

Effect of Glyphosate on Purple Nut Sedge (*Cyperus rotundus*) in Watermelon (*Citrullus vulgaris*) Seed Crop Yield

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Cyperus rotundus exhibits prolific vegetative activity with its complex underground system of basal bulb, rhizomes and tubers. Control of purple nut sedge is difficult because of its perennating underground rhizomes and tubers. The losses due to weeds range from 10-80% depending upon the weed density and flora (Holm *et al.*, 1977). Its manual control is not effective. Glyphosate may be one choice to control this weed.

Field experiment was conducted during spring seasons of 2000 and 2001 at Indian Agricultural Research Institute Regional Research Station, Karnal. Experimental site was heavily infested with *C. rotundus* (320-360 shoots m⁻²). The soil of experimental area was clay loam in texture having pH 7.9, organic carbon 0.45%, electrical conductivity 0.31 mmhos/cm and 130, 29 and 310 kg/ha available N, P and K, respectively. The treatments comprising blanket spray of glyphosate at 2.0 and 1.0 kg using 500 l water ha⁻¹ and on weed foliage after shielding the non-targeted plants i.e. watermelon plants; followed by one hoeing near the plant base at 5 to 6 leaf stage of *C. rotundus*, two hand weedings (20 and 40 days after sowing), one hand weeding (20 days after sowing) and weedy check were tried in randomized block design with four replications. Shielding of plants was done by covering seedlings of watermelon by PVC pots at 15-20 days after sowing at spray time. Watermelon cultivar 'Sugar baby' seeds were sown in furrow bed methods i. e. seeds were sown on the

topside of the furrow 50 cm apart and vines were allowed to trail on the raised bed (1.5 m wide on either side) on 14 and 18 March during 2000 and 2001, respectively. Crop was uniformly fertilized with recommended dose of N, P and K. Crop was thinned 7-10 days after its emergence by keeping plant to plant distance of 50 cm.

Glyphosate at 2.0 and 1.0 kg ha⁻¹ with hoeing was most effective in reducing *C. rotundus* density (68.8 and 62.3%). Density of *C. rotundus* and weed dry weight were significantly higher in one and two hand weedings compared to glyphosate at 2.0 and 1.0 kg ha⁻¹ (Table 1).

Seed yield of watermelon was reduced 74.9% in weedy check when compared to glyphosate at 2.0 kg ha⁻¹+hoeing. Seed yield between two glyphosate treatments remained at par. Hand weeding twice recorded significantly lower seed yield compared to glyphosate treated plots but it was significantly more than one hand weeding and weedy check (Table 1).

The highest additional return (Rs. 35,440 and 32,475 ha⁻¹) was obtained with glyphosate at 2.0 and 1.0 kg ha⁻¹ integrated with one hoeing, while one hand weeding recorded the lowest additional return (Rs. 19,140 ha⁻¹).

REFERENCE

- Holm, L. G., D. L. Plunknett, J. V. Pancho and J. P. Herberger, 1977. *The Worlds Worst Weeds*. East-West Book Center, University Press, Hawaii, Honolulu, Hawaii. 609 pp.

Table 1. Effect of weed control treatments on *Cyperus rotundus*, seed yield and economics of watermelon (Mean of two seasons)

Treatment	Cyperus density (No. m ⁻²)	Weed dry weight (g m ⁻²)	Seed yield (kg ha ⁻¹)	1000-seed weight (g)	Gross returns (Rs. ha ⁻¹)	Cost of operations* (Rs. ha ⁻¹)	Cost of treatment (Rs. ha ⁻¹)	Total cost (Rs. ha ⁻¹)	Net returns (Rs. ha ⁻¹)	Additional returns over control
Glyphosate 2.0 kg ha ⁻¹ fb 1 hoeing	(32) 5.77	16.0	181.4	42.2	72740	18000	11500	29500	43240	35440
Glyphosate 1.0 kg ha ⁻¹ fb 1 hoeing	(47) 6.97	30.4	173.4	41.5	69400	18000	11125	29125	40275	32475
Two hand weeding	(84) 9.22	56.0	150.4	40.9	60080	18000	8000	26000	34080	26280
One hand weeding	(133) 1.60	94.2	106.0	39.5	42440	11500	4000	15500	26940	19140
Weedy check	(341) 18.51	246.6	45.4	38.5	18000	10200	-	-	7800	-
LSD (P=0.05)	1.00	20.6	26.7	1.83						

Figures in parentheses are original values.

*Operations include cost of ploughing, seed bed preparations, fertilizer, irrigation, rouging, harvesting and seed extraction. Cost of poly pot Rs. 26 per pot, cost of glyphosate Rs. 300 per litre, sale price of IARI seed Rs.400 per kg.