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Yield and Yield Attributes of Chickpea (*Cicer arietinum* L.) as Influenced by Various Row Spacings and Weed Control

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Chickpea (C*icer arietinum* L.) is one of the most important protein rich legume crop grown in India. It is mostly consumed in the form of processed whole seed, dal flour, green vegetable, snacks and sweets, etc. In Uttar Pradesh, it is grown in 0.97 m ha with a production of 0.66 mt. The low productivity of chickpea has mainly been due to lack of suitable weed control measures and agronomic practices in this region. It has been reported that the yield of chickpea was increased by 107% when weeds were controlled (Ahlawat and Nath, 1981). Unweeded conditions caused an yield reduction of 29.3% over weed free check (Ali and Nath 1994). Hence, a study was conducted to find out the optimum row spacing and weed control measures to get better yield of chickpea.

The experiment was conducted at Student's Instructional Farm of Chandra Shekhor Azad University of Agriculture & Technology, Kanpur during winter season of 2005-06. The treatments comprising three row spacings and six weed control measures were tested in factorial randomized block with three replications. The variety 'KPG-59' (Uday) was sown by the end of November using 80 kg seed/ha. A basal dose of 20 kg N, 26.2 kg P and 16.7 kg K/ha was applied uniformly to all the treatments. Herbicides were sprayed at spray volume of 600 l/ha.

The experimental field was dominated with *Chenopodium album* L., *Parthenium hysterophorus* (L.), *Cynodon dactylon* (L.) Pers, *Asphodelus tenuifolius* (Cav.), *Fumaria parviflora* Lamk., *Anagallis arvensis* (L.), *Coronopus didymus* (L.) Sm. and *Spergula arvensis* (L.). The effect of various row spacings on weed density and weed dry matter failed to touch the level of significance, but the wide row spacing observed numerically more weed density compared to narrow row spacing. The weed density and dry matter both were significantly affected by various weed control methods. Hand weeding recorded significantly lowest (nil) weed density and dry matter compared to other weed control methods.

The results (Table 1) indicate that pods/plant and number of seeds/pod were significantly higher at the row spacing of 40 cm compared with that of 20 and 30 cm but test weight was not influenced by various

Table 1. Effect of row spacing and weed control methods on yield and yield attributes of chickpea

Treatments	Pods/ plant	Seeds/ pod	Test weight (g)	B : C ratio	Yield (t/ha)		Harvest index (%)
					Seed	Straw	
Row spacings (cm)							
20	25.95	1.31	131.27	2.02	1.62	1.68	49.44
30	27.72	1.40	131.61	2.40	1.8.3	1.88	49.14
40	29.06	1.46	131.87	2.18	1.70	1.74	49.30
LSD (P=0.05)	0.68	0.04	0.66	0.07	0.07	0.08	NS
Weed control							
Control	24.48	1.04	130.62	1.82	1.48	1.52	48.77
Hand weeding	29.31	1.58	132.96	2.19	1.85	1.91	49.20
Pendimethalin (PE)	28.20	1.40	131.38	2.23	1.76	1.80	49.37
Pendimethalin+one hand weeding	28.20	1.44	131.25	2.11	1.72	1.77	48.90
Chickpea+fenugreek	27.10	1.40	131.47	2.58	1.70	1.74	48.98
Chickpea+paddy straw	28.15	1.48	131.83	2.27	1.78	1.83	49.93
LSD (P=0.05)	0.97	0.06	0.93	0.10	0.11	0.12	0.63

NS–Not Significant.

row spacings. All weed control measures proved significantly superior to the unweeded control in improving yield attributes. Hand weeding recorded the highest pods/plant, number of seeds/pod and test weight over all the weed control treatments. These parameters increased due to hand weeding by lowering the crop competition with weeds and increased the availability of moisture and plant nutrients to the crop. Similar results have also been reported by Singh and Bhan (1993).

The maximum seed and biological yields were recorded at a row spacing of 30 cm, which were significantly higher than 20 and 40 cm row spacing. All weed control measures recorded significantly higher crop yield (seed and biological) over the control treatment. The cultural measures (hand weeding) were found most efficient and recorded the highest seed and biological yield of 19.64 and 19.15% higher yield than unweeded control. Weed control measures significantly influenced the harvest index. The gram+methi method of weed control significantly increased the harvest index and it remained at par with pendimethalin.

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