

Efficiency of fluchloralin under different seeding and moisture regimes on yield and weed flora of groundnut (*Arachis hypogaea*)

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ABSTRACT

A field experiment was conducted during 1990 and 1991 to study the effect of fluchloralin with different seeding methods and moisture regimes on weed count and weed weight in summer groundnut or peanut (*Arachis hypogaea* L.). Efficiency of fluchloralin was more under ridges and furrows method of seeding combined with 4.00 cm water through line source sprinkler irrigation.

The slow growth and poor coverage of foliage in groundnut or peanut favour more weed population than any other oilseed crops. Hand-weeding is time-consuming and uneconomical. Sometimes, it becomes totally impossible owing to scarcity of labour. Chemical weed control is potential means for controlling weeds. However, information on herbicide efficiency under different seeding and moisture regimes are lacking. Keeping above in view the present work was undertaken to evolve the best seeding method and its influence on fluchloralin under line-source sprinkler and surface-flow methods.

MATERIALS AND METHODS

The experiment was conducted at Agricultural College and Research Institute, Madurai, Tamil Nadu, during the summer season of 1990 and 1991. The soil was

sandy loam in texture, having pH 7.9 and low available N (kg/ha) medium available P and K.

The experiment was conducted in split-split design with 4 replications. Treatments were: 4 moisture regimes, viz. 4.78 cm (I_1), 4.00 cm (I_2) and 3.18 cm (I_3) under line-source sprinkler and 4.00 cm (I_4) by surface-flow methods were allotted to main plot; and seeding methods, viz. ridges and furrows (L_1) broad bed and furrows (L_2) and check basin (L_3) methods were in subplots. Pre-emergence application of fluchloralin followed by hand-weeding on 30 days after sowing (DAS) (W_1) was compared with hand-weeding once on 30- DAS (W_2) in sub-plots. The data on weed counts were taken at 30 DAS and weed weights were taken at harvest. Square root $\sqrt{(0.5 + X)}$ transformation was adopted for statistical analysis.

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RESULTS AND DISCUSSION

Weed flora

The dominant weeds recorded in the experimental field were: *Trianthema portulacastrum* L. (20%), *Echinochloa colonum* Link. (30%), *Boerhaavia diffusa* L. (18%), *Cyperus rotundus* L. (15%) and other broad-leaved weeds, viz. *Amaranthus viridis* L., *Tridax procumbens* L., *Euphorbia hirta* L. and *Portulaca oleracea* L. were also present in very low proportions.

Effect on weed

Pre-emergence application of fluchloralin followed by hand-weeding at 30 DAS proved significantly superior to hand-weeding once in reducing the weed population and their dry weight (Table 1). The efficiency of the applied herbicide was more almost

all the weed species mentioned above except *Cyperus rotundus*. This sedge weed appears to be very difficult to control both by fluchloralin and hand-hoeing. This may probably due to underground pro-pagation prevailing in *Cyperus rotundus*. Ramakrishna and Ong (1988) observed effective control of weeds and also reduced weed weight by the use of preemergence herbicide followed by hand-weeding at day 30 DAS in peanut. Similarly, Brar and Mehra (1989) recorded reduction weed count and weed weight with fluchloralin followed by hand-weeding.

Effect of seeding methods

Different seeding methods showed marked effect on weed population and their dry-matter accumulation. The maximum reduction in weed population and dry weight

Table 1. Effect of fluchloralin, seeding methods and moisture regimes on weed counts, weed dry matter and pod yield of groundnut

Treatment	Weed count (No/m ²)		Weed dry matter (kg/ha)		Pod yield (kg/ha)	
	1991	1992	1991	1992	1991	1992
W ₁ Pre-emergence fluchloralin followed by hand-weeding on 30 DAS	21.0	23.5	20.6	21.6	1,858	1,780
W ₂ Hand-weeding on 30 DAS	34.8	32.4	42.4	39.0	1,160	1,096
Mean	27.9	28.0	31.5	30.0	1,509	1,441
CD (P = 0.05)	1.8	2.1	0.56	0.86	91	73
L ₁ , Ridges and furrows method	27.2	27.1	30.6	27.6	1,720	1,606
L ₂ , Broad-bed and furrow method	27.3	28.0	31.4	31.0	1,495	1,439
L ₃ , Check basin method	29.6	29.0	32.5	32.4	1,313	1,279
Mean	27.9	28.0	31.5	30.3	1,509	1,441
CD (P = 0.05)	2.0	2.4	0.64	1.25	82	73
I ₁ , 4.78 cm. through line source	29.3	29.6	33.6	31.2	1,453	1,434
I ₂ , 4.0 cm through line source	24.7	24.9	25.6	24.0	1,898	1,895
I ₃ , 3.18 cm through line source	28.4	28.9	31.8	30.0	1,056	915
I ₄ , 4.00 by surface flow	29.0	28.2	35.1	36.0	1,631	1,518
Mean	27.9	27.9	31.5	30.0	1,509	1,441
CD (P = 0.05)	2.2	2.5	1.04	2.16	121	155

was recorded in ridges and furrows method of seeding compared with broad-bed and furrows and check basin methods. This may be attributed to relatively better crop growth and enhanced herbicidal activity under ridges and furrows methods of seeding.

Gradient moisture regimes

All the moisture regimes caused significant reduction in population build-up and dry-matter accumulation of weeds during 1990 and 1991. Among the different moisture regimes, application of 4.00 cm water through line-source sprinkler significantly reduced the weed density and dry weight of weeds. This might be due to the creation of conducive environment for the movement of herbicides under 4.00 cm water through line-source sprinkler, resulting in higher degree of weed-control efficiency as compared with other regimes. Russel *et al.* (1990) observed increased herbicidal activity with optimum moisture regime of 2.5 cm, Whereas Younce and Skroch (1989) observed decreasing herbicidal activity with increasing moisture stress.

Effect on groundnut yield

Weed weight and weed density had sig-

nificant influence on yield and yield attributes of groundnut. Pod yield was the function of positively associated yield attributes like number of pods, double-seeded pods, 100-pod and 100-kernel (36 g) weight. All these parameters were increased under low weed density and weed weight resulting higher yield. Similar trend of increasing yield attributes and yield with decreasing weed density and weed weight was reported by Rethinam *et al.* (1976).

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