recorded the lower dry matter accumulation (22.21 g) but was found statistically at par with 45 MW. This collaborated with the findings of Husnain *et al.* (2015)^[3], Kiran and Chimmad (2015)^[5]. Among genotypes, higher dry matter accumulation plant⁻¹ (25.30 g) at harvest was recorded in JAKI-9218 which was significantly higher at all growth stages but was found at par with Akash (23.75 g). JG-14 recorded least dry matter accumulation plant⁻¹ (21.97 g) and it was found comparable with Akash.

Conclusion

Sowing of chickpea at 44 MW found to be significantly superior for obtaining higher growth attributes of chickpea varieties among all the sowing dates. However, it was found comparable with sowing at 45 MW. Among the genotypes, JAKI-9218 being

comparable with Akash recorded significantly higher growth attributes than JG-14.

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