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Studies on Herbicides for Greengram Under Rainfed Conditions

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ABSTRACT

Five pre-emergence herbicides *viz.* terbutryn, prometryne, alachlor, nitrofen and dichlormate were tried in different doses and compared with hand weeding. Prometryne and terbutryn controlled the weeds effectively in greengram but reduced the stand of the crop. Alachlor at 1.5 l a. i./ha controlled the weeds and increased the yields over hand weeding.

INTRODUCTION

In dryland farming moisture conservation is the most important problem. Of the many ways to conserve moisture, proper weed control is quite important. When the weeds are checked at germination stage itself the available moisture can be best utilised for the germination and growth of crop. Mani *et al.* (1973) reported that both linuron and prometryne increased the yield of rabi pulses. Yogeswara Rao *et al.* (1973) observed higher yield of green gram by the application of alachlor at 2.0 kg a.i./ha under rainfed conditions. Singh *et al.* (1971) obtained maximum yield with alachlor at 2.0 kg a.i./ha. Since no work was carried out in Tamil Nadu for weed control in rainfed green gram the present study was taken up.

MATERIALS AND METHODS

A field experiment was laid out in a randomised block design with three replications during the North-east monsoon season, 1973-74 under rainfed conditions. Green gram variety Co. 2 was sown in a red loam soil which has the fertility status of low, medium and high avilable NPK. The net plot size was 3.33 x 3.00 m. Five pre-emergence herbicides *viz.* terbutryn at 0.75, 1.00, and 1.50 kg a.i./ha, alachlor at 1.00, 1,50 and 2.00 l a.i./ha, nitrofen at 1.50, 2.00 and 2.50 l a.i./ha prometryne 0.75 kg a.i. /ha, and dichlormate at 2.00 l a.i. /ha were compared with hand hoeing and weeding twice and unweeded control. The pre-emergence application of the herbicides was done after sowing the crop.

RESULTS AND DISCUSSION

The most common weed flora of the soil comprised of *Trianthema portulucastrum* L., *Gynandropsis pentaphylla* L., *Amaranthus viridis* L., *Euphorbia hirta* L., and *Digera arvensis* L., The grass weeds such as

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TABLE. Effect of herbicides on weeds and crops attributes of rainfed green gram

Treatment (a.i./ha)	Weeds			Crop						
	Weed count per Sq. m	Weed dry matter kg/ha	Plant hight cm	Plant dry matter kg/ha	No. of total nodules	No. of effective nodules	No. of pods/plant	No. of seeds pod	Seed yield kg/ha
Terbutryn 0.75 kg	45 (1.63)	750	23.5	1125	2	1	6.3	5.1	520
,, 1.00 kg	30 (1.43)	600	22.1	950	2	1	5.2	5.7	420
,, 1.50 kg	25 (1.39)	420	19.7	850	1	1	4.0	4.9	320
Alachlor 1.50 lit	90 (1.95)	1000	25.7	1353	4	3	6.7	6.4	550
,, 1.75 lit	50 (1.66)	960	24.9	1375	2	2	7.0	6.3	575
,, 2.00 lit	42 (1.62)	810	25.1	1295	3	3	7.2	6.0	570
Nitrofen 1.50 lit	165 (2.21)	1800	24.9	1075	2	2	4.9	4.9	490
,, 2.00 lit	145 (2.16)	1400	25.1	1120	2	2	4.7	5.1	485
,, 2.50 lit	125 (2.10)	1260	24.3	1083	1	1	4.9	5.2	475
Prometryne 0.75 kg	45 (1.65)	603	22.4	980	2	1	3.7	4.1	435
Dichlormate 2.00 lit	250 (2.39)	1800	26.1	1180	1	1	4.9	5.7	445
Handweeding twice	90 (1.95)	1200	25.2	1280	2	1	6.9	6.1	535
Unweeded control	420 (2.62)	2500	22.2	575	—	—	1.5	2.1	120
C. D. (P=0.05)	0.105	167	1.39	66			0.002	0.044	32.5

Cynodon dactylon L., and *Chloris barbata* were also noticed.

The weed control efficiency was more in terbutryn and prometryne followed by alachlor, nitrofen and dichlormate in the order of efficacy (Table). Among different herbicides, the lowest number of weeds per unit area (25 /sq. m.) was noted in terbutryn and the highest (250/sq.m) in dichlormate treatment while unweeded control had 420/sq.m. Similar trend was noticed in the dry matter of weeds also. Unweeded control recorded the highest dry matter of weeds (2500 kg/ha). Among the herbicides terbutryn and prometryne had the lowest drymatter (420-700 kg/ha) while dichlormate and nitrofen had more drymatter (1260 to 1800 kg/ha). The late growth of weeds were more in dichlormate and nitrofen treatments.

The height of the plant was affected by terbutryn at 1.00 and 1.50 kg a.i./ha, prometryne 0.75 kg/ha and it was on par with unweeded control. The action of terbutryn and prometryne was more after the receipt of rainfall during the early period of crop. Considerable mortality of plants were also noticed in these plots. These had reflected in the drymatter production of the crop. Unweeded control had the lowest drymatter of crops (575 kg/ha) and highest dry matter of weeds of (2500 kg/ha). In the case of terbutryn and prometryne due to the mortality of plants in the early stages and stunted growth, the dry matter was less (850-950 kg/ha). The drymatter of crop was more in alachlor treated plots (1375 kg/ha) which controlled the weeds and provided a weed free environment till the crop covered the soil.

The total and effective root nodules in the herbicide treated and hand weeded plots did not show difference proving that the pre-emergence application of these herbicides did not affect the nodule forming bacteria.

Number of pods per plant was lowest in the unweeded control (1.5/ plant) and highest in alachlor treatments (7.2/ plant), Significant reduction in pod numbers were noticed in terbutryn, prometryne, dichlormate and nitrofen treatments. Similar trend was seen in the number of seeds per pod. The lowest number of 2.1 seeds/ pod in unweeded control and the highest number of 6.4 seeds /pod in the alachlor treated plots were recorded. This has reflected in the seed yield also. In the unweeded control due to the smothering of weeds and increased weed drymatter the crop dry matter was reduced and caused reduction in pod number, number of seeds per pod and recorded the lowest yield of 120 kg/ha. In the terbutryn and prometryne treatments though the weed control was effective, due to initial set back and withering of crop, the drymatter, number of pods per plant and seeds per pod were less and hence recorded lower yields. The yield in hand weeding was 535 kg/ha whereas alachlor (at 1.751 a.i./ha recorded 575 kg/ha. However, it was on par with alachlor 1.5 kg a i./ha (550 kg/ha). The handweeding plot and alachlor at 1.5 l a.i./ha were on par in the seed yield.

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