with 187.5 kg N ha^{-1} was required in N deficient soils.

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INFLUENCE OF POPULATION AND FERTILIZER LEVELS ON WEED CONTROL METHODS IN SOYBEAN

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ABSTRACT

Results revealed that *Trianthema portulacastrum* a broad leaved weed was the dominant in irrigated field. Hand weeding twice (W_3) followed by thiobencarb at 1.0 kg ha^{-1} plus one hand weeding (W_2) had an effective control of weeds and increased the yield attributes and grain yield of soybean. Fertilizer levels and spacings did not influence the yield. The high net return was obtained under the treatment combination of hand weeding twice adopting a spacing of 30 x 10 cm and a fertilizer dose of 20:80:40 kg N.P.K ha^{-1}. This was followed by application of thiobencarb at 1.0 kg ha^{-1} as pre-emergence herbicide plus one hand weeding under the same spacing and fertilizer levels.

KEY WORDS : Soybean, Weed Control, Fertilizer, Population Levels.

The diet of majority population in developing countries is inadequate and ill balanced due to socio-economic factors. The task of providing a balanced diet is far more challenging that of providing the bare requirement. Soybean, *Glycine max* (L.) Merr, has a good poectential due to its high protein and moderate oil content. Also, it is highly adaptable to varying soil and climatic conditions. Fertilizer use continues to be the major factor for increasing the soybean yield and productivity with the availability of input intensive high yield soybean varieties. There has been a considerable increase in the application of fertilizers supplying the major nutrients. Plant population is also a factor influencing soybean production so as to obtain maximum yield. It has been estimated that 33 per cent of potential production is lost due to weed competition besides the loss of valuable plant nutrients in the form of weed removal. The reduction in yield of soybean ranged from 10 to 73 per cent due to weed competition as seen from various studies. A number of pre-emergence herbicides are used for early control of weeds in soybean. Soybean crop receiving sufficient fertilizer and optimum population under favourable conditions, face competion of weeds at higher magnitude. Hence controlling weeds under fertilizer levels and population management system becomes more important. Keeping these points in view, the present investigation has been taken up.

MATERIALS AND METHODS

The field experiment was conducted at the Tamil Nadu Agricultural University, Coimbatore during the South West monsoon season 1990, under irrigated conditions. The experiment was laid out in split plot design with three replication. The treatments consisted of:

Main plots

Population : S_1 : 30 x 10 cm (3, 33, 333 plants ha^{-1})
S_2 : 30 x 5 cm (6, 66, 666 plants ha^{-1})

Fertilizer : F_1 : 20:80:40 kg NPK ha^{-1}
F_2 : 20:120:60 kg NPK ha^{-1}

Sub plots : W_1 : Thiobencarb at 1.0 kg ha^{-1}
W_2 : Thiobencarb at 1.0 kg ha^{-1} plus one hand weeding at 35 days after sowing
W_3 : Two hand weeding at 15 and 35 days after sowing.
W_4 : Unweeded check.

RESULTS AND DISCUSSION

The nutrients removal by weeds was lowest under the treatment W_3 and the treatment W_2 due to their effective control of weeds resulting in lower weed dry matter production. In unweeded check (W_4), nutrients removal by weeds was the highest due to higher weed dry matter production (Data not furnished). This result is in accordance with Singh and Mani (1977). Application of higher dose fertilizer (F_2) registered higher nutrients removal by weeds. In the plant population (S_1) nutrients removal by weeds was higher due to high weed dry matter production.

The nutrients uptake by crop was higher under the treatment hand weeding twice (W_3) followed by thiobencarb at 1.0 kg ha^{-1} plus one hand weeding (Data not furnished). It is attributed to high dry matter production resulted in higher nutrients uptake. This is in agreement with the findings of Prabhakaran (1986) and Tekatushi (1983). The number of pods per plant and the number of seeds per pod were not significantly influenced by fertilizer and spacing levels. The treatments W_3 and W_2 recorded higher number of pods per plant accounting for 30.06 and 28.27 respectively followed by W_1 (25.26). Unweeded check (W_4) registered the lowest number of pods per plant (Table 1). Similar findings were observed

Table 1. Effect of treatments on yield attributes of soybean

Treatment	Number of pods per plant					Number of seeds per pod					100 grain weight (g)				
	F_1	F_2	Mean	S_1	S_2	F_1	F_2	Mean	S_1	S_2	F_1	F_2	Mean	S_1	S_2
W_1	25.2	26.0	25.6	24.9	26.3	2.2	2.2	2.2	2.2	2.2	9.1	9.1	9.1	9.1	9.1
W_2	27.9	28.6	28.3	27.7	28.8	2.2	2.2	2.2	2.2	2.2	9.1	9.0	9.0	9.0	9.1
W_3	29.9	30.2	30.1	28.7	31.5	2.3	2.3	2.3	2.3	2.3	9.2	9.3	9.3	9.3	9.2
W_4	18.3	20.9	19.6	18.1	21.1	2.1	2.1	2.1	2.1	2.1	8.1	8.3	8.2	8.2	8.2
Mean	25.3	26.5		24.8	26.9	2.2	2.2		2.2	2.2	8.9	8.9		8.9	8.9
S_1	25.1	26.1				2.2	2.2				8.8	8.9			
S_2	25.5	26.8				2.2	2.2				8.9	9.0			

	SEd	CD (P=0.05)	SEd	CD (P=0.05)	SEd	CD (P=0.05)
F	0.7	NS	0.02	NS	0.08	NS
S	0.7	NS	0.02	NS	0.08	NS
W	1.2	2.5	0.02	0.04	0.06	0.13
F at S	0.9	NS	0.03	NS	0.11	NS
F at W	1.6	NS	0.03	NS	0.10	NS
W at F	1.7	NS	0.02	NS	0.08	NS
S at W	1.6	NS	0.03	NS	0.10	NS
W at S	1.7	NS	0.02	NS	0.08	NS

Table 2. Effect of treatments on grain yield of soybean (kg ha^{-1})

Treatment	F_1	F_2	Mean	S_1	S_2
W_1	585.5	557.2	571.3	588.5	554.2
W_2	730.5	612.7	671.6	721.7	621.5
W_3	798.5	781.8	790.2	761.8	818.5
W_4	222.8	231.0	226.9	228.0	225.8
Mean	584.3	545.7		575.0	555.0
S_1	584.2	565.8			
S_2	584.5	525.5			

	SEd	CD (P=0.05)
F	51.0	NS
S	51.0	NS
W	43.3	89.4
F at S	72.2	NS
F at W	73.6	NS
W at F	61.2	NS
S at W	73.6	NS
W at S	61.2	NS

by Hagood *et al.*, (1981). The interaction was not significant.

The grain yield was not significantly influenced due to various fertilizer levels and spacing levels possibly due to native soil fertility. Hand weeding twice (W_3) recorded significantly increased grain yield accounting for 790.2 kg ha^{-1} followed by thiobencarb at 1.0 kg ha^{-1} plus one hand weeding (W_2) (671.6 kg ha^{-1}). This might be due to effective control of board leaved weed resulting in lesser weed competition for moisture, nutrients, light so that the crop grow better and increased yield and yield components. Lowest yield in unweeded check (W_4) (226.9 kg ha^{-1}) was due to heavy infestation of weeds and suppressed the crop growth resulting in reduced yield (Table 2). Similar findings were recorded by Howe and Oliver (1987). The interaction effect was not significant.

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RESEARCH NOTES

PHENOTYPIC STABILITY FOR DRY MATTER PRODUCTION IN SESAME

Twenty three parents and their 60 hybrids of sesame (*Sesamum indicum*) were evaluated for stability of total dry matter production (TDMP) under six environments at the Agricultural College and Research Institute, Coimbatore, Tamil Nadu during 1991- 92. The six environments were created by conducting the experiments in a single location in three different seasons *viz.*, *kharif*, *rabi* and summer and two soil types *viz.*, red and black soil in each season. The crop was raised in randomised block design with three replications in each of the above environments. A single row of 4.5 m length was allotted to each genotype under each replication with a spacing of 45 cm between successive rows and 15 cm between plants within ive random and com etitive plants per genotype were recorded for total dry matter production. The data were subjected to statistical analysis as proposed by Eberhart and Russell (1966).

The pooled analysis of variance showed that the mean squares due to genotypes and environments were significant for TDMP indicating the presence of variation among genotypes as well as environments. The mean squares due to G X E interaction were significant when tested against pooled error. The G X E error effects were further partitioned into linear and non linear components. Mean square for pooled deviation was significant, indicating the presence of genetic variability among the materials tested 971).