

On farm demonstration of herbicide usage in transplanted rice

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ABSTRACT

An on-farm field demonstration was conducted involving herbicide in order to reduce drudgery of farm women in transplanted rice at village Mirzapur, Rangareddy District (Andhra Pradesh) during wet season 2011. The study revealed that plant height, tiller number m⁻², panicle number m⁻², panicle length, grain number panicle⁻¹, filled and unfilled grain panicle⁻¹, panicle weight, grain yield and straw yield differed significantly for different treatments under study. The mean maximum grain yield was recorded in the treatment plot of improved practice + herbicide application (5.39 t ha⁻¹) and significantly superior to all other treatments. Improved practice was also significantly superior to farmer's practice (4.70 t ha⁻¹) as well as farmers practice + herbicide (4.96 t ha⁻¹). Intervention of herbicide has reduced cost of cultivation and more net returns with higher Benefit Cost ratio as well as reduced the operational drudgery of farm women in transplanted rice.

Key words: farm women, transplanted rice, herbicide use, on farm demonstration

Among the biotic constraints weeds pose a major problem to realize the yield potential of rice. The present status of rice production indicates that weed control is costly and labour intensive. With increase in adoption of modern cultivars, to realize their high yield potential, farmers are applying increased amounts of nutrients. In addition, poor tillage practices, inadequate crop stand; delay in inter-culture operations and poor water and management aggravates the weed problem (Moody, 1993). It is reported that weeds alone causes a yield loss of 15-90% under different system of rice cultivation.

Rice farming is intensive where participation of women is very significant and almost all the activities from seed selection, nursery raising, field preparation, transplanting, fertilizer application, weeding, harvesting, winnowing, parboiling, drying and storage are carried out by woman alone or jointly with men. Most of these operations involve drudgery and hence there is need to increase the work efficiency by reducing work load and operational drudgery. Weed control in rice farming under Indian conditions is done by labourer particularly by women (De Dutta and Flinn, 1986). Timely control

of weeds is crucial and often influences the efficiency of herbicide (Singh and Pillai, 1996). In order to reduce the drudgery of farm women engaged in rice farming and to control the weeds and reduce labour requirement, there is a need to apply recommended herbicides. The present on farm demonstration was undertaken involving herbicide usage assumes greater significance as it not only controls weeds effectively but also reduces drudgery of farm women in rice.

An on-farm demonstration involving herbicides as an intervention was conducted at village Mirzapur, Rangareddy District (Andhra Pradesh) during wet season 2011. Rice variety RP Bio.226 (Improved Sambha Mahsuri) was transplanted after Tomato crop. The demonstration field was clayey (Vertisols) having soil pH of 8.1 with medium availability of nitrogen and phosphorus.

The treatments included in the demonstration are farmers practice (Random transplanting of 4-5 seedling of 30 days old hill⁻¹ + 150:120:0 kg N:P:K ha⁻¹ + 1 time weeding (20 DAT) + plant protection), improved practice (line transplanting of 2 seedlings of 25 days old

hill⁻¹ + 100:60:40 kg N:P:K ha⁻¹ + two times weeding (20 and 40 Days after transplanting + Need based plant protection), farmers practice + herbicide (Butachlor @ 1.5 kg a.i ha⁻¹ applied at 5 DAT + one hand weeding) and Improved practice + herbicide (Butachlor @ 1.5 kg a.i ha⁻¹ applied at 5 DAT + one hand weeding).

The demonstration was laid out in Randomized block design with four replications. The gross plot size was of 4000m² (250 m² treatment⁻¹). Entire dose of phosphorus and potassium, half of the nitrogen were applied basally and remaining nitrogen in two equal splits at tillering and panicle initiation stage. Transplanting was done with inter row spacing of 20 cm and 10 cm intra-row spacing. Recommended dose of fertilizers were applied as per the treatments requirements. Required quantity of herbicide was mixed in sand (50 kg fine sand ha⁻¹) and applied in field on 5th day after transplanting (DAT). Other management practices like irrigation, plant protection were followed according to the treatments. Crop was harvested at maturity stage and data on growth parameters yield and yield attributes were recorded at the time of harvest. Economic returns were worked out by considering cost of cultivation of each treatments and selling price of paddy grain and paddy straw.

In the present demonstration some important weeds recorded were categorized as broad leaved weeds, grasses and sedges. The prominent grass weed flora observed were viz., *Cynodon dactylon*, *Echinochloa crusgalli*, *Pennisetum* spp., *Panicum* spp. and *Digiteria* spp. The broad leaved weeds which observed in the demonstration field were *Marselia* spp. and *Ipomea* spp. Only two sedges i.e. *Cyperus* spp. and *Fimbristylis* were observed during the cropping period.

Mean maximum plant height (76 cm) was recorded in improved practice+herbicide application and lowest plant height (73 cm) was recorded in farmers practice. The mean maximum tiller m⁻² and panicle m⁻² were recorded under improved practice + herbicide application (425 and 399) followed by improved practice (400 and 392) and both the treatments were significantly superior to farmer's practice and farmer's practice + herbicide application (Table 1). Panicle length was maximum under improved practice + herbicide application followed by improved practice. Mean maximum panicle weight (2.94 gm) was recorded by

Table 1. Summary of grain yield and yield attributes of transplanted rice during wet season 2011

Treatments	Plant height (cm)	Tiller m ⁻² (No.)	Panicle m ⁻² (No.)	Panicle length (cm)	Panicle wt.(g)	Filled grain panicle ⁻¹ (No.)	Unfilled grain panicle ⁻¹ (No.)	Total grain panicle ⁻¹ (No.)	Grain yield (t ha ⁻¹)	Straw yield (t ha ⁻¹)	Returns from (₹ ha ⁻¹)		Cost of Cultivation (₹ ha ⁻¹)	B:C ratio	
											Grain	Straw			Total
Farmers Practice (FP)	72.50	342	329	14	2.25	151	17	168	4.70	4.75	47000	4750	51750	30620	1.69
Improved Practice (IP)	75.75	400	392	18	2.85	165	12	177	5.22	5.47	52000	5470	57470	31220	1.84
FP + Herbicide	73.25	365	333	15	2.40	165	12	177	4.96	5.05	49600	5050	54650	30020	1.82
IP + Herbicide	76.00	425	399	19	2.94	180	10	190	5.39	5.50	53900	5500	59400	28370	2.09
CD (P<0.05)	2.37	40	24	1	0.16	6	3	13	0.03	0.05					

*selling price of paddy ₹ 10,800 t⁻¹, selling price of straw ₹ 1000 t⁻¹.

improved practice + herbicide application and lowest was recorded under farmer's practice. The mean maximum filled grains panicle⁻¹(180), lowest unfilled grains panicle⁻¹(10) and maximum total grains panicle⁻¹ (190) were recorded in improved practice + herbicide application and significantly superior to farmer's practice.

Grain yield differed significantly among different treatments under demonstration. The mean maximum grain yield was recorded by improved practice + herbicide application (5.39 t ha⁻¹) and significantly superior to all other treatments. Farmer's practice + herbicide application was significantly superior to farmers practice. Straw yield followed the same trend as that of grain yield. Maximum grain yield under herbicide application treatment could be due to timely control of weeds, reduced weed competition and maximum utilization of applied nutrients by rice crop.

The mean maximum net returns and B:C ratio of ₹ 31030 ha⁻¹ and 2.09, respectively were recorded under improved practice + herbicide application followed by improved practice, farmer's practice + herbicide application and farmer's practice. Application of herbicide was cheaper in terms of cost of weeding

and reduced women labour requirement for weeding and drudgery of farm women. Thus, intervention of herbicide reduced cost of cultivation and resulted in more net returns with higher B:C ratio (Table 1).

On the basis of these findings it, was concluded that, use of herbicide with improved package of practices or with farmers practice reduced labour requirement, especially for weeding under transplanted condition and also reduced their operational drudgery with higher rice production per unit area and more economic returns.

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