

Effect of clomazone - pendimethalin readymix on the weed growth and yield of soybean [*Glycine max* (L.) Merrill]

A.C. Surya Prabha*, R. Jayakumar., M.Senthivelu and M. Sugirdha
Agricultural College and Research Institute, Killikulam, VALLANAD (T.N.) INDIA

ABSTRACT

An experiment was conducted during Jan – April, 2002 on clay loam soil of Tamil Nadu Agricultural University, Coimbatore to study the influence of clomazone – pendimethalin readymix on the weed growth and yield of soybean. The treatments constituted clomazone - pendimethalin readymix at different doses compared with recommended doses of clomazone and pendimethalin as well as the farmers practice of hand weeding twice and unweeded control. The dominant weed flora in the field were *Cynodon dactylon*, *Cyperus rotundus*, *Digera arvensis*, *Trianthema portulacastrum* and *Datura metal*. The clomazone - pendimethalin readymix at 6.0 lit ha⁻¹ recorded the lowest number of individual weed species and total weed population resulting in lesser weed DMP. The clomazone - pendimethalin readymix at 2.0 lit ha⁻¹ registered the highest grain yield.

Key words : Soybean, Clomazone – pendimethalin, Yield.

INTRODUCTION

Soybean [*Glycine max* (L.) Merrill] has been proclaimed as the miracle crop as it plays a greater role in boosting protein and oil production in India. It occupies third place among the major oil seed crops and Madhya Pradesh leads in area (2.5 m ha) and production (2.96m tonnes) among the major states (Singh and Bhan, 2002). Weed infestation in soybean is one of the main constraints which limits the crop yield. Application of pre – emergence herbicides was found to be effective in controlling weeds in soybean (Rapparini *et al.*, 2000). Clomazone, a new pre-emergence herbicide used for the control of grasses and annual broad leaved weeds. Pendimethalin, is a selective pre-emergence dinitroaniline herbicide used for the control of grasses and annual broad leaved weeds. The readymix combination of clomazone with pendimethalin has assumed to give broad spectrum of weed control in soybean. The present investigation was, therefore, undertaken with the objective to study the weed growth and crop yield as affected by clomazone - pendimethalin readymix.

MATERIALS AND METHODS

A field experiment was conducted during Jan – April, 2002 at Tamil Nadu Agricultural University, Coimbatore to study the influence of clomazone - pendimethalin readymix on weed growth and yield of soybean. The soil was clay loam analyzing low in available nitrogen (252 kg ha⁻¹), medium in available phosphorus (20 kg ha⁻¹) and high in available potassium (410 kg ha⁻¹). The experiment was laid out in Randomized Block Design with the treatments replicated thrice. The treatments consisted of pre – emergence application of clomazone - pendimethalin readymix @ 1.0 lit ha⁻¹ (T₁), clomazone - pendimethalin readymix @ 1.25 lit ha⁻¹ (T₂), clomazone - pendimethalin readymix @ 1.5 lit ha⁻¹ (T₃), clomazone - pendimethalin readymix @ 2.0 lit ha⁻¹ (T₄), clomazone - pendimethalin readymix @ 2.5 lit ha⁻¹ (T₅), clomazone - pendimethalin readymix @ 3.0 lit ha⁻¹ (T₆), clomazone - pendimethalin readymix @ 4.0 lit ha⁻¹ (T₇), clomazone - pendimethalin readymix @ 5.0 lit ha⁻¹ (T₈), clomazone - pendimethalin readymix @ 6.0 lit ha⁻¹ (T₉), Clomazone 50 EC – 500 g ha⁻¹ (T₁₀), pendimethalin 30 EC - 1000 g ha⁻¹ (T₁₁), Hand weeding twice (20 and 40 DAS) (T₁₂) and unweeded control (T₁₃).

Soybean variety CO-2 was sown at the seed rate of 60-70 kg ha⁻¹. Sowing was done on 8.01.2002 and harvesting was done on 8.04.2002. Weed biomass as well as species wise weed count, crop yield were recorded during the experimentation.

RESULTS AND DISCUSSION

The weed flora observed in the experimental field during the

course of study consisted of grasses, sedges and broad leaved weeds. The major weeds were *Cynodon dactylon*, *Dactyloctenium aegyptium* in grasses, *Cyperus rotundus* in sedges, *Digera arvensis*, *Trianthema portulacastrum* and *Datura metal* in broad leaved weeds.

The total weed population was significantly reduced by the various weed management practices. The general appraisal revealed that the increased levels of clomazone - pendimethalin readymix treatments decreased the total weed population. At 20, 40 and 60 DAS, clomazone - pendimethalin readymix at 6.0 lit ha⁻¹, recorded the least total weed population which was followed by clomazone - pendimethalin readymix at 5.0 lit ha⁻¹ (Table 1). The reduced total weed population registered in the experimental field may be due to the active reduction of germination and growth of weeds by the pre – emergence soil applied herbicides. This was in accordance with the findings of Jordan *et al.* (1993).

The dry matter production of weeds was recorded at 20, 40 and 60 DAS. The mean dry matter production of weeds ranged from 58.6 to 287.1, 33.8 to 498 and 172 to 721 kg ha⁻¹ at 20, 40 and 60 DAS. Clomazone - pendimethalin readymix at 6.0 lit ha⁻¹ recorded the lowest weed dry matter production of 58.6, 33.8 and 172 kg ha⁻¹ at 20, 40 and 60 DAS. The unweeded control recorded the highest weed dry matter production at 20, 40 and 60 DAS (Table 2). The weed dry matter was inversely proportional to the crop dry matter and directly proportional to the nutrient removal by weeds. The decrease in DMP at higher doses of clomazone - pendimethalin readymix may be attributed to the effective control of weeds throughout the crop growth period eventually the lower doses at 2.0 lit ha⁻¹ of readymix gave satisfactory reduction in weed DMP. These results are in agreement with those of Rani and Kodandaramaiah (1998).

The clomazone - pendimethalin readymix at 2.0 lit ha⁻¹ registered the highest seed yield of 1632 kg ha⁻¹. It registered 67 per cent increase over the control. It was followed by hand weeding twice which recorded a seed yield of 1623 kg ha⁻¹. The lowest seed yield of 541 kg ha⁻¹ was recorded in unweeded control (Table 3). The highest number of 58 pods plant⁻¹ was recorded in clomazone - pendimethalin readymix at 2.0 lit ha⁻¹ which was 68 per cent increase over unweeded control. The higher seed yield recorded in clomazone - pendimethalin readymix at 2.0 lit ha⁻¹ might be due to the lack of phytotoxicity registered in this treatment and optimal weed control thereby boosting crop growth, yield parameters and consequently the seed yield. The results are in agreement with the reports of Nandurkar *et al.* (1997).

*Author for correspondence

Table 1 : Total weed population (No. m⁻²) as influenced by clomazone - pendimethalin readymix.

Trt. No.	Treatments	Dose ha ⁻¹	20 DAS	40 DAS	60 DAS
T ₁	Clomazone + Pendimethalin	1.0 lit	2.26 (182.0)	2.0(100.0)	2.14(154.0)
T ₂	Clomazone + Pendimethalin	1.25 lit	2.23(169.0)	1.97(94.0)	2.13(135.0)
T ₃	Clomazone + Pendimethalin	1.5 lit	2.15 (144.0)	1.91(83.0)	2.10(126.0)
T ₄	Clomazone + Pendimethalin	2.0 lit	2.09 (125.0)	1.86(73.0)	2.08(121.0)
T ₅	Clomazone + Pendimethalin	2.5 lit	1.99 (99.2)	1.79(63.0)	2.01(104.0)
T ₆	Clomazone + Pendimethalin	3.0 lit	1.94 (88.0)	1.77(60.0)	1.99(99.0)
T ₇	Clomazone + Pendimethalin	4.0 lit	1.78(58.0)	1.70(57.0)	1.96(91.0)
T ₈	Clomazone + Pendimethalin	5.0 lit	1.77(59.0)	1.66(46.0)	1.94(87.0)
T ₉	Clomazone + Pendimethalin	6.0 lit	1.54(35.0)	1.46(29.0)	1.85(70.0)
T ₁₀	Clomazone	500 g	1.98(96.0)	1.97(95.0)	2.0(128.0)
T ₁₁	Pendimethalin	1000 g	1.93(86.0)	1.83(68.1)	2.09(125.0)
T ₁₂	Hand weeding twice	-	2.36(212.0)	1.75(57.0)	1.97(94.0)
T ₁₃	Unweeded control	-	2.47 (295.0)	2.20(108.0)	2.29(198.0)
SE(d)			0.08	0.07	0.08
CD (P=0.05)			0.18	0.13	0.17

Data subjected to log (x+2) transformation – Figures in parentheses are original values

Table 2 : Weed DMP (kg ha⁻¹) as influenced by clomazone - pendimethalin readymix

Trt. No.	Treatments	Dose ha ⁻¹	20 DAS	40 DAS	60 DAS
T ₁	Clomazone + Pendimethalin	1.0 lit	113.0	285.0	512
T ₂	Clomazone + Pendimethalin	1.25 lit	109.4	254.0	438
T ₃	Clomazone + Pendimethalin	1.5 lit	106.4	184.0	356
T ₄	Clomazone + Pendimethalin	2.0 lit	104.6	149.0	324
T ₅	Clomazone + Pendimethalin	2.5 lit	82.9	103.9	256
T ₆	Clomazone + Pendimethalin	3.0 lit	74.2	98.3	241
T ₇	Clomazone + Pendimethalin	4.0 lit	71.8	67.4	188
T ₈	Clomazone + Pendimethalin	5.0 lit	68.2	37.4	186
T ₉	Clomazone + Pendimethalin	6.0 lit	58.6	33.8	172
T ₁₀	Clomazone	500 g	104.6	212.0	426
T ₁₁	Pendimethalin	1000 g	83.2	126.0	313
T ₁₂	Hand weeding twice	-	193.0	42.0	198
T ₁₃	Unweeded control	-	287.1	498.0	721
SE(d)			1.90	2.4	3.12
CD (P=0.05)			3.8	4.6	6.2

Table 3 : Effect of treatments on seed yield of soybean

Trt. No.	Treatments	Dose ha ⁻¹	Pods plant ⁻¹	Seed yield (kg ha ⁻¹)	% increase over control
T ₁	Clomazone + Pendimethalin	1.0 lit	34	1140	52.5
T ₂	Clomazone + Pendimethalin	1.25 lit	40	1305	58.5
T ₃	Clomazone + Pendimethalin	1.5 lit	55	1560	65.3
T ₄	Clomazone + Pendimethalin	2.0 lit	58	1632	66.8
T ₅	Clomazone + Pendimethalin	2.5 lit	49	1420	60.2
T ₆	Clomazone + Pendimethalin	3.0 lit	41	1355	60.1
T ₇	Clomazone + Pendimethalin	4.0 lit	49	1343	59.7
T ₈	Clomazone + Pendimethalin	5.0 lit	38	1287	57.9
T ₉	Clomazone + Pendimethalin	6.0 lit	31	1249	56.7
T ₁₀	Clomazone	500 g	48	1594	66.1
T ₁₁	Pendimethalin	1000 g	43	1369	60.4
T ₁₂	Hand weeding twice	-	46	1623	66.6
T ₁₃	Unweeded control	-	18	541	0.0
SE(d)			0.44	12.4	-
CD (P=0.05)			0.90	31.2	-

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