



## Effect of post-emergence herbicide on yield and yield contributing character of transplanted rice in north Konkan region

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Cultivation of rice by transplanting in puddled soil is the major practice followed in Konkan region. Weed infestation is the major problem associated with the cultivation of rice under the different ecosystems (Rao *et al.* 2007). In transplanted rice (TPR), weeds not only reduce the grain yield up to 45% but also impair rice grain quality. The share of weed management cost is higher than any other operations in TPR. Though many pre-emergence herbicides are available for controlling weeds, the need for post-emergence herbicide is often realized to combat the weeds emerged during later stages of crop growth. Moreover, due to increasing problem of labour availability for rice cultivation, use of post-emergence herbicide has greater potential for effective weed management and higher rice yield. In this context, present study was carried out to evaluate bispyribac-sodium efficacy in managing weeds of transplanted rice.

### METHODOLOGY

A field experiments were conducted at Agricultural research station Palghar, Dr Balasaheb Sawant Konkan krishi vidyapeeth Dapoli (MS) to evaluate herbicide bispyribac-sodium on weed control efficiency, growth and, yield of TPR during Kharif 2010 and 2011. A total of seven treatments were evaluated in a randomized block design with four replications. The treatments consisted of pre-emergence application (PE) of butachlor 1500 g/ha at 0-5 days after transplanting (DAT), post-emergence application (POE) of bispyribac-sodium at 25, 35, 50 g/ha applied at 20 DAT, weed free, two hand weeding

and weedy check. The soil of the experimental field was clay loam with a pH of 7.5 and having NPK status of low, medium and high respectively. The rice variety ‘Karjat-3’ were tested with recommended package of practices. The data on weed growth, yield performance and economics was collected using standard methods.

### RESULTS

Basically, grassy weeds were predominant followed by broad leaved weeds and sedges. Among the grassy weeds *Echinochloa colona* and among the broad leaf weed *Mimosa pudica* were dominant. The total weed density and biomass decreased with increase in doses of bispyribac-sodium but not significantly. The lowest total weed density and biomass was observed by weed free plots, which was statistically on par with application of all the doses of bispyribac-sodium during both the years. The highest weed density and biomass was observed in unweeded control plot. Reduction in weed density and biomass due to application of bispyribac-sodium at 15 and 25 DAT in transplanted rice were reported by Yadav *et al.* (2009).

Among the weed control treatments, application of bispyribac-sodium at 50 g/ha recorded highest weed control efficiency of 98.1 and 98.5%, which was followed by the same herbicide with lower doses of 35 g/ha (97.5 and 97.8%) and 25 g/ha (96.5 and 97.1%), respectively, during both the years. Weed index which indicate the reduction in grain yield was

**Table 1. Effect of post emergence application of herbicide on yield contributing character of rice under the Konkan condition**

Treatment	Total weed density at 45 DAT (no./m <sup>2</sup> )		Total weed Biomass (kg/ha)		Weed control efficiency (%)		Weed index		Grain yield (t/ha)		Net profit (Rs/ha)		B:C ratio	
	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
Butachlor 1500 g/ha	4.75	33.00	356	307	92.1	91.3	11.23	13.70	6.34	5.89	38.74	34.72	2.81	2.43
Bispyribac-sodium 25 g/ha	1.50	12.00	159	105	96.5	97.1	4.21	4.64	6.84	6.51	42.45	40.40	2.89	2.61
Bispyribac-sodium 35 g/ha	1.25	7.67	112	76	97.5	97.8	3.57	2.99	6.88	6.62	42.09	40.23	2.81	2.54
Bispyribac-sodium 50 g/ha	0.75	5.32	87	53	98.1	98.5	1.75	0.35	7.01	6.70	42.25	40.33	2.73	2.51
Weed-free	0	0	0	0	100.0	100.0	-	-	7.14	6.83	40.32	37.77	2.47	2.24
Two hand weedings	3.75	16.67	289	128	93.6	96.4	6.30	5.57	6.69	6.45	38.55	36.47	2.54	2.30
Unweeded check	63.75	110.68	4511	3541	-	-	44.78	51.28	3.94	3.33	15.48	10.26	1.78	1.45
LSD (P=0.05)	0.28	12.00	3.89	81.60	-	-	-	-	1.94	1.78	-	-	-	-

minimum under bispyribac-sodium applied plots. POE of bispyribac-sodium at all the doses reduced the grain yield very marginally indicating the superiority in weed control. Higher weed control efficiency with lower weed index in bispyribac-sodium applied plots were due to effective weed control as evident from lower weed density and biomass than other treatments as reported by Yun *et al.* (2005)

Significantly higher rice yield was associated with bispyribac-sodium application. Weed free has registered highest grain yield of 7.14 and 6.93 t/ha during 2010 and 2011, respectively which was at par with all the doses of bispyribac-sodium. POE of bispyribac-sodium at 25 g/ha recorded grain yield of 6.84 and 6.51 t/ha during 2010 and 2011, respectively which was at par with higher doses of bispyribac-sodium and significantly superior than butachlor application. The effect of all the three doses of bispyribac-sodium on grain yield was significantly higher than butachlor application and unweeded

control. The per cent yield increment due to application of bispyribac-sodium at the rate of 25 g/ha were 7.9, 2.2 and 73.5 during 2010 and 0.8, 9.4 and 95.7% during 2011 than hand weeding twice, butachlor application and unweeded control, respectively. There was 44.8 and 51.3% yield reduction due to uncontrolled weeds in unweeded check over weed free check during 2010 and 2011, respectively. The results of effective weed control along with higher grain yield by bispyribac-sodium against mixed weed flora in transplanted rice are in conformity with Yadav *et al.* (2009)

The economic analysis of weed management practices revealed Post-emergence application of bispyribac-sodium at 25 g/ha registered highest net profit of 42,452 and 40,400 /ha during 2010 and 2011, respectively followed by bispyribac-sodium at 50 g/ha (42,086 and 40,330 /ha). Higher benefit-cost ratio was also associated with bispyribac-sodium at 25 g/ha (2.89 and 2.61) which was followed by bispyribac-sodium at 35 g/ha (2.81 and 2.54).



## CONCLUSION

Application of post-emergence herbicide bispyribac-sodium at the rate of 25 g/ha on 20 DAT is suitable for attaining higher productivity by effectively managing weeds in transplanted rice.

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## Effect of method of sowing and weed control on the performance direct-seeded rice in Konkan region

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The alternate methods of rice establishment are inevitable for handling the problem of labour shortage and make the rice cultivation more remunerative (Rao et al., 2007). Weeds are very serious problem in rice of Konkan region. Hence studies on sowing methods and weed management are essential. Hence, a field study was undertaken at Agronomy Farm, College of Agriculture, Dapoli during Kharif, 2013 to quantify the effect of methods of rice sowing and weed control on weeds, yield and economics of direct-seeded rice in Konkan region.

## METHODOLOGY

The field experiment was laid out in split plot design with three sowing methods: broadcast-seeding, drill-seeding and drum-seeding as main plots and seven weed control measures as sub plots. Three replicates were maintained.

The soil of the experimental plot was sandy clay loam in texture, slightly acidic in pH, medium in organic carbon content, medium in available nitrogen, low in available phosphorus and high in available potassium. The weed growth, yield performance and economics data was taken following standard methods.

## RESULTS

The beneficial effect of drill-seeding method of rice establishment in enhancing the growth characters i.e. plant height, leaves, number of tillers, and dry matter production was reflected in higher rice yield and yield attributing characters.

Different methods of sowing showed significant influence on various yield attributes. Number of panicle m<sup>-2</sup>, maximum panicle length, maximum number of filled grains, weight of filled grains panicle<sup>-1</sup>, and 1000 grain weight was found to be maximum with drill-seeding followed by drum-seeding. The increased yield attributes might be due to increased growth and development parameters which ultimately resulted in increased rice grain and straw yield as reported by Roy (2009)

Density of monocots and broad leaved weeds (BLW) (number 0.25 /m<sup>2</sup>) was significantly influenced by different methods of sowing. At 30, 60, 75 DAS and at harvest, density of monocot and BLW was significantly lower with drill-seeding, followed by drum-seeding. Broadcast-seeding recorded significantly higher density of monocot and BLW.

**Table 1. Effect of methods of rice seeding and weed control on yield contributing parameters, grain and straw yield, weed index and economics of rice**

Treatment	Grain yield (q/ha)	Straw yield (q/ha)	Weed density (Monocot)	Weed density (BLW)	WCE (%)	Cost of cultivation (Rs/ha)	B: C ratio
<b>Seeding methods</b>							
S <sub>1</sub> : Broadcast-seeding	29.94	38.45	4.95 (2.06)	9.81 (2.84)	46.20	40428.42	1.09
S <sub>2</sub> : Drill-seeding	37.43	48.32	2.86 (1.73)	3.71 (1.87)	63.42	43514.53	1.29
S <sub>3</sub> : Drum-seeding	35.88	46.57	3.38 (1.88)	4.90 (2.08)	58.68	43420.08	1.24
LSD (P=0.05)	4.05	7.64	(0.29)	(0.73)		2103.82	-
<b>Weed control methods</b>							
W <sub>1</sub> : Unweeded check	20.74	26.88	10.22 (3.15)	19.00(4.23)	0	36389.89	0.85
W <sub>2</sub> : Weed free (H.W. at 20, 40, 60 DAS)	41.97	54.26	0.33 (0.88)	0.44 (0.92)	98.95	50182.44	1.26
W <sub>3</sub> : PE Oxadiargyl @ 120 g ha <sup>-1</sup>	31.86	40.27	4.22 (2.16)	6.56 (2.53)	45.52	38936.70	1.22
W <sub>4</sub> : PoE Bispyribac sodium @ 25 g ha <sup>-1</sup>	33.48	42.85	4.33 (2.11)	5.89 (2.41)	51.82	40760.62	1.23
W <sub>5</sub> : PE Oxadiargyl @ 120 g ha <sup>-1</sup> + One hoeing (40 DAS)	35.20	45.76	2.67 (1.77)	3.89 (2.01)	53.17	42579.96	1.24
W <sub>6</sub> : PoE Bispyribac sodium @ 25 g ha <sup>-1</sup> + One hoeing (40 DAS)	36.62	48.05	3.00 (1.83)	4.33 (2.06)	59.33	43286.72	1.28
W <sub>7</sub> : PE Oxadiargyl @ 120 g ha <sup>-1</sup> + PoE Bispyribac sodium @ 25 g ha <sup>-1</sup>	41.05	53.07	1.33 (1.32)	2.89 (1.70)	83.92	45044.07	1.37
LSD (P=0.05)	4.08	7.26	(0.46)	(0.49)		2305.94	
<b>Interaction effects</b>							
S.Em. ±	2.70	4.90	(0.27)	(0.37)		1495.42	-
LSD (P=0.05)	-	-	-	-		-	-