Short communication

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Integrated weed management in turmeric

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Turmeric is one of the important spice crop grown in India in an area of 1.49 lakh hectares with a production of 5.27 tones. India is leading in turmeric cultivation contributing 70% production but productivity is much lower. Weed competition is one of the limiting factors for low yield of crop. Due to improper weed management, 30-70% yield losses have been reported (Krishnamurty and Ayyaswamy 2000). Turmeric is a long durational crop (more than 280 days), therefore pre-emergence application of herbicides alone does not control weeds throughout critical crop weed competition period of the crop and needs an integration of post-emergence application of herbicide or inter-culture operation in combination with pre-emergence herbicide application. Hence a field experiment was carried out to suggest a suitable integrated weed management in turmeric.

The experiment was carried out during 2012-13 in randomized block design with three replications on medium black soil with slightly alkaline in reaction (pH 8.1), low in nitrogen (212 kg/ha), medium in phosphorus (15.6 kg/ha) and high in potassium (578 kg/ha) content at Weed Science Research Station, V Naik Marathwada Krishi Vidyapeeth,Parbhani, which falls within 19^0 16' N latitude and 76^0 47' E longitude. The turmeric variety '*Selum*' was planted on raised beds at 90 x 30 :120 cm spacing on 19 June 2012. The recommended dose of FYM at 10 t/ha and 200:150:150 kg/ha NPK was applied in equal three splits at planting, 60 and 120 days after planting. The treatments were metribuzin 0.7 kg/ha PE *fb* two hoeings, metribuzin 0.7 kg/ha PE *fb* fenoxaprop 67 g/ha + metsulfuron 4g/ha POE , metribuzin 0.7 kg/ha PE *fb* straw mulch 10 t/ha *fb* one HW, pendimethalin 0.7 kg/ha PE *fb* two hoeings, pendimethalin 0.7 kg/ha PE *fb* fenoxaprop 67 g/ha + metsulfuron 4g/ha POE , pendimethalin 0.7 kg/ha PE *fb* straw mulch 10 t/ha *fb* one HW, atrazine 0.75 kg/ha PE *fb* fenoxaprop 67 g/ha + metsulfuron 4g/ha POE , atrazine 0.75 kg/ha PE *fb* straw mulch 10 t/ha *fb* one HW, weed free and weedy check. The weed count was taken at 30 and 60 DAS, in addition to this weed dry matter was also recorded and used for calculating weed control efficiency in each treatment. The quadrant (1 x 1 m size) was used for taking the observations on weeds. The herbicides were applied as per treatments, using a spray volume of 500 litres/ha for pre-emergence and 300 litres/ha for post emergence with knapsack sprayer with flat fan nozzle. The economics was worked out based on cost of cultivation ` 79,000/ha and average sale price of raw turmeric ` 20,000/t.

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The dominant weed flora of turmeric experimental plot was *Acalapha indica, Euphorbia geniculata, Parthenium hysterophorus, Digeria arvensis* (among broad-leaved weeds), *Cynodon dactylon, Brachiria eraciformis* (among grassy weeds) and *Cyprus rotundus* (sedge).

All the weed control treatments significantly reduced dry weight of weeds and weed control efficiency significantly over weedy check (Table 1). Among the various treatments, metribuzin 0.7 kg/ha PE *fb* straw mulch 10 t/ha *fb* one HW recorded lowest dry weight of weeds (4.1, 7.5 and 10.1, 18.6 for grassy and BLW, respectively) and highest WCE (68 and 75 %) at both the observations (30 and 60 DAS) as compared to all other treatments.

No crop injury was observed with the pre-emergence herbicide application under study, however post-emergence application of fenoxaprop + metsulfuron 67 + 4 g/ha caused injury (50%) to turmeric. Rhizome weight, finger weight and number per plant and fresh rhizome yield were significantly influenced by the weed control treatments (Table 1). Among the various treatments, metribuzin 0.7 kg/ha PE *fb* straw mulch 10 t/ha *fb* one HW recorded significantly highest fresh rhizome yield (12.16 t/ha) as compared to other treatments except the treatments included the straw mulch application. Unweeded check recorded the significantly lowest fresh rhizome yield (3.02 t/ha) with a yield loss of 80%. Similar results were also reported by Avilkumar *et al.* (2000) and Ratnum *et al.* (2012).

Table 1. Rhizome yield, dry weed weight and weed control efficiency in turmeric as influenced by weed control treatments

Treatment	Fresh rhizome yield (t/ha)	Dry weed weight (g/m^2)				Weed control efficiency (%)		Net returns ($x10^3$ `/ha)	B:C ratio
		Grassy		Broad- leaved					
		30	60	30	60	30	60		
Metribuzin 0.7 kg/ha PE *fb* two hoeings	10.16	4.7	8.9	14.6	14.1	60	65	120.64	1.46
Metribuzin 0.7 kg/ha PE fb fenoxaprop 67 g/ha + metsulfuron 4g/ha POE	8.11	4.1	7.5	10.1	18.6	62	70	89.65	0.99
Metribuzin 0.7 kg/ha PE *fb* straw mulch 10 t/ha *fb* one HW	12.16	2.0	6.1	13.2	18.2	68	75	144.63	1.47
Pendimethalin 0.7 kg/ha PE *fb* two hoeings	9.75	5.1	6.5	20.4	21.8	55	58	111.76	1.34
Pendimethalin 0.7 kg/ha PE *fb* fenoxaprop 67 g/ha + metsulfuron 4g/ha POE	8.06	3.1	3.8	18.2	26.4	64	71	78.85	0.95
Pendimethalin 0.7 kg/ha PE *fb* straw mulch 10 t/ha *fb* one HW	10.28	5.7	8.4	16.1	20.8	68	64	105.88	1.06
Attrazine 0.75 kg/ha PE *fb* fenoxaprop 67 g/ha + metsulfuron 4g/ha POE	7.66	3.1	5.3	10.1	14.3	56	62	71.56	0.87
Attrazine 0.75 kg/ha PE *fb* straw mulch 10 t/ha *fb* one HW	9.74	5.1	6.0	8.1	14.6	65	72	97.88	0.96
Weed free	109.5	3.2	5.0	15.2	11.2	70	78	118.4	1.18
Weedy Check.	30.20	6.1	7.0	18.2	25.1	-	-	19.10	0.24
LSD (P=0.05)	27.95	2.01	4.85	5.16	5.80	-	-	53.81	-

Among the weed management treatments highest net monitory returns (` 1,44,630/ha) and B:C ratio (1.47) were recorded with metribuzin 0.7 kg/ha PE *fb* straw mulch 10 t/ha *fb* one HW owing to lower weed growth and highest turmeric yield.

SUMMARY

A field experiment was carried out during 2012-13 in randomized block design with three replications at Weed Science Research Station, VNMKV, Parbhani with eight treatments. Results showed that metribuzin 0.7 kg/ha PE *fb* straw mulch 10 t/ha *fb* one HW recorded lowest dry weight of weeds, highest weed control efficiency, fresh rhizome yield (12.16 t/ha) net monitory returns (` 1,44,630/ha) and B:C ratio (1.47) as compared to other treatments .

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