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RESEARCH ARTICLE

Varietal performance of chickpea under harsh edaphic and environments of Bundelkhand for subsistence farmers

■ **R.K. Singh, M.K. Singh and Ram Prakash**

SUMMARY

The adaptive trial was laidout during 2002-2003 at dry eco-system of Jalaun district of Bundelkhand. The soil of pilot area was *Kabar*, having low fertility status especially in organic matter. The improved genotypes KWR-108, KGD-1168 and Pusa-256 was tested with local check Radhey in adaptive trial. The cultivars planted in the first fortnight of November and harvested in the end of March after 140 days of seeding. The cultivar Pusa-256 gave highest average grain yield of chickpea by 15.50 q/ha. The local check Radhey, KWR-108 and KGD-1168 gave lowest yield by a margin of 2.25 q/ha, 1.00 q/ha and 1.00 q/ha, respectively, in comparison to cv. PUSA-256. The growth and yield traits recorded under test genotypes, supported to the grain yield of chickpea.

Key Words : Alluvium soil, Dry eco-system, Dry farmed area, *Kabar* soil

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On a global basis, chickpea (*Cicer arietinum* L.) is the third most important pulse crop after dry beans (*Phaseolus vulgaris* L.) and dry beans (*Pisum sativum* L.). Although predominantly consumed as pulse, dry chickpea is also used in prepairing a variety of snack food, sweet and condiments. Green fresh chickpea are commonly consumed as a vegetable for a short period before the crop is mature. Nutritionally, chickpea is relatively free from various anti nutritional factors, has a high protein digestibility, and in richer in phosphorus and calcium than other oulses. Because of its higher fat content and better fibre digestibility, chickpea holds great promise as a protein and calorie source for animal feed to ruminants and non-ruminants. Chickpea straw has a forage value comparable to other straw commonly used for livestock feed. Because of these diversified uses of the crop and its ability to grow better with low inputs under harsh edaphic and aried environments than many other crops, it is an important

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component of cropping systems of subsistence farmers in the Indian sub-continent.

The chickpea cultivation is practically concentrated in the Indo-Gangetic alluvium soil specially in Bundelkhand of Uttar Pradesh as rainfed crop. The increasing trend in area, production and productivity was found upto 2008-2009, thereafter, reduction was noted due to biotic and abiotic reason. At present in U.P. about 5.58 lakh ha chickpea is grown with total production of 1.77 lakh mt and productivity of 3.17 q/ha (Anonymous, 2016).

Singh *et al.* (2013) reported from C.S. Azad University of Agriculture and Technology, Kanpur that the front line demonstration with full package of practices specially with variety on farmers field is the pin point for increasing the production of pulses.

Keeping the above point in view, the present investigation was under taken to enhance the productivity of chickpea through adaptive trial on farmers fields.

MATERIAL AND METHODS

The adaptive trial was carried out during winter season of 2002-2003 at K.V.K. Rura Mallau, Jaluan under dry land eco-system. The soil of pilot area was *Kabar* having pH 7.5, organic carbon 0.23%, available phosphorus 13.9 kg/ha and available potash 115 kg/ha, therefore, the fertility status of operational area was poor. The pH was determined by Electrometric glass electrode method (Piper, 1950), while organic carbon was determined by Colorimetric method (Datta *et al.*, 1962). Total nitrogen was analysed by Kjendahl's method as discussed by Piper (1950). The available phosphorus and potassium were determined by Olsen's method (Olsen *et al.*, 1954) and Flame photometric method (Singh, 1971), respectively. The improved varieties of chickpea *i.e.*, KWR-108, KGD-1168 and Pusa-256 were tested with local cultivar Radhey at two location at Rura Sirsa, Nadigaon block and Chhani, Konch block of Jalaun district. The recommended conservation agronomical practices were followed. The chickpea was sown in first fortnight of November 2002 and harvested in the end of March 2003 after 140 days of sowing. The recommended practices for dry land eco-system were followed for raising of chickpea cultivars as suggested by Singh *et al.* (2013). The adaptive trial was conducted on farmers fields.

RESULTS AND DISCUSSION

The average data obtained from the adaptive trial are presented in Table 1 and discussed here under.

Perusal of data make it clear that in adaptive trial cultivar Pusa-256 registered higher branches/plant (15.65) as compared to other tested varieties. Cultivars Radhey, KWR-108 and KGD-1168 produced at par branches/plant. The maximum pods/plant (25.00) was also counted in Pusa-256, while Radhey, KWR-108 and KGD-1168 produced 22.20, 23.40 and 23.45 pods/plant, respectively. Number of grains/pod was recorded almost equal in all the tested varieties but numerically higher grains/pod was recorded under Pusa-256. Variety Pusa-256 gave higher grain weight/plant (10.00 g) over local and other two test varieties. The 100-seed weight was weighed 21.00 gram in Radhey, 21.05 gram in KWR-108, 21.07 gram in KGD-1168 and 21.15 gram in Pusa-256.

The highest average yield (q/ha) of chickpea was recorded in cultivar Pusa-256 (15.50 q/ha), while Radhey as local check, KWR-108 and KGD-1168 yielded grain yield by 13.25 q/ha, 14.50 q/ha and 14.50 q/ha, respectivdely. There has been considerable increase in branches/plant, pods/plant, pods weight/plant, grains/pod, grain weight/plant and test weight in cultivar Pusa-256 planted under adaptive trial over the other three varieties contributed to increase the seed yield (q/ha). These results are in agreement with those reported by Singh (2005).

Under dry eco-system of Bundelkhand variety Pusa-256 maintained better source-sink relationship. Under this situation the dry matter or photosynthates produced by source organs translocated towards sink organ (economic part) and produced higher seed yield of chickpea. The sowing of variety Pusa-256 of chickpea

Table 1 : Growth, yield traits and yield of chickpea under different cultivars (average data of two locations)

Sr. No.	Variety	Branches/ plant	Pods/ plant	Pods weight/ plant	Grains/ pod	Grain yield/ plant (g)	100-seed weight (g)	Yield (q/ha)
1.	Radhey (Local)	14.18	22.20	10.40	1.71	8.30	21.00	13.25
2.	KWR-108	14.30	23.40	10.88	1.77	8.75	21.05	14.50
3.	KGD-1168	14.32	23.45	10.90	1.78	8.81	21.07	14.50
4.	Pusa-256	15.65	25.00	11.50	1.85	10.00	21.15	15.50

had higher number of pods/plant, grain weight/plant means it possessed higher sink capacity to utilized the photoassimilates translocated from source, resulted in, higher weight of 100-seed and maximum grain yield (q/ha). These results confirm the findings of Panwar *et al.* (1986), Shrivastava and Bharadwaj (1986), Pachpor and Shete (2010), Singh *et al.* (2015) Singh *et al.* (2015) and Singh *et al.* (2016).

Conclusion :

The cultivar Pusa-256 of chickpea gave higher grain yield under dry land eco-system, therefore, farm house hold may be advocated for adoption of aforementioned cultivar for better production.

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