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EFFECT OF NIPPING ON GROWTH AND YIELD OF CHICKPEA

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ABSTRACT

Chickpea is an important crop in the cropping pattern supplying cheap protein diet especially for poor people. Over the years, however, low yields are more prominent declining acceptability of this crop. Apart from other production enhancement indicators, nipping appeared to be a factor increasing yield and yield contributing parameters. To investigate the appropriate nipping technique as well as to sort out combination of spacing and nipping, an experiment was conducted during 2008-09 with chickpea variety NIFA-2005. Nipping was done on four different crop growth stages viz. nibbling (topping), harvesting at 4" level, harvesting at ground level and control (no nipping) with rows 40 and 50 cm apart. Among the parameters studied, number of plants/plot, plant height and grain yield appeared statistically significant across nipping methods and row spacing whereas number of pods/plant, number of grains/pod and 1000-grain weight were found non-significant. Control plot produced tallest plants (78.80 cm) whereas maximum yield (1792 kg/ha) was obtained in nipping at ground level with rows 40 cm apart. The research concluded that nipping is a profitable practice for chickpea growers.

Key words: Chickpea, nipping, spacing, growth, yield**.**

INTRODUCTION

Chickpea is a main nutritive legume crop of rural and urban household of the poor in the developing world (Sharma *et al*., 2003). It is Pakistan's foremost pulse crop. It is grown under three cropping systems (1) the rained system, constituting 88% of the total chickpea area, where chickpea is grown as a sole crop or mixed with other (2) the rice-based system, constituting 11% of the total area, where the crop is grown on residual moisture after rice; and (3) the irrigated system constituting only 1% of the total area. In Pakistan chickpea was grown on an area of about 0.97 million ha. It is mainly grown in the sandy desert and semi-arid zones of the country. In NWFP, chickpea covers an area of 35.19 thousand ha with total production of 14.43 thousand tonnes (Anonymous, 2008).

Chickpea is an economical source of quality protein food. It is used in a wide variety of dishes and snacks around the world. In Indo-Pakistan subcontinent and round the Mediterranean, it is mainly roasted, boiled, or fried and is used as the central ingredient in main dishes. The seeds can be eaten whole split and decorticated (dal) or ground as four (basal), the shoots and green leaves are even cooked and eaten as green vegetables. According to World Health Organization (WHO) Standards, the combined amino acid content of food mix of wheat-chickpea at a ratio of 67:25 makes the amino acid content almost perfect. The nutritional complementarily of chickpea with wheat and rice, the two most important cereals consumed in Pakistan, underscores the importance of concentrated development of the most important pulse crop. It helps in the management of soil fertility, particularly in dry areas through nitrogen fixing bacteria which increases the soil fertility. In dry farming of sandy zones, chickpea is a source of cash income for the farmers. It also provides livestock feed.

The low productivity of chickpea crop in Pakistan may be ascribed besides other factors its growing either in high rainfall areas or on very unproductive/ marginal lands. Nevertheless, it is imperative to increase productivity in different agro ecological zones by manipulating various agronomic practices. Nipping in chickpea is one of the important parameter for the enhancement of yield and yield contributing parameters. Singh and Diwakar (1995) revealed that foliage nipping at early stages of crop could increase number of branches while restricting profuse vegetative growth thereby promoting crop yield. Nipping at various stages tended to enhance number of branches and number of pods that in turn boost chickpea yield (Aziz, 2000). Nipping practice in the research area has twofold advantage. On the one hand nipping at prescribed growth stages could improve yield of the crop while on the other hand during time the chickpea in the field is usually a shortage of fodder and poor farmers could not afford to buy forage at distant locations, so chickpea may provide them an opportunity to fetch green fodder for their livestock. Chaube and Pundhir (2005) reported that chickpea nipping after 45 days after sowing increased yield as well as controlled disease severity. Aslam *et al*. (2008) witnessed an increased in height and number of

pod bearing branches with respect to topping of chickpea at various levels under water deficit systems.

Keeping in view the vitality of chickpea crop in the cropping pattern of low water ecology and profitable crop for poverty stricken people as well as significance of nipping that could enhance yield, present research has been contemplated with the objectives: To estimate the effect and most appropriate method of nipping on yield of chickpea. To find out the most applicable row spacing and nipping method on yield and yield contributing parameters of chickpea.

MATERIALS AND METHODS

The experiment was conducted at the Agricultural Research Institute, Dera Ismail Khan, NWFP, Pakistan during 2008-09. Prior to crop, soil was prepared to form a fine seed bed by ploughing, harrowing and tillering once each. The stubbles of the previous rice crop were uprooted and mixed in the soil. The soil of site was silty clay, the pH 7.78 and the organic matter content 0.88%. Chickpea variety NIFA-2005 (Desi) was cultivated on October 22, 2008. The trial was laid out in a randomized complete block design with three replications. The net plot size was 4 x 2 m^2. A row spacing of 40 and 50 cm was maintained through a man driven hand drill in this experiment. Nipping was done on four different crop growth stages viz.

(1^{st}) Nibbling (topping) (2^{nd}) Harvesting at 4" level
(3^{rd}) Harvesting at ground level (4^{th}) Control

Fertilizer (20:50 kg NP/ha) and seed rate (30 kg/ha) were applied as per standard recommendations for the locality. The following parameters were recorded during the course of study:

Number of plants/plot: After 30 days after sowing the germinated seeds were counted in each plot and their average was recorded.

Number of pods/plant: The number of pods from ten randomly selected plants in each plot was counted at maturity and their average was computed.

Number of grains/pod: The number of grains of ten randomly selected pods in each plant was counted at harvest and their average was calculated.

1000-grain weight (g): Thousand grains in each plot was counted, weighed by using sensitive electronic balance and then recorded.

Plant height at maturity (cm): Plant height was recorded by measuring randomly selected 10 plants in each plot from ground to the top of the plant at maturity.

Grain yield (kg/ha): Grain yield in each plot was recorded after harvesting, sun drying and threshing separately using 1 m^2 quadrate and then converted to kg/ha by using the following formula: Grain yield (kg/ha) = Grain yield/m^2 (kg) x 10000.

The data thus obtained were analyzed statistically using MSTATC computer software (MSTATC, 1991).

RESULTS AND DISCUSSION

Data given in Table-1 showed that maximum number of plants (133.3/plot) was observed in control where row spacing was 40 cm. Similarly, topping with spacing of 40 and 50 cm apart and nipping at ground level and 4" level produced statistically similar number of plants/plot. Minimum number of plants/plot was noted in T_2S_2 (4" level), T_3S_2 (ground level) and T_4S_2 (control) treatments with spacing 50 cm apart. Data further indicated that nipping effects on pods/plant (Table-1) & grains/pod (Table-2) did not show any significant difference for both the row spacing.

Data in Table-2 revealed that T_1S_1 (topping+40cm) produced heavier grains (195.5 g) with rows 40 cm apart. Whereas, treatment with 50 cm spacing had 1000-grain weight of 193.3 (g) in T_4S_2 (control). The lowest grain weight (140 and 152.7 g) was recorded in T_3S_1 (ground level) and T_2S_1 (4" level). The difference among treatments was non-significant statistically.

Table-1. Effect of nipping on number of plants/plot, plant height and pods/plant of chickpea.

Treatments	Plants/ plot	Plant height (cm)	Pods/ plant
T_1S_1 (Topping+40cm)	109.7^{ab}	65.67^{bc}	77.53^{NS}
T_2S_1 (4" level)	112.0^{ab}	60.50^{cd}	72.93
T_3S_1 (Ground level)	119.3^{ab}	57.87^{d}	64.53
T_4S_1 (Control)	133.3^{a}	76.80^{a}	87.80
T_1S_2 (Topping+50cm)	119.3^{ab}	69.73^{b}	91.73
T_2S_2 (4" level)	104.0^{b}	66.40^{bc}	94.87
T_3S_2 (Ground level)	98.00^{b}	50.73^{e}	67.27
T_4S_2 (Control)	94.67^{b}	67.53^{b}	82.60
$LSD_{0.05}$	**29.01**	**7.03**	**---**

NS = Non-significant
Means followed by different letter(s) in a column are significant at 5% level of probability.

Similarly, significantly the tallest plants (76.80 cm) were recorded in T_4S_1 (control) with rows 40 cm apart, followed by T_1S_2 (topping+50cm) having plant height of 69.73 cm. Treatment, T_3S_2 (ground level) produced short statured plants of 50.73 cm. These results were supported by Aslam *et al*. (2008) who explained that vigorous cutting of chickpea is related with production of tallest plants. As mentioned in Table-2, significantly higher grain yield (1917 kg/ha) was obtained in T_3S_1 (ground level) followed by statistically

at par grain yield of 1792 and 1708 kg/ha in T_2S_1 (4" level) and T_1S_2 (Topping+50cm). Minimum grain yield (1396 kg/ha) was noted in T_2S_2 (4" level) with 50 cm row spacing. The results are corroborated to that of Khan *et al*. (2003) who revealed that removing top growth tended to increase seed yield. Similarly, chickpea nipping has been reported to an innovative and profitable venture in D.I.Khan by using crop for grazing goats and sheep at seedling stage resulting profuse growth of the plants (Khattak *et al*., 2007). Nipping of chickpea especially during last week of December to the end of January not only instrumental in providing extra feeding material for cattle but also have significant affect on number of productive branches per plant, number of pods per plant, 100 seeds weight and yield (kg ha^{-1}) of this crop (Khan *et al*., 2006).

Table 2. Effect of nipping on 1000-grain weight, grains/pod and grain yield of chickpea.

Treatments	1000-grain weight (g)	Grains/ pod	Grain yield (kg/ha)
T_1S_1 (Topping+40cm)	195.5 ^{NS}	1.44 ^{NS}	1625 bc
T_2S_1 (4" level)	152.7	1.34	1792 ab
T_3S_1 (Ground level)	140.0	1.33	1917 a
T_4S_1 (Control)	189.8	1.34	1562 bc
T_1S_2 (Topping+50cm)	177.0	1.29	1708 ab
T_2S_2 (4" level)	180.5	1.34	1396 c
T_3S_2 (Ground level)	190.8	1.47	1646 abc
T_4S_2 (Control)	193.3	1.37	1520 bc
$LSD_{0.05}$	---	---	275.0

NS = Non-significant

Means followed by different letter(s) in a column are significant at 5% level of probability.

Conclusions: Nipping or cutting back chickpea at various levels would enhance yield and yield contributing parameters of this crop. Present research findings revealed a case in favor of nipping that not only increased yield as well supplying fodder at times when there is scarcity of green forage in the area. Since this crop is characterized as crop with minimal input resource applications, higher yields can certainly fix its place in cropping schemes both in low and high productive land use systems.

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