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RESEARCH NOTE

Weed Management in Oil Palm Plantations

Oil palm (*Elaeis guineensis* Jacq.) was recently introduced as an irrigated crop of small and marginal farmers in the eleven states identified as potential by the working groups. This crop is presently grown in about 50,000 ha. Since this crop is a wide spaced perennial with 9 x 9 m triangular planting it leaves lot of unused space as well as palm basins. While inter/mixed/multiple cropping system is a way of managing weeds, most of the time the basins are full of weeds hindering the loose fruit collection after harvest, which necessitates proper weed management. Repeated hand weeding is a costly affair in most part of oil palm growing areas. The timely availability of labour for weeding has also become impossible. Under such circumstances, a low cost but cost effective weed management was felt necessary by many of the farmers. Keeping this in mind the present study was taken up. The study aims at bringing out the most suitable herbicide for weed control in oil palm plantations and also work out the economics of using herbicides.

The experiment was started in December 1999 and continued for a period of one year in a four-year old oil palm plantation. The chemicals tried were Glyphosate, Gramaxone (@ 750 ml/ha and 1000 ml/ha) and Glufosinate ammonium @ 600 ml/ha. Hand weeding and no weeding treatments were also included for comparison. Seven treatments with nine palms per treatment were replicated three times in Randomised Block Design. Spraying was taken up in the entire palm basin of 3 m radius. Before taking up spraying it was calibrated to know the amount of spray fluid required to cover the entire basin area and it was noted as 1500 ml. In a Knapsack sprayer of 15 litres capacity fitted with a fan-jet nozzle, 13.5 litres of spray fluid was taken and used for spraying in nine basins of a particular treatment.

During the first round of spray the entire spray fluid (13.5 litres) was required for all the nine palms of one treatment. Subsequent sprayings were taken up at quarterly intervals only on basins where weeds were present i.e.spot application. In the sprayer 13.5 litres of spray fluid was taken and after spot application in nine basins, amount of spray fluid left back in the sprayer was noted and the amount of spray fluid actually used was calculated. Weed count of monocots and dicots was recorded separately just before starting the experiment. Later on, it was taken at fortnightly intervals using an iron quadrant of 50 x 50 cm size. Visual observation on percent weed control was noted after one week of every spraying. Weed dry weight was recorded once in three months just before next spraying in the basins maintained for destructive sampling using the same quadrant. The data was analysed statistically using the M-stat software.

Of all the seven treatments tried, Glyphosate @ 1000 ml/ha recorded the lowest monocot weed number of 1.93 and dry weight of 0.48g and dicot weed no. of 3.13 and dry weight of 1.83g per 50 x 50 cm area (Table 1). The highest values were recorded in the control plots followed by hand weeded plots. Glyphosate was found to be significantly superior to the other treatments in reducing the monocot weed number and dry weight. Glyphosate is one of the most phloem mobile herbicides and is especially effective against perennial weeds in which it accumulates in the meristematic tissue of shoots, roots and storage organs and blocks the aromatic amino acid synthesis. With regard to dicot weed dry weight, Glyphosate was superior to Gramaxone, hand weeded and control plots. However, it was on par with glufosinate ammonium. Glyphosate and gramaxone are on par with each other with regard to dicot weed number. Glyphosate 750 ml/ha and 1000 ml/ha were on par with regard to all the parameters studied.

Glyphosate 1000 ml/ha had the highest percent of Weed Control Efficiency (WCE) both in case of dicots and monocots closely followed by Glyphosate 750 ml/ha. Gramaxone 750 ml/ha had the lowest WCE followed by hand weeding and Gramaxone 1000 ml/ha. Glufosinate ammonium had the intermediate WCE. WCE in the control plots is considered as zero and the seasonal drying up of annual weeds is not taken into account.

A total of 17.5 ml of Glyphosate is needed to keep the basin weed free for a period of one-year and the cost worked out to Rs. 8.40/palm/year (Table 2). Although the cost of weeding is slightly higher than Gramaxone @ 750 ml/ha in view of its beneficial long term effect in controlling the perennial grass weeds, Glyphosate 750 ml/ha/year is recommended.

A shift in the weed flora from monocots towards dicots was observed in the Glyphosate treated plots. For efficient weed management during the next round of spraying, dicots that were left out should be removed manually and the

Table 1: Effect of herbicides on weed population, dry matter and weed control efficiency in oil palm basins at Pedavegi.

Treatments	Dicots			Monocots		
	No.	Dry weight (g)	WCE %	No.	Dry weight. (g)	WCE %
1.Glyphosate750ml/ha	4.03	2.25	82	2.77	0.57	96
2. Glyphosate 1000 ml/ha	3.13	1.83	86	1.93	0.48	97
3.Gramaxone 750 ml/ha	3.77	4.63	64	6.87	5.07	64
4. Gramaxone 1000 ml/ha	3.77	4.34	66	6.43	4.67	67
5. Glufosinate ammonium 600 ml/ha	4.60	3.00	77	4.77	2.98	79
6. Hand weeding	6.27	4.67	64	6.33	4.65	67
7.No weeding	14.37	12.82	0	14.33	14.00	0
CD p= (0.05)	1.203	1.465	-	0.903	2.051	-

Table 2: Economics of weed control in oil palm basins at pedavegi

Treatments	Chemical requirement (ml/palm basin/year)	Cost of weeding (Chemical + labour*) Rs./palm/year
1. Glyphosate 750 ml/ha	17.50	8.40
2. Glyphosate 1000 ml/ha	22.60	10.40
3.Gramaxone 750 ml/ha	20.25	7.05
4. Gramaxone 1000 ml/ha	26.55	8.75
5. Glufosinate ammonium 600 ml/ha	14.25	Rate not available
6. Hand weeding	-	12.00**
7.No weeding	-	-

** At a turnover of 150 palm basins per day with a wage rate of @Rs. 60 per day

** At a turnover of 20 basins per day with a wage rate of @Rs. 60 per day

existing grasses and just emerging dicots are to be sprayed with herbicide in order to reduce the quantum of the chemical. It was also observed that when the palm basin was completely covered with grasses, herbicides were effective for a longer period as the dried grass formed a mulch over the ground and did not allow further weed growth easily. The same condition can also be obtained by growing green manure crops like sun hemp in the basins and incorporate the same in the basin to act as mulch which can prevent weed growth.

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