Madras Agric. J. 90 (1-3) : 164-166 January-March 2003

Research Notes

Weed management by non chemical and chemical methods in greengram

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There are more than 400 major weed species occurred in cultivation of arable crops and most of them have allelopathic properties which reduce the crop growth and yield. The long term use of chemical herbicides caused human health hazard and environmental pollution problems more particularly in under developed and developing countries. The integrated weed management practices specifically through habitat manipulation and exploitation of smothering and suppressing effect of crop/crop varieties through biochemical interaction (allelopathy) can prvide us an alternative means of weed control. Studies on the above aspects in greengram are very meagre in relation to weed control and hence, the present study was undertaken to evaluate the allelopathic plant materials/products, plant extract, and smother crop for weed management in greengram.

A field experiment was conducted during *kharif* 1998 at Tamil Nadu Agricultural University, Coimbatore to study the allelopathic effect of plant materials on weed control in greengram. The following treatments were evaluated in a randomized block design replicated thrice.

T_1 : Mulching of mango seednut pulp @ 2 t ha^{-1}
T_2 : Mulching of *Eucalyptus* leaf litter @ 2 t ha^{-1}
T_3 : Soil incorporation of wattle tannin @ 500 t ha^{-1}
T_4 : Mulching of sweet potato vine (fresh) residues @ 2 t ha^{-1}
T_5 : Mulching of maize stover residues @ 2 t ha^{-1}
T_6 : Mulching of sunflower stalk residues @ 2 t ha^{-1}
T_7 : Mulching of redgram leaf litter residues @ 2 t ha^{-1}
T_8 : Mulching of sorghum stalk residues @ 2 t ha^{-1}
T_9 : Mulching of *Abutilon* sp. residues @ 2 t ha^{-1}
T_{10} : Mulching of neem cake @ 2 t ha^{-1}
T_{11} : Intercropping of proso millet (*Panicum miliaceum* L.)
T_{12} : Pre-emergence application of fluchloralin at 1.5 kg a.i. ha^{-1} + One hand weeding and hoeing on 40 DAS
T_{13} : Unweeded control

Greengram KM 2 was used as test crop. The crop was sown with a spacing of 30 : 10 cm. The crop residues were cut into piece of 10 cm length and spread over the interspace uniformly after sowing of crop. The mango seednut pulp and wattle tannin extract powder were applied uniformly and incorporated into the soil before sowing. The proso millet cv. CO 3 was sown in between greengram in 1:1 row ratio. The proso millet crop was cut and used as surface mulch at 30 days after sowing. The crop received other cultural management as per the recommended agronomic practices.

The major weed flora observed in the experimental field were *Cynodon dactylon* Pers. *Dactyloctenium aegyptium* Beaur, *Eleusine indica* Linn. *Panicum repens* Linn., *Cyperus rotundus* Linn. *Trianthema portulacastrum* L., *Amaranthus viridis* Linn., *Flaveria australasica*, *Parthenium hysterophorus*, *Boerhaavia diffusa* Linn., *Digera arvensis* Forks and *Acalypha indica* Linn.

Data on density and dry matter production (DMP) of weeds of 20 DAS and 40 DAS revealed that all the treatments significantly reduced the weed density and DMP compared to unweeded control (Table 1). Integrated method of herbicide application with manual weeding recorded significantly lower density and DMP of weeds at 20 DAS. This was followed by mulching of *Eucalyptus* leaf litter @ 2 t ha^{-1} and

ible 1. Effect of allelopathic weed control treatments on density and dry matter production of weeds and the yield of greengram

eat-ents	Weed density (No/m²)		Weed DMP (Kg ha⁻¹)		WCE* (%)		Weed index (%)	Grain yield (kg ha⁻¹)
	20 DAS	40 DAS	20 DAS	40 DAS	20 DAS	40 DAS		
	104.46	192.80	580.00	1015.00	45.19	36.50	35.9	558
	(2.027)	(2.289)	(2.764)	(3.007)				
	72.40	146.30	393.00	865.00	62.01	51.81	18.8	708
	(1.871)	(2.171)	(2.596)	(2.938)				
	133.60	257.40	797.00	1365.00	29.90	15.25	55.6	387
	(2.1320	(2.413)	(2.902)	(3.135)				
	89.30	163.60	408.00	890.00	53.14	46.11	25.5	649
	(1.787)	(2.219)	(2.612)	(2.950)				
	157.70	283.50	925.00	1890.00	17.26	6.62	70.0	261
	(2.203)	(2.455)	(2.967)	(3.276)				
	99.10	177.10	532.00	950.00	48.00	41.67	30.3	607
	(2.004)	(2.253)	(2.727)	(2.978)				
	149.40	279.90	863.00	1675.00	21.67	7.81	65.8	297
	(2.180)	(2.450)	(2.937)	(3.224)				
	142.30	268.80	840.00	1480.00	25.34	11.47	58.8	359
	(2159)	(2.432)	(2.925)	(3.170)				
	112.80	215.70	636.00	1085.00	40.81	28.95	38.6	535
	(2.095)	(2.337)	(2.804)	(3.036)				
	122.50	235.10	704.00	1120.00	35.72	22.57	47.4	458
	(2.095)	(2.374)	(2.848)	(3.049)				
	127.70	249.30	755.00	1280.00	33.00	17.93	54.1	399
	(2.112)	(2.400)	(2.879)	(3.107)				
	33.80	78.70	63.00	395.00	82.26	74.04	0.0	872
	(1.553)	(1.906)	(1.812)	(2.598)				
	190.60	303.63	1015.00	2235.00	0.00	0.00	83.5	235
	(2.284)	(2.485)	(3.007)	(3.349)				
	6.913	8.843	24.549	77.537	-	-	-	69
	14.269	18.251	50.667	218.074	-	-	-	144

gures in parenthesis are log (x + 2) transformed values.
WCE - Weed control efficiency.

ulching of sweet potato fresh vine residue 2 t ha⁻¹. Though, the trend was similar 40 DAS, the lowest weed population and MP of weeds in the integrated method of uchloralin @ 1.5 kg a.i. ha⁻¹. with one hand eeding and hoeing was less. This was followed y *Eucalyptus* leaf litter at 2 t ha⁻¹ and mulching f sweet potato fresh vines residues at 2 t

The aqueous extracts as well as growing plants inhibit seed germination and seedling growth of *Abutilon theophrasti, Datura stramonium, Ipomoea* spp. *Brassica kaber* weeds reported by Dharmaraj *et al.* (1994). Soil incorporation of sunflower residues significantly reduced the number of dicot weeds by 66% (Anaya, 1989). The aqueous and organic extracts exert allelopathic suppression on seed germination

and seedling growth of *Amaranthus leucocarpus* Wats and barnyard grass owing to phytotoxic mixture of resin glucosides (Anaya *et al.* 1990).

Efficiency of weed control treatments ranged from 17.26 to 82.26 per cent of 20 DAS. The highest WCE (82.26 per cent) was recorded with the pre-emergence application of fluchloralin + one hand weeding followed by mulching of *Eucalyptus* leaf litter (62.01 per cent) and mulching of sweet potato fresh vine residue (53.14 per cent). The lowest weed control efficiency was registered under mulching of maize stover residues (71.26 per cent). Similar trend was also observed at 40 DAS also. Grain yield from pre-emergence fluchloralin applied plot was taken as a base for calculating weed index indicating yield loss caused by different weed control treatments. The highest weed index was recorded in unweeded control (83.5 per cent) followed by mulching of redgram leaf litter (65.5 per cent). The minimum weed index was recorded by mulching of *Eucalyptus* leaf litter (18.8 per cent) as compared to other treatments.

Grain yield of greengram was significantly altered by different weed control treatments. The highest grain yield (871.66 kg ha^{-1}) was obtained under pre-emergence application of fluchloralin + one hand weeding. This was followed by mulching of *Eucalyptus* leaf litter (707.67 kg ha^{-1}) mulching of sweet potato fresh vine residues (649.34 kg ha^{-1}), mulching of sunflower stalk residues (607.14 kg ha^{-1}) and mulching of mango seednut pulp (558.14 kg ha^{-1}). The lowest greengram yield (235.0 kg ha^{-1}) was recorded under unweeded control.

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(Received: September 2001; Revised : October 2002)

Madras Agric. J. 90 (1-3) : 166-169 January-March 2003

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Effect of agronomic practices for multi-blooming in greengram (*Vigna radiata* L.) (Cv. Pusa bold)

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A field experiment was conducted at wet land farm of Tamil Nadu Agricultural University, Coimbatore during Summer 2001 in order to study the effect of foliar application of urea, Di-Ammonium Phosphate (DAP) and Naphthalene Acetic Acid (NAA) on the growth and yield of greengram var. Pusa bold. The experiment was laid out in randomized block design with three replications. The various treatment combinations involving Nitrogen, DAP and NAA include 25:50:0 kg NPK ha^{-1} basal alone (T_1), 25:50:0 kg NPK ha^{-1} + 12.5 kg N ha^{-1} (soil) at 55 DAS + 12.5 kg N ha^{-1} (soil) at 65 DAS (T_2), 25:50:0 kg NPK ha^{-1}+ 12.5 kg