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EFFECT OF MINIMUM TILLAGE SYSTEM ON PRODUCTIVITY OF RICE

Farmers usually adopt intensive tillage operations for rice with the main intention of controlling weeds, minimizing percolation rate of water and preparing a soft bed for crop establishment. This system results in high energy consumption, drudgery of labour and high cost of cultivation. Recently, there is a growing concern to reduce the cost of cultivation by minimizing the cost on land preparation (AICRIP, 1998).

An experiment was conducted at the Regional Agricultural Research Station, Pattambi during rabi 1998-'99 to study the adaptability of minimum tillage system in rice cultivation. The details of treatments are given in Table 1. The field experiment was conducted in randomized block design with three replications using Jyothi as the test variety which was transplanted on 18th day at a spacing of 15 cm x 10 cm. The plot size adopted was 20 m^2. The minimum tillage system involved one light ploughing and puddling followed by light irrigation to moisten the soil and activate weed germination and growth. After 15 days, glyphosate @ 2.5 l ha^{-1} (T_1) or paraquat @ 3.75 l ha^{-1} (T_3) as per treatments was sprayed followed by flooding the soil for two days to soften the soil and then transplanting done. In local tillage system (T_4, T_5 and T_6) the land was ploughed three times, followed by puddling and levelling. In hand weeding treatments, the plots were kept weed free up to maximum tillering stage.

The data on grain yield are given in Table 1. There was no significant difference in yield between treatments. The highest yield was observed in treatments of local tillage system with two hand weedings (T_5 = 3687 kg ha^{-1}), which was closely followed by minimum tillage system (T_1 = 3333 kg ha^{-1}). Minimum tillage system with pre-plant spray of glyphosate followed by butachlor spray (T_2) gave an yield on par with that of local tillage system with hand weeding (T_5). There was no serious weed problem in plots of minimum tillage system.

The results of the study indicated the possibility of raising a rice crop with minimum tillage operations and controlling the weed growth both by pre-planting and post-planting weedicide application. Similar results have been reported elsewhere as well (AICRIP, 1998). This system would not only reduce the cost of production but results in minimum soil disturbance and water percolation as well. The results are much relevant to Kerala where the cost of production of

Table 1. Effect of tillage systems on grain yield of rice

Sl. No	Treatments	Grain yield, kg ha^{-1}
1	Minimum tillage system with pre-plant spray of glyphosate @ 2.5 l ha^{-1}	3333
2	Minimum tillage system with pre-plant glyphosate spray @ 2.5 l ha^{-1} fb pre-emergent spray of butachlor @ 1.25 kg ai ha^{-1} 6 DAP	3277
3	Minimum tilllage system with pre-plant spray of paraquat @ 3.75 l ha^{-1} fb 2,4-D @ 1.0 kg ai ha^{-1} at 21 DAP	2886
4	Local tillage system fb butachlor @ 1.25 kg ai ha^{-1} 6 DAP and spot weeding	3296
5	Local tillage system with two hand weedings	3687
6	Local tillage system with unweeded check	2849
CD (0.05)		NS

fb = followed by; DAP = Days after planting

rice is very high and the net profit is comparatively less. Detailed investigations are required to draw up appropriate management technologies under minimum tillage system.

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