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RESEARCH PAPER

Efficacy of different weed management practices and various fertility levels in soybean [*Glycine max* (L.) Merrill]

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Abstract : An experiment was conducted during *Kharif* season of 2006 as Junagadh (Gujarat) to study the efficacy of weed management practices in soybean [*Glycine max* (L.) Merrill] under various fertility levels. Different weed management treatments tried in this experiment exerted their significant effect on grain and stover yield of soybean. Almost all the growth and yield attributes were recorded maximum value under treatment W_5. Treatment W_4 was found equally effective in respect on recording higher values of these parameters than rest of the treatments. Application of 40:80:40 kg NPK ha^{-1} recorded the maximum value of plant height, plant spread, number of pods, seeds per pod and test weight. This reflected in marked effect in increasing grain (2006 kg ha^{-1}) and stover (2381 kg ha^{-1}) yields.

Key Words : Soybean, Pendimathalin, Quizalofop-ethyl, Imazethapyr, Fertility levels

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INTRODUCTION

Weeds form a single negative factor and serious menace which play key role against achieving full yield potential of the crop. The manual weeding and mechanical hoeing is found to be labourious and time consuming. Not only this but in a peak period of crop growth, labour is scare and labour charges are high due to shifting of agricultural labours to industries. The incessant rains and inaccessible field conditions during crop growing season do not provide an opportunity to manage weed problems by traditional weed control methods. Under such conditions, the use of selective herbicides may probably be a suitable answer. Post emergence herbicides are important tool in soybean production and their use should be determined on a field as a basis with preemergence herbicides. Fertilizers, a costly input of production are essential for securing higher yields. Proper dose and time of application with right method increases the growth and yield of crops. Practically no systematic research has been done to evaluate the efficacy of post emergence herbicides under different fertility levels. Taking a note of the fact, present research was conducted.

MATERIAL AND METHODS

The present investigation was carried out at Instructional Farm, Junagadh Agricultural University, Junagadh during *Kharif* 2006. The soil of the

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experimental plot was low in available nitrogen, medium in available phosphorus and high in available potassium. The experiment was laid out in Split Plot Design with eighteen treatment combinations comprising six levels of weed management practices as main plot treatments *viz.*, W_1- Pre-emergence pendimethalin @ 0.5 kg ha^{-1} + HW and IC at 30 DAS, W_2– Post-emergence quizalofop -ethyl @ 40 g ha^{-1} at 25 DAS + HW and IC at 45 DAS, W_3- Post-emergence imazethapyr @ 75 g ha^{-1} at 25 DAS + HW and IC at 45 DAS , W_4- 2 HW + 2 IC at 20 and 40 DAS, W_5- Weed free upto 60 DAS through hand weeding and W_6- Unweeded control and three levels of fertilizers as sub plot treatments *viz.*, F_1- 20:40:20 kg N:P_2O_5:K_2O ha^{-1} F_2- 30:60:30 kg N:P_2O_5:K_2O ha^{-1} F_3- 40:80:40 kg N:P_2O_5:K_2O ha^{-1}. The experiment was tried in three replications. The crop was fertilized with urea, SSP and MOP as per need of the treatment. The pre and post emergence herbicides application was also be carried out as per the treatment. Variety Gujarat soybean-1 was sown at the row spacing of 45 cm with seed rate of 60 kg ha^{-1}. The biometric observations were recorded and statistical analysis was carried out.

RESULTS AND DISCUSSION

The findings of the present study as well as relevant discussion have been presented under following heads :

Effect of weed management practices :

Different weed management practices do not influenced the initial and final plant populations. Plant height, number of branches per plant and plant spread were significantly influenced by weed management practices (Table 1). W_5- Weed free upto 60 DAS through hand weeding showed taller plants with higher number of branches and maximum values of plant spread compared to unweeded control (W_6). Hand weeding upto 60 DAS might have been resulted in better availability of nutrients to crop in absence of weed. The lowest plant height, number of branches and plant spread was recorded in unweeded control (W_6) which may be due to severe competition by weeds with crop for moisture and nutrients. Present findings are in agreement with those obtained by Chhatrola (2005).

Yield attributes *viz.*, number of pods, number of seeds per pod and test weight were shown maximum number under weed free treatment (W_5). However it did not differ significantly by W_4 treatment. It was due to favourable environment into root zone by the plant

Table 1: Effect of different weed management practices and various fertility levels on growth, yield attributes and yields of soybean

Treatments	Plant population plants / ha		Plant height		Plant spread	No. of branches /plant	No. of pods/ plant	No. of seeds/ pod	Test weight (g)	Grain yield (kg/ha)	Stover yield (kg/ha)
	Initial	Final	30 DAS	60 DAS At harvest							
Weed management practices											
W_1	143242	145324	21.94	38.98 45.71	33.56	4.05	48.73	2.39	7.99	1663	1997
W_2	144349	145727	22.68	42.69 48.4	34.78	4.61	55.48	2.46	8.5	1852	2163
W_3	144983	147099	22.83	44.16 48.89	35.44	5.00	58.62	2.64	8.84	1950	2267
W_4	146407	147825	24.57	44.46 50.51	38.00	5.59	60.87	2.74	9.13	2129	2496
W_5	150285	150650	25.49	45.42 52.99	40.00	6.00	62.17	2.97	9.87	2336	2772
W_6	138889	140160	18.05	30.03 38.19	30.22	4.00	38.52	2.1	7.06	1220	1465
C.D. (P=0.05)	NS	NS	2.82	4.33 4.06	3.04	0.56	4.37	0.27	0.84	235.85	232.53
Fertility levels (kg N:P_2O_5:K_2O ha^{-1})											
F_1	144477	143145	19.92	39.13 43.7	30.72	4.13	46.94	2.43	7.13	1596	1911
F_2	148310	146978	23.25	40.88 48.95	36.11	4.98	54.78	2.55	9.03	1973	2288
F_3	149802	148269	24.61	42.86 49.69	39.17	5.52	60.48	2.67	9.53	2006	2381
C.D. (P= 0.05)	NS	NS	1.26	2.29 2.17	1.3	0.23	1.98	0.12	0.4	108.38	108.2

upto 60 days. Umale *et al.* (2005) also reported similar results.

Grain and stover yields was significantly higher in treatment W_5 (Weed free) but found at par with treatment W_4 (2 HW and IC at 20 and 40 DAS). Increase in yield attributes and grain characters is responsible for higher values of grain and stover yield. These findings corroborate the reports of Chavan *et al*. (2000).

Effect of fertility levels :

Different fertility levels showed non-significant values of plant population. The maximum plant height, number of branches per plant and plant spread were recorded with the treatment F_3 (40:80:40 kg N:P_2O_5:K_2O ha^{-1}). It may be due to favourable influence of nitrogen to provide larger cells in cell division and cell elongation. Similar findings were also reported by Desai (1996) and Dash *et al.* (2005).

Significant differenence in yield attributes and yield was recorded with various fertility levels. Application of F_3 (40:80:40 kg N:P_2O_5:K_2O ha^{-1}) resulted into significant increase in yields while it was significantly lower with F_1- 20:40:20 kgN:P_2O_5:K_2O ha^{-1}. Favourable effect of nutrients increases growth characters and yield attributes which resulted in more grain and stover yields. Halvankar *et al.* (1999) and Rajavel *et al.* (2004) also recorded similar results.

Interaction effect :

The interaction effect of weed management practices and various fertility levels was found to be non-significant under all the growth characters, yield attributes and yield.

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