Short communication

Economics of Weed Management Practices in System of Rice Intensification (SRI)

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Abstract

Two field experiments were conducted during Thaladi and Kuruvai seasons in 2009 to 2010 at Annamalai University Experimental Farm in a factorial randomized block design with three replications. Eight treatments formed by combination of two age of seedlings (M_1 – 10 days old seedlings and M_2 – 15 days old seedlings) and four weed management practices (S_1 – conoweeding two times, S_2 – conoweeding four times, S_3 – pre-emergence application of butachlor @ 1.5 kg a.i. ha^{-1} + hand weeding on 35 DAT and S_4 – unweeded control). The results revealed that conoweeding four times and use of 15 days old seedlings gave the highest net return and BCR.

Key Words: System of rice intensification, weed management, age of seedlings, rice, yield, economics.

More than 90 per cent of world's rice is grown and consumed in Asia and it is the staple food for more than half of the global population. India that ranks first in terms of rice acerage (45.54 m ha) in the world stands second for its production (99.18 m t) owing to low productivity (2.18 t ha^{-1}). Rice production has to be increased in India to meet the increasing demand and particularly in Tamil Nadu state with the problems of drought, poor quality irrigation water, non-vailability and high cost of labour during peak season, shrinking resources and frequent and prolonged power cuts. Present days rice cultivation is less remunerative due to increased cost of cultivation. System of Rice intensification (SRI) is emerging as a new technology to increase the rice production besides it saves land, water, labour and other resources (Uphoff and Randriamiharisoa, 2002; Budhar *et al*., 2006; Hugar *et al*., 2009).

In order to study the economics of difference weed management practices in SRI, two field experiments were conducted in the Department of Agronomy Experimental Farm, Annamalai University, Tamil Nadu during Thaladi (August 2009 to January 2010) and Kuruvai (June 2010 to September 2010) seasons with Co 43 and ADT 43 rice varieties, respectively. The farm is situated at 11°24' North latitude, 79°44' East longitude and at an altitude of 5.79 m above MSL. The texture of the soil is clayey loam with a pH of 8.4 and was rated as low for available nitrogen (227 kg ha^{-1}), medium for available phosphorus (17 kg

ha^{-1}) and high for available potassium (346 kg ha^{-1}). The experiments were laid out in a factorial randomized block design with three replications. The treatments formed by combination of two age of seedlings (M_1 – 10 days old seedlings and M_2 - 15 days old seedlings) and four weed management practices (S_1 – conoweeding two times, S_2 – conoweeding four times, S_3 – pre-emergence application of butachlor @ 1.5 kg a.i. ha^{-1} + hand weeding on 35 days after transplanting (DAT) and S_4 – unweeded control). Recommended package of practices were adopted for both the crops. Benefit of cost ratio was worked out by dividing the gross income by cost of cultivation.

The additional cost of cultivation due to various weed management practices ranged from Rs. 2018 to Rs. 3449 in Thaladi season (Table 1) and Rs. 2537 to Rs. 3594 in Kuruvai season (Table 2). Conoweeding four times was found to be cheaper than (Rs. 413 and 436) conventional method of butachlor application @ 1.5 kg a.i. ha^{-1} + hand weeding on 35 DAT. Conoweeding four times practiced in 15 days old seedlings gave the highest net return and BCR (Rs. 74652 and 3.48 in Thaladi season and Rs. 61750 and 2.98 in Kuruvai season). Similar BCR result was reported by Radhamani *et al*. (2012). In conoweeding four times, weeds are buried inside the soil and minimized the weed competition besides it improveing soil aeration, root development, nutrient absorption and more number of tillers which favoured the crop growth and resulted in higher grain yield, net income and BCR (Mishra and Sahoo, 1991; Norman Uphoff, 2002; Thiyagarajan *et al*., 2002). The next best treatment was conventional method of butachlor application @ 1.5 kg a.i. ha^{-1} + hand weeding. Conoweeding two times resulted in an additional net income of Rs. 35983 and BCR of 1.18 in Thaladi season and Rs. 23641 and 0.94 in Kuruvai season over unweeded control. Lowest net income and BCR was noticed in unweeded control. The trend of the treatments was same when practiced in 10 days old seedlings. From this study, it may be concluded that conoweeding four times was found to be efficient in controlling weeds, economical and gave the highest net income and BCR in SRI.

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Table 1: Economic analysis for Thaladi season

Treatment	Grain yield (kg ha^{-1})	Straw yield (kg ha^{-1})	Gross returns (Rs/ha^{-1})	Cost of cultivation (Rs/ha^{-1})	Net returns (Rs/ha^{-1})	BCR
M_1S_1	6003	7365	79401	29045	50356	2.73
M_1S_2	7493	8829	98745	30063	68682	3.28
M_1S_3	7197	8465	94830	30476	64354	3.11
M_1S_4	2859	3990	38298	27027	11271	1.41
M_2S_1	6503	7915	85951	29045	56906	2.95
M_2S_2	7975	9374	104714	30062	74652	3.48
M_2S_3	7673	9010	101086	30476	70610	3.31
M_2S_4	3600	4750	47950	27027	20923	1.77

Table 2: Economic analysis for Kuruvai season

Treatment	Grain yield (kg ha^{-1})	Straw yield (kg ha^{-1})	Gross returns (Rs/ha^{-1})	Cost of cultivation (Rs/ha^{-1})	Net returns (Rs/ha^{-1})	BCR
M_1S_1	5305	6531	75496	29954	29299	2.5
M_1S_2	6145	7525	87410	30575	44126	2.85
M_1S_3	5934	7282	84422	31011	40655	2.72
M_1S_4	2750	3852	39602	27417	8981	1.44
M_2S_1	5612	6897	76808	29954	37230	2.56
M_2S_2	6480	7881	91124	30575	61750	2.98
M_2S_3	6269	7638	89122	31011	58303	2.87
M_2S_4	3100	4280	44580	27417	13589	1.62