



Original Research Article

Performance of Chickpea Varieties under Different Dates of Sowing in High Altitude Zone of Andhra Pradesh, India

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ABSTRACT

Keywords

Chickpea,
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An experiment was conducted to study the performance of chickpea varieties (KAK-2, Pule G 95311(Vihar), JG 11 and Nbeg-3) under five different dates of sowing viz., October first week, October third week, November first week, November third week and December first week at Regional Agricultural Research Station, Chintapalli, Visakhapatnam district of Andhra Pradesh during *rabi* season of the year 2011-12, 2012-13 and 2013-14. The results of three years study revealed that among the five different dates of sowing November first week sowing recorded significantly higher yields ($1521.5 \text{ kg ha}^{-1}$) followed by October third week sowing ($1296.5 \text{ kg ha}^{-1}$) and among the varieties JG11 produced higher seed yields (1278 kg ha^{-1}) followed by NBeg 3 ($1188.8 \text{ kg ha}^{-1}$).

Introduction

Chickpea (*Cicer arietinum* L.) is an important food legume crop grown during *rabi* season in India, covering about 8.56 Mha area with production of 7.35Mt and productivity of 859 kg ha^{-1} (Deepika Tiwari and Meena, 2014). In Andhra Pradesh, it is grown in 5.70 lakh ha with a production of 5.49 mt. In High Altitude and Tribal (HAT) zone of Andhra Pradesh, chickpea was introduced as nontraditional pulse crop during *rabi* season. In HAT zone this crop performs well as it is a cold loving plant. Since majority of the soils in this area are red sandy loams with clay base, chickpea can be recommended in this situation. There is a big gap between the yield realized in experimental station (2200 kg ha^{-1}) and the farm yield (1274 kg ha^{-1}) in Andhra Pradesh.

The major constraints responsible for this untapped yield potential are inappropriate production practices, viz., usage of low yielding and non-responsive genotypes, pest and disease problems, lack of stress-resistant high yielding genotypes, lack of improved soil and crop management practices and lack of appropriate institutional support (Ramakrishna *et al.*, 2005). Selection of suitable variety and time of sowing plays a major role in realizing higher yields. These factors will help in utilizing resources like residual soil moisture and nutrients from the soil. Information on these aspects is lacking in high altitude and tribal zone of Andhra Pradesh. Hence, this study was conducted at Regional Agricultural Research Station, Chintapalle during the year 2011-12 to

2013-14 to identify suitable high yielding variety of chickpea with optimum sowing time for high altitude and tribal zone.

Materials and Methods

A field experiment was conducted at Regional Agricultural Research Station, Chintapalle during the *rabi* season of three consecutive years 2011-12, 2012-13 and 2013-14. The geographical location of the site is situated between 17°13' north latitude and 82°33' east longitude with an altitude of 767.6 m above the mean sea level. The average annual rainfall is 1018.2 mm, which is mainly received between June and September. Temperature ranges between 2.8–15°C during winter and occasional frost. The experimental site was sandy clay loam in texture, low in organic carbon (0.41), available nitrogen (219 kg ha⁻¹), and medium in available phosphorus (16.5 kg ha⁻¹) and high in available potassium (383 kg ha⁻¹). The experiment consists of twenty treatment combinations with five dates of sowing viz., D₁ – October First week, D₂ – October third week, D₃ – November first week, D₄ – November third week and D₅ - December first week and four varieties viz., V₁- KAK-2, V₂ - Pule G 95311(Vihar), V₃ - JG 11 and V₄ – Nbeg-3 in split plot design with three replications. Sowings were done in furrows at 30 cm between rows and 10 cm between plants with in the row. Basal dose 20 kg nitrogen through urea and 50 kg phosphorus through single super phosphate and 40 kg sulphur was applied uniformly to all plots. The observations pertaining to growth and dry matter accumulation were recorded at harvest.

Results and Discussion

Sowing time markedly influenced the plant height and dry matter accumulation of chickpea crop. More plant height (59.9 cm) was recorded in November first week

sowing followed by October third week sowing (55.9 cm), shorter plants (37.6 cm) were noticed in December first week sowing. More dry matter production per plant (31.3 g) was observed in October first week sowing followed by November first week sowing (27.4 g). The yield attributing characters viz., number of pods per plant and number of seeds per plant greatly influenced by different dates of sowing. Significantly higher number of seeds per plant (104.3) and seeds per plant (104.9) were recorded in November first week sowing over December first week sowing (50.9 and 57.9, respectively).

Chickpea varieties sown during November 1st week recorded significantly higher grain yield (1521.5 kg ha⁻¹) compared to crop sown during October 1st week, October 3rd week, November 3rd week and December 1st week. The crop sown on November 1st week recorded 26.84, 14.78, 46.90 and 60.64% higher yield over crop sown on October 1st week, October 3rd week, November 3rd week and December 1st week, respectively. The higher grain yield of chickpea sown during November 1st week is attributed to lower maximum temperature coupled with higher relative humidity compared with other dates of sowing. The higher grain yield in November 1st week sown crop can be attributed to higher values of yield components (No. of pods plant⁻¹ and No. of seeds plant⁻¹) over early and late sown crop. Similar higher grain yield of chickpea from November 1st week sown crop from different agro-climatic conditions are reported by Saini and Faroda (1997) and (Nagarajaiah *et al.*, 2005).

Significantly higher number of pods/ plant and seeds per plant were noticed in JG 11 (92, 91.9 respectively) which was compared to KAK 2 and Vihar but on par with NBeg-3. Seed yield was greatly influenced by different varieties evaluated, JG 11 variety

yielded significantly higher seed yield (1278 kg ha⁻¹) over Vihar (769.4 kg ha⁻¹) and KAK 2 (1031.6 kg ha⁻¹) but it was on par with NBeg-3 (1188.8 kg ha⁻¹). Dahiya and Waldia (1981) & Munirathnam *et al.* (2013) also reported yielding variation in chickpea varieties.

The interaction between dates of sowing and varieties showed significant difference in terms of seed yields. Higher seed yield of

1753.09 kg ha⁻¹ (Table 2) was recorded with JG 11 variety sowing during November first week.

Based on the above results, it can be concluded that chickpea sowing in November first week produces higher seed yields and JG 11 and Nbeg 3 were found suitable for high altitude and tribal zone of Andhra Pradesh.

Table.1 Yield attributes and yields of chickpea as influenced by dates of sowing and varieties

Treatments	Plant height (cm)	No. of Pods plant ⁻¹	No. of Seeds plant ⁻¹	Dry matter production at harvest (g plant ⁻¹)	Seed Yield (kg ha ⁻¹)
Dates of Sowing(5)					
D ₁	52.7	74.6	84.0	31.3	1113.0
D ₂	55.9	80.7	84.0	17.7	1296.5
D ₃	59.9	104.3	104.9	27.4	1521.5
D ₄	44.9	85.0	74.1	22.0	807.9
D ₅	37.6	50.9	57.9	23.6	596.8
SEm	2.7	3.4	4.1	1.2	48.0
CD(0.05)	8.9	11.1	13.4	NS	156.8
Varieties(4)					
V ₁	50.43	65.1	71.2	27.3	1031.6
V ₂	49.39	75.6	72.8	20.4	769.4
V ₃	50.81	92.0	91.9	26.9	1278.8
V ₄	50.40	83.6	87.9	22.9	1188.8
SEm	1.21	2.57	2.77	0.83	48.41
CD(0.05)	NS	7.1	7.7	2.3	134.2

Table.2 Interaction between dates of sowing and varieties on seed yield (kg ha⁻¹) of chickpea

Treatments	D ₁	D ₂	D ₃	D ₄	D ₅
V ₁	1129.33	1185.76	1427.22	706.43	709.55
V ₂	795.10	763.43	1650.22	490.18	148.21
V ₃	1239.98	1255.75	1753.09	976.44	799.08
V ₄	1287.87	1611.31	1625.65	1058.76	730.65
CD (0.05)	300.1				
CV (%)	17.57				

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