EVALUATION OF DIFFERENT WEED MANAGEMENT PRACTICES ON WEED DYNAMICS IN IRRIGATED COTTON

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ABSTRACT

A field experiment was conducted to study the evaluation of different weed management practices on weed dynamics in irrigated cotton. The experiment was laid in split plot design with five main off-season land management practices and six sub plot-cropping season weed management practices and replicated thrice. Results of the experiment revealed that the off-season soil solarization with transparent white polyethylene sheets followed by pre- sowing soil incorporation of fluchloralin 0.75 kg / ha + blackgram intercropping performed the best in recording the least total weed counts, weed biomass and weed control efficiency.

Key words: Cotton, Off-season, cropping season, weed management and weed dynamics

INTRODUCTION

Cotton is an important commercial crop in India and contributes more than 80 per cent of raw materials to textile industry. India is the largest cotton growing country in the world but it ranks third in production next to China and US with a share of 12 per cent global production (Khadi, 2006). With economic liberalization and globalization sweeping the world there is a scope for our country to play a leading role in cotton production and export of textile, yarn and raw cotton and the requirement of cotton have been projected. The productivity of cotton is 410 kg / ha, which is lower than world average of 595 kg /ha. Implying the necessity for inclusion of better technology for narrowing down the productivity gap. Cotton, being a wide spaced and relatively slow growing crop in early stages, is subjected to a severe weed menace. Weed infestation in commercial crops, particularly in cotton has been reported to offer severe competition and causing yield reduction. The period of weed interference, crop damage and the critical time of crop-weed competition were 30 to 90 days which occupied 50 per cent of the whole cotton growing period (Wn Jian Rong *et al*., 2001). Presence of weeds during competition period reduced the yield of cotton to the extent of 74 per cent (Brar and Brar, 1992). Favourable temperature, light, and moisture available to crop also permit rapid multiplication of weeds at the early stages and posses competition to cotton crop. Integrated weed management is gaining momentum due to its effectiveness in controlling continuous use of the same method leads to build up of tolerant weeds. It is, therefore necessary to combine or integrate two or more methods of weed control. With this background, the present study was undertaken.

MATERIALS AND METHODS

The experiment was conducted at Annamalai University Experimental Farm, Annamalainagar, which is located at 11°24´ North latitude and 79°41´ East longitude, at an altitude of 5.79 metres above mean sea level. The soil of the experimental farm was clayey in texture with 0.71 per cent organic carbon, neutral in soil reaction (7.5 pH), low in available N, medium in available P and high in available K. Field experiment was laid in split plot design with five off-season land management practices (Main plot treatments) namely, fallow, pressmud (6t/ha- was applied after ploughing then incorporated to soil by hand hoe), glyphosate spray (1.5kg/ ha with ammonium sulphate at 2.5 kg /ha as an additive using 600 litres per hectare of water and repeated once again after a fortnight), twice summer ploughing with an interval of 15 days after the receipt of

summer showers and soil solarization by spreading with white transparent polyethylene sheet of thickness 0.05mm over the strip of land for 40 days and securing them airtight by folding and inserting the edges underneath the bunds, after initial wetting of the soil at 70 per cent available soil moisture . After 40 days polyethylene sheet was removed from soil and cotton variety LRA5166 (165 days) was sown on June 6th. The sub- plot treatments consists of cropping season weed control measures namely, unweeded control, twice hand weeding at 25 and 45 days after sowing (DAS), pre-sowing soil incorporation of fluchloralin (1.5 kg / ha), half dose of fluchloralin (0.75 kg / ha)+ mulching with sugarcane trash (12 t / ha) at 25 DAS, half dose of fluchloralin (0.75 kg / ha)+ intercropping with blackgram (ADT-3) was sown in between two rows of cotton crop (2:1) and fluchloralin 0.75 kg / ha+ one hand weeding on 45 DAS . Observations were recorded on total weed count, weed biomass and weed control efficiency at 60 DAS.

RESULTS AND DISCUSSION

Effect on weed dynamics:

Soil solarization by spreading with white transparent polyethylene sheet of thickness 0.05mm over the strip of land for 40 days was recorded significantly reduced weed count, weed biomass and increased weed control efficiency at 60 DAS. This was followed by pressmud application at 6 t / ha. This is may be due to application of pressmud at a higher dosage performed superior by suppressing weed seed germination and weed growth. It showed that next in order in recording the least total weed count, total weed biomass and highest weed control efficiency. Soil solarization was most effective in reducing the infestation of all the dominant weed species namely *Cyperus rotundus, Cleome viscosa, Cynodon dactylon* and *Trianthema portulacastrum.* This could be attributed to the direct killing of seeds stimulated to germinate in the moistened mulched soil and killing of germinating seeds whose dormancy is broken in the heated soil as suggested by Katan and Devay (1991). Soil solarization reduced the viability of weed seeds in the top 5 cm soil layer due to increased soil temperature up to 50.1^{o}C by soil solarization. Off-season soil solarization was recorded lowest total weed count (3.77 / m^2), total weed biomass (29.4 g / m^2) and the highest weed control efficiency (72.0 per cent). In respect of cropping season weed control measures fluchloralin at 0.75 kg/ ha + intercropping with blackgram performed superior by registering the lowest total weed count (5.77 /m^2), total weed biomass (52.6 g / m^2) and the highest weed control efficiency (49.3 per cent) at 60 DAS. The interaction effects were found to be significantly influencing the total weed count, total weed biomass and weed control efficiency. Soil solarization followed by fluchloralin 0.75 kg/ha+ intercropping with blackgram recorded lowest total weed count (3.50 /m^2), total weed biomass (23.87 g / m^2) and highest weed control efficiency (77.4 per cent). This could be attributed to efficient and prolonged weed control by the herbicide, efficiently supplemented by intercrop. Intercropping of short duration legume as live mulch in between wide spaced cotton reduces weed intensity with increased yield of cotton. The interaction effect of solarization with weed control measures was reported to result significant interaction and synergistic weed control by Nanjappa *et al.*, (2001).

Table1. Evaluation of different weed management practices on weed dynamics in irrigated cotton.

Treatment	**Total weed count (No. / m^2) at 60 DAS**	**Total weed biomass (g / m^2) at 60 DAS**	**Weed control efficiency (per cent)**
M_1- Fallow	(66.24) 8.16	89.8	-
M_2-Pressmud Application	(19.99) 4.53	32.4	69.0
M_3- Glyphosate spray	(34.31) 5.89	66.3	35.9
M_4- Summer ploughing twice	(58.32) 7.67	85.3	17.3
M_5- Soil solarization	(13.69)	29.4	72.0

	3.77		
CD (P=0.05)	0.61	1.89	-
S_1- Unweeded control	(46.49) 6.85	71.6	-
S_2- Hand weeding twice at 25 and 45 DAS	(33.02) 5.78	53.8	48.2
S_3- Fluchloralin at 1.5kg / ha	(41.68) 6.49	65.9	36.2
S_4- Fluchloralin at 0.75 kg / ha + Intercropping (Blackgram)	(32.85) 5.77	52.6	49.3
S_5- Fluchloralin at 0.75 kg / ha + mulching (25 DAS)	(37.41) 6.16	57.4	44.6
S_6- Fluchloralin at 0.75 kg / ha + one hand weeding (45DAS)	(38.3) 6.22	62.5	39.5
CD (P=0.05)	0.27	2.1	-

(Figures in the parentheses indicate original values)

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