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Yield, yield parameters and economics of pigeonpea (*Cajanus cajan* (L.) Millsp) as influenced by genotypes, planting geometry and protective irrigation

G. PRAMOD*, B.T. PUJARI, M.K. BASAVARAJA, VIJAY MAHANTESH AND VENKATE GOWDA
Department of Agronomy, College of Agriculture, University of Agricultural Sciences, G.K.V.K., BENGALURU (KARNATAKA) INDIA

ABSTRACT

A field experiment was conducted during *Kharif* 2006 to study the performance of pigeonpea genotypes to planting geometry under different protective irrigation. The two protective irrigations given at flowering and early pod filling stages recorded significantly higher maximum mean seed yield (16.51 q ha^{-1}) followed by one irrigation at flower initiation stage (14.33 q ha^{-1}) and control. Among different genotypes, BSMR-736 (14.95 q ha^{-1}) and Asha (14.13 q ha^{-1}) produced, significantly higher seed yield when compared to Maruti. And Maximum seed yield of 14.80 q per hectare was realized with 5 x 2 ft and it was 13 per cent higher than 5 x 3 ft (13.07 q per hectare). The BSMR-736 (22.88%) and Asha (21.85%) were recorded significantly higher protein content as compared to Maruti (22.03%). The protein content of pigeonpea seeds did not differ significantly due to protective irrigation and planting geometry. Among the different irrigation levels, two irrigations recorded higher net returns (Rs. 23,774 ha^{-1}) and B:C ratio (2.40). Among pigeonpea genotypes, BSMR-736 (Rs. 20,802 ha^{-1} and 2.13, respectively) and Asha (Rs. 19,136 ha^{-1} and 1.96, respectively) recorded significantly higher net returns and benefit cost ratio when compared to Maruti. The pigeonpea with planting geometry of 5 x 2 ft recorded significantly higher net returns (Rs. 20,499 ha^{-1}) and benefit cost ratio (2.09) over 5 x 3 ft.

Key words : Genotypes, Irrigation, Yield, Yield attributes, Economics, Piegonpea

INTRODUCTION

Pigeonpea [*Cajanus cajan* (L.) Millsp.] is one of the protein rich legumes of the semi-arid tropics grown throughout the tropical and sub-tropical regions of the world between 30^0 N and 35^0 S latitude. However, major area in India is lying between 14 and 28^0 N latitude, where 90 per cent of the world's pigeonpea is produced. In India, it occupies an area of about 3.52 million hectares producing 2.37 million tonnes with an average productivity of 673 kg ha^{-1} (Anonymous, 2006). Pigeonpea is grown in almost all the states of India, but the major states are Maharashtra, Uttar Pradesh, Gujarat, Madhya Pradesh and Karnataka.

Normally the crop is grown under dry land in *Kharif* under low management conditions and is fairly drought tolerant. However, the productivity of the crop is quite low. One of the possible ways of increasing its productivity is through intensive cultivation which requires the development of suitable technology. The yield potential of pigeonpea can be realized only through efficient utilization of solar radiation and mitigating terminal drought for which canopy size and shape claim a paramount importance.

MATERIALS AND METHODS

A field experiment was conducted at Agriculture College Farm, Raichur during *Kharif* 2006-07 in order to study the response of pigeonpea genotypes to planting geometry under different protective irrigations, there were 18 treatments comprising combinations of three irrigations in main plots (I_0 – No irrigation, I_1 – One irrigation at flower initiation stage and I_2 – Two irrigations at flower initiation and early pod formation), three genotypes in sub plots (Asha, Maruti and BSMR-736) and two planting geometry in sub-sub plots (5 x 2 ft and 5 x 3 ft). Treatments were replicated three times in split-split plot design. The entire quantity of recommended dose of fertilizer for pigeonpea (25:50 NP kg ha^{-1}) in the form of urea and diammonium phosphate was applied at the time of sowing. Measured quantity of irrigation water was applied to each plot as per treatments. For each irrigation, 60 mm depth of measured quantity of water was applied to individual plants. During cropping period, total rainfall received was about 428 mm considering effective rain fall, the amount of rainfall for control treatment was 360 mm and for one irrigation 420 mm and for two irrigation 480 mm including the additional irrigation water given. These data were used for calculations of water use efficiency (WUE). Five plants in each plot were randomly selected from net plot area and tagged for recording yield parameter. Observation was record on number of pods per plant, 100 seed weight (g), seed yield per plot. Seed yield per hectare was calculated based on the net plot basis. Per cent crude protein was calculated by multiplying the nitrogen per cent in seeds with a constant of 6.25. Net returns (Rs. ha^{-1}) calculated by deducting cost of cultivation (Rs. ha^{-1}) from gross returns. B:C ratio was worked out as a ratio of net returns (Rs. ha^{-1}) to cost of cultivation (Rs. ha^{-1}).

* Author for correspondence.