RESEARCH PAPER International Journal of Agricultural Sciences, Vol. 5 Issue 1, January to May, 2009 : 295-296

Effect of irrigation and land configuration on growth, yield and quality of chickpea [*Cier arietinum* (L.)] under vertisol of South Gujarat

K.B. PATEL, Y.N. TANDEL* AND M.K. ARVADIA
Department of Agronomy, N.M. College of Agriculture, Navsari Agricultural University, NAVSARI (GUJARAT) INDIA

ABSTRACT

Field experiment was conducted during *rabi* season at College Farm, N. M. College of Agriculture, N.A.U., Navsari to study the effect of irrigation and land configuration on growth, yield and quality of chickpea under vertisol of South Gujarat. Four levels of irrigation (I_1: 0.4, I_2: 0.6, I_3: 0.8, and I_4: 1.0 IW/CPE ratio) and three land configuration methods (C_1: Flat bed, C_2: Board bed and furrow, and C_3: Ridge and furrow) were evaluated in split plot design with four replication. Results revealed that irrigating the crop at 0.8 IW/CPE ratio with ridges and furrow method of sowing was gave significantly higher seed and straw yield with better quality of chickpea under South Gujarat condition.

Key words : Chickpea, Irrigation, Land configuration, Yield and Quality, Ridge and Furrow

INTRODUCTION

Chickpea is one of the most important *rabi* pulse crop of Gujarat. It occupies 1.44 lakh hectare area under cultivation in Gujarat state. The low productivity is mainly due to the fact that the chickpea is grown on the conserve moisture conditions coupled with minimal inputs. Hence, its production is largely depends on the availability of the residual soil moisture during the post-monsoon period. Supply of timely and adequate irrigation play a key role in the high and economic production. The majority of soils of South Gujarat are high in clay content (40-60%) exhibiting poor physical soil parameters. The prospect of increasing productivity of this crop seems to be bright if it is grown with better agronomical practices like proper irrigation management, good seed bed preparation *etc.* Therefore, the present investigation was undertaken to ascertain beneficial effects of irrigation and land configuration treatments on growth, yield and quality of chickpea.

MATERIALS AND METHODS

The experiment was conducted during the *rabi* season at the College Farm, N.M. College of agriculture, NAU, Navsari. The experiment was laid out in Split Plot Design with four replications. The treatment combinations consisting four levels of irrigation (I_1: 0.4, I_2: 0.6, I_3: 0.8, I_4: 1.0 IW/CPE ratio) and three land configuration methods (C_1: Flat bed, C_2: Broad bed and furrow, C_3: Ridge and furrow). The soil is clay in texture having pH of 7.3 with 0.49% organic carbon, 0.048% total N, 32.43 kg.ha^{-1} available P and 350.0 kg.ha^{-1} available K. The field capacity, permanent wilting point and bulk density of 0-90 cm soil layer were 31.96%, 18.2% and 1.45 g/cc, respectively. Recommended dose of chemical fertilizer (25-50-0 kg/h NPK) was applied uniformly. Entire quantity of N and P were applied as basal dose through urea and SSP, respectively. Sowing the seed of chickpea cv. GG-2 with seed rate of 60 kg/ha. at distance of 30 cm between two rows. A common irrigation was given uniformly to all the treatments for proper germination. The irrigation depth was maintained about 60 mm in each irrigation. Total number of applied irrigations was 4, 5, 6 and 7 under 0.4, 0.6, 0.8 and 1.0 IW/CPE ratio, respectively.

RESULTS AND DISCUSSION

Growth attributes:

Irrigation scheduling at 1.0 IW/CPE ratio was significantly increased the plant height, dry weight of plant at harvest and straw yield of chickpea which was statistically at par with 0.8 IW/CPE ratio. While the number of root nodules, number of pods, test weight, seed yield, protein content and protein yield were significantly higher with 0.8 IW/CPE ratio as compared to 0.4 IW/CPE ratio. Sandhu *et al*. (1978) reported that excessive vegetative growth due to frequent irrigation reduced the yield potential and suggested that the optimum grain requires continuous translocation of nutrients to the developing grains. Similarly, the maximum protein content with increasing frequency of irrigation in chickpea was also reported by Dixit *et al.* (1993).

The land configuration had markedly influenced on growth, yield and quality of chickpea. Significantly higher plant height (48.16cm), dry weight of plant at harvest

*** Author for correspondence.** Present Address : Soil and Water Management Research Unit, Navsari Agricultural University, NAVSARI (GUJARAT) INDIA

Table 1 : Growth and yield component, grain and straw yield and quality of chickpea as influenced by irrigation and land configuration

Treatment	Plant height at harvest (cm)	Dry weight of plant at harvest (g)	No. of root nodules/plant at 60 DAS	No. of pods/ plant	Test weight (g)	Seed yield (kg/ha)	Straw yield (kg/ha)	Protein content (%)	Protein yield (kg/ha)
Irrigation IW/CPE ratio (I)									
I_1 :0.4	45.40	4.07	8.75	22.7	24.0	950	1322	18.43	175.67
I_2 : 0.6	46.41	4.25	9.25	23.0	25.0	1011	1395	19.47	197.20
I_3 : 0.8	47.41	4.35	9.87	25.03	27.58	1156	1429	20.0	230.99
I_4 : 1.0	48.98	4.63	9.39	23.48	25.83	1022	1498	19.66	202.03
S.E. $\pm$	0.70	0.11	0.21	0.43	0.60	41.2	32.9	0.34	9.47
C.D. (p=0.05)	2.24	0.37	0.67	1.38	1.61	131.8	105.4	1.09	30.28
Land configuration (C)									
C_1	45.83	4.16	9.04	22.89	24.31	963	1347	18.89	181.95
C_2	47.16	4.34	9.25	23.68	25.94	1025	1415	19.20	198.87
C_3	48.16	4.48	9.66	24.09	26.56	1116	1472	20.08	223.54
S.E. $\pm$	0.60	0.08	0.15	0.32	0.50	34.62	27.03	0.26	7.65
C.D. (p=0.05)	1.75	0.24	0.45	0.94	1.46	101.04	78.90	0.76	22.34
Interaction									
I x C	NS	NS	NS	NS	NS	NS	NS	NS	NS

NS-Non significant

(4.48g), number of root nodules, number of pods per plant, test weight, seed yield, straw yield, protein content and protein yield were recorded under ridges and furrow method of sowing (C_3) over the flat bed method. Moreover, the same treatment was also remained at par with treatment C_2 (Board bed and furrow) for growth attribute. Similar results were also observed by Shaikh and Mungse (1998) regarding growth and yield attributes, while Rasve *et al.* (1983) observed regarding quality of chickpea.

REFERENCES

Dixit, J. P., Dudey, O. P. and Soni, N. P. (1993). Effect of sowing date and irrigation on yield and nutrient uptake by chickpea (*Cicer arietinum*) cultivars under Tawa Command Area. *Indian J. Agron.*, **38** (2) : 227-231.

Rasve, S.D., Bharambe, P.R. and Ghonsiker, C. P.(1983). Effect of irrigation frequency and method of cultivation on yield and quality of summer groundnut. *J.Maharashtra Agric.Univ.*, **8** (1) : 57-59.

Sandhu, B.S., Prihar, S.S., Kher, K.L. and Sandhu, K.S. (1978). Scheduling of irrigation to the chickpea. *Indian J. Agric. Sci.*, **48** : 486-492.

Shaikh, R.S. and Mungse, H.B.(1998). Yield and yield components of late sown chickpea (*Cicer arietinum* L.) as influenced by planting system, plant population and fertilizer levels. *J. Maharashtra Agric.Univ.*, **23** (1) : 74-75.

Received : May, 2007; Accepted : December, 2008