YIELD IMPROVEMENT OF CHICKPEA USING SYSTEM OF RICE INTENSIFICATION (SRI) TECHNIQUE

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Extended Summary

World population is predicted to be double by 2050, imposing an increasing demand for human food. Legumes can play an important role to produce highly digestible (70-90%) protein seed (26%) maintaining soil productivity, Chickpea (*Cicer arietinum* L.) belongs to the family Fabaceae is an important food legume contains essential amino acids like isoleucine, leucine, lysine, phenylalanine, valine etc. (Fattah, 2006). The average yield of chickpea in Bangladesh is lower due to importantly absence of suitable variety and plant spacing. In this regard management like System of Rice Intensification (SRI) is claimed to be a novel and promising approach coupled with high yielding variety to productive rice. In recent years, the adaptation of SRI principles to other crops (wheat, mustard, sugarcane, finger millet, pulses etc.) showing increased productivity, 2015; Pradan, 2012 is being referred as the System of Crop Intensification (SCI). In pursuit of extending the beneficial effect of SCI, the present study was programmed in chickpea for the first time in Bangladesh. An attempt was therefore desired to undertake this experiment with the financial assistance of University Grands Commission (UGC) through Sher-e-Bangla Agricultural University Research System (SAURES) to study whether the principle of SCI is applicable for improvement its production level. The experimental treatment comprised of two factors; variety and spacing. Three varieties were V_1= BARI chola-5, V_2= BARI chola-6 and V_3 = BARI chola-9; five spatial arrangements were S_1 = 40 cm × 10 cm, S_2 = 30 cm × 30 cm, S_3 = 40 cm × 40 cm, S_4 = 50cm × 50 cm and S_5 = 60 cm × 60 cm. Treatments variables were tested under split plot design replicated thrice when varieties were placed in main plot and spacing in sub plot. The recommended dose of N, P_2O_5, K_2O, B at the rate of 20, 40, 20, 1 kg ha^{-1}, respectively were added to the soil. Seeds were at the rate of 50 kg ha^{-1} sown on 30 November, 2015. Row to row and plant to plant distances were maintained as per treatment variables of the experiment. Crop was harvested on 29 March 2016 (120 DAS).

Results indicated that, among the cultivars BARI Chola-5 (V_1) gave maximum number of branches plant^{-1} above ground dry weight plant^{-1} (22.92 g), pods plant^{1} (50.43), seed yield (0.78 t ha^{-1}), stover yield (1.09 t ha^{-1}) and biological yield (1.87 t ha^{-1}) at harvest. BARI Chola-5 had 36.84% field advantages over lower

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one. In case of different spacing, 40 cm × 40 cm (S_3) planting gave maximum number of branches $plant^{-1}$, above ground dry weight $plant^{-1}$ (24.06 g), pods $plant^{-1}$ (47.49). The highest seed yield (1.62 t ha^{-1}) was obtained in S_1 (40 cm × 10 cm) while the lowest seed yield (0.30 t ha^{-1}) at S_5 (60 cm × 60 cm). Narrower spacing (40 cm × 10 cm) gave 440.00% greater yield than wider spacing due to more number of plants per unit area. In combination treatment BARI chola-5 along with 40 cm × 40 cm spacing (V_1S_3) gave maximum number of branches $plant^{-1}$ (60.22), above ground dry weight $plant^{-1}$ (26.89 g), pods $plant^{-1}$ (66.00). Seed yield (1.82 t ha^{-1}) was maximum recorded from treatment V_1S_1 (BARI chola-5 combined with 40 cm × 10 cm) and the minimum seed yield (0.23 t ha^{-1}) at V_2S_5 (BARI chola-6 combined with 60 cm × 60 cm). Combination V_1S_3 produced maximum pods $plant^{-1}$ (comparable 186.09%) due to individual plant bearing growth but failed to produce targeted yield for wanting desired plant population.

From the result of this experiment it may be concluded that wider spacing (40 cm × 40 cm) influenced individual plant with vigorous growth consequently maximum yield contributing character but failed to show maximum seed production due to lower number of plant per unit area when recommended spacing (40 cm × 10 cm) showed maximum seed production.