

Research
Paper

Effect of mechanization with different land configuration on growth and growth attributes of soybean

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ABSTRACT

An experiment was conducted during the *Kharif* season of 2009-10 to study the effect of mechanization with different land configuration on growth and growth attributes of soybean with Randomized Block Design. The treatment consisted of six land configuration treatments. viz., T₁ (Flat bed layout), T₂ (BBF layout), T₃ (Ridges and furrow), T₄ (Flat bet + opening of furrow after every two rows at 30 DAS), T₅ (Flat bet + opening of furrow after every 5 rows at 30 DAS), T₆ (Conventional / farmer's practice) and replicated four times. Result showed that, mechanized culture with broad bed furrow increased significantly plant height at 80, 100 and at harvest, number of functional leaves at 40 and 60 days, leaf area plant⁻¹, number of branches plant⁻¹ at all growth stages, number of developing pods plant⁻¹, dry matter accumulation plant⁻¹ at 80 DAS, AGR for dry matter and plant height in between 40-60 DAS, PGR in between 40-60 DAS, leaf area index, it also increased NAR between 40,60 and 80 DAS

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Key words : Soybean, land configuration, mechanization Growth attributes

INTRODUCTION

Soybean (*Glycine max.* L.) is one of the important oilseed as well as leguminous crop. It is the cheapest and richest source of high quality protein. It supplies most of the nutritional constituents essential for human health. Hence, soybean is called as "Wonder Crop" or "Golden bean" or "Miracle bean". This crop in fact has made revolution in the agricultural economy with its immense potential, quality of Food, Feed, numerous industrial production commodity. Symbiotically soybean fixes 125-150 kg N ha⁻¹ (Chandel and Bhatia, 1989) and leaves about 30-40 kg N ha⁻¹ for succeeding crop (Sexena and chandel, 1992). In India soybean is grown over an area of 7.46 m ha with a production of 8.35 m tonnes and with average productivity of 1007 kg ha⁻¹. Madhya Pradesh, Uttar Pradesh and Maharashtra are the major soybean producing states. (Anonymous, 2006). To improve growth potential of soybean it is necessary to use mechanization with different land configurations. Patil (2005) reported that in soybean all growth attributes viz., plant height,

number of leaves plant⁻¹, leaf area plant⁻¹, dry matter accumulation plant⁻¹, were significantly higher under ridges and furrow method of planting over flat bed method of planting. Considering the above facts, attempt was made to study the effect of mechanization with different land configuration on growth attributes of soybean.

MATERIALS AND METHODS

An experiment was carried out during *Kharif* 2009-10 at Gadadhi Block, Central Research station, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (M.S.). The experiment was laid out in Randomized Block Design in Four replication with six land configuration treatment i.e. T₁ (Flat bed layout), T₂ (BBF layout), T₃ (Ridges and furrows), T₄ (Flat bet + opening of furrow after every two rows, at 30 DAS), T₅ (Flat bed + opening of furrow after every 5 rows at 30 DAS), T₆ (Conventional / Farmers practice). In treatments T₁ to T₅ are mechanized culture with tractor. Gross plot size was of 15 m x 4.5m with net plot size of 13.0m x 3.6m. The experimental site was

clayey in texture, low in nitrogen content, medium in phosphorus and rich in potash, soil reaction was found to be slightly alkaline. Observations on growth and growth attributes viz., plant height, number of functional leaves plant⁻¹, number of branches plant⁻¹, leaf area plant⁻¹, dry matter accumulation plant⁻¹, absolute growth rate, relative growth rate, net assimilation rate were recorded.

RESULTS AND DISCUSSION

The results obtained from the present investigation have been discussed in the following sub heads :

Effect of mechanization with different land configuration on growth attributes:

The growth component was influenced due to various treatments of land configurations. The plant height, number of branches plant⁻¹ and dry matter accumulation plant⁻¹, at 60DAS, 80 DAS and at harvest treatment broad bed furrow (T₂) recorded maximum followed by the treatment ridges and furrow (T₃). The treatment opening of furrow after every two rows (T₄) and opening of furrow after five row (T₅) showed its superiority over treatment flat bed (T₁) and farmers practice (T₆) at 60 DAS, 80 DAS and at harvest.

The number of functional leaves plant⁻¹ and leaf area plant⁻¹ was influenced significantly by different land configuration treatment at 60 DAS and 80 DAS. BBF (T₂) recorded significantly maximum number of leaves and leaf area plant⁻¹ followed by the treatment ridges and furrow (T₃), opening of furrow after every two rows (T₄), opening of furrow after every Five rows (T₅) and significantly superior over treatment flat bed (T₁) and farmers practice (T₆). These results are in the line with the results of Ralli and Dhingra (2003). They conducted a field experiment at Ludhiana on loamy soil and revealed that growth attributes *i.e.* plant height, number of branches, dry matter accumulation, leaf area was higher in BBF as compared to flat bed sowing in soybean.

Effect of mechanization with different land configuration on growth analysis:

The absolute growth rate and relative growth rate in between 20-40 DAS and 40-60 DAS, broad bed furrow (T₂) recorded higher values followed by ridges and furrow. T₄ and T₅ recorded high AGR and RGR over the treatment flat bed (T₁) and farmers practice (T₆). In between 60-80 DAS values of AGR and RGR were not influenced due to different treatments of land configuration.

In case of net assimilation rate in between 20-40 and 40-60 DAS, treatment BBF (T₂) recorded higher values

Treatments	Plant height (cm)		No. of functional leaves plant ⁻¹		No. of branches plant ⁻¹		Leaf area plant ⁻¹ (cm ²)		Dry matter accumulation plant ⁻¹ (g)	
	60 DAS	80 DAS	60 DAS	80 DAS	60 DAS	80 DAS	60 DAS	80 DAS	60 DAS	80 DAS
T ₁ Flat bed sowing	11.10	57.10	19.15	17.53	16.89	15.91	13.31	0.06	0.18	16.16
T ₂ BBF	19.15	59.20	17.53	16.89	15.91	13.31	0.06	0.18	16.16	13.05
T ₃ Ridges and furrow	17.53	57.51	16.89	15.91	13.31	11.76	0.05	0.15	15.03	13.66
T ₄ Flat bed opening of furrow after every two rows of 30 DAS	16.89	56.93	15.91	13.31	11.76	10.05	0.05	0.13	14.05	13.05
T ₅ Flat bed opening of furrow after every five rows of 30 DAS	15.91	55.95	13.31	11.76	10.05	8.73	0.05	0.13	13.05	13.05
T ₆ Farmers practice	13.31	53.30	11.76	10.05	8.73	7.05	0.05	0.13	12.05	13.05
S.E.D.	0.05	0.07	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
C.D. (P 0.05)	0.18	0.22	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
C.V.	16.16	56.16	16.16	16.16	16.16	16.16	16.16	16.16	16.16	16.16

Treatments	Absolute growth rate (g day ⁻¹)		Relative growth rate (g day ⁻¹)		No. plants per row (g day ⁻¹)	
	20/0	60/80	20/0	60/80	20/0	60/80
T ₁ Ridge and furrow	0.025	0.2/3	0.013	0.03/9	0.0019	0.0037
T ₂ Ridge	0.105	0.371	0.02/2	0.07/5	0.0070	0.0038
T ₃ Ridges and furrow	0.078	0.311	0.0210	0.0259	0.0053	0.0070
T ₄ Ridge opening of furrow every 50 rows of 30 DAS	0.058	0.265	0.0178	0.0275	0.0070	0.0089
T ₅ Ridge opening of furrow every 50 rows of 30 DAS	0.030	0.271	0.0131	0.0319	0.0021	0.0095
T ₆ Farmers practice	0.015	0.202	0.0082	0.3/9	0.0012	0.0082

over ridges and furrow (T₃). Treatment T₄ and T₅ recorded higher NAR over flat bed (T₁) and farmers practice (T₆). In between 60-80 DAS, treatment opening of furrow after every five rows (T₅) recorded higher values of NAR over rest of the treatments.

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