Int.J.Curr.Microbiol.App.Sci (2017) *6*(4): 1274-1279

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 6 Number 4 (2017) pp. 1274-1279**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2017.604.155

Response of Different Weed Management Practices on Yield, Quality and Nutrient Uptake of Kharif Drilled Rice (*Oryza sativa* L.)

G.B. Shendage*, V.M. Kanade, Bheru Lal Kumhar, P.P. Sarawale and S.D. Raut

Department of Agronomy, College of Agriculture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli- 415712 Maharashtra, India
**Corresponding author*

Keywords

Herbicides, Growth, Yield and Rice.

Article Info

Accepted:
12 March 2017
Available Online:
10 April 2017

A B S T R A C T

Field experiment was conducted at Agronomy farm of Dr. B.S. Konkan Krishi Vidyapeeth, Dapoli during *kharif* season of 2014 to study the effect of different weed management practices on yield, quality and nutrient uptake of *kharif* rice (*Oryza sativa* L.). The experiment was laid out in a randomized block design. There were ten treatments which were replicated thrice. The treatments mainly comprised of Bispyribac-Na PoE (T_1), Pendimethalin PE fb Bispyribac-Na PoE (T_2), Oxadiargyl PE fb Bispyribac-Na PoE (T_3), Pyrazosulfuron PE fb Bispyribac-Na PoE (T_4), Pendimethalin PE fb Bispyribac-Na PoE fb Manual weeding (T_5), Pendimethalin PE fb Manual weeding (T_6), Bispyribac-Na + (Chlorimuron + Metasulfuron) PoE (T_7), Three mechanical weedings (cono/rotary weeder at 20, 40 and 60 DAS) (T_8), Weed free check (Hand weeding at 20, 40 and 60 DAS) (T_9) and Weedy check (T_{10}). Results revealed that treatments Weed free check, Pendimethalin PE fb Manual weeding and Pendimethalin PE fb Bispyribac-Na PoE fb. Manual weeding produced higher growth and yield attributes as compared to rest of the treatments under study. Treatment weed free check recorded highest grain and straw yield of rice.

Introduction

In India rice is gown in an area of around 44 million ha annually with a production of 104 million tones contributing 45% of the total food grain production of the country. Rice is the most important staple food grain crop of the world which constitutes the principle food for about 60 per cent of the world's population. India is the world's second largest rice producer and consumer next to China. Rice is grown either by direct seeding or by transplanting. In Konkan, rice is mostly grown by transplanting method. However, there are some pockets, where drilled and dibbled rice is also practiced. However, the weed infestation is the main problem. Weed and crop seeds germinate at the same time resulting in greater competition for space, light, moisture and nutrients from early stage of crop growth which brings down the yield drastically. While in transplanted rice, where land is puddled and 3 to 4 weeks old seedlings are transplanted with the elimination of initial competition and withstanding the competition effectively during the later stage.

Weed control methods such as hand pulling or pulling by sickle are laborious, tedious drudgery causing and expensive process. The labour requirement for such operations may

be 60 to 70 person days during peak season demand. Weed management is an important aspect regarding obtaining higher crop yield as weeds are silent, malignant and massive forces, which reduce yield drastically. Though manual weeding is considered as best method but it is time consuming and uneconomical to control weeds, therefore it has given importance to the development and warrants the use of herbicides to get timely as well as effective weed control.

For direct seeded rice, it is important to keep field weed free for first 30 days. Therefore, use of pre-emergence or early post-emergence herbicides is effective and economical at initial stages. The pre-emergence or early post-emergence herbicide either prevents weed seeds or inhibits the growth of seedlings. Use of these herbicides along with post-emergence herbicides or cultural, mechanical and agronomic methods of weed control gives effective control of weeds. Hence, it is decided to generate data with systematic research, regarding efficiency of herbicides. Thus, weed is the biggest biological constraint in direct seeded rice cultivation.

Materials and Methods

The experiment was conducted at the Agronomy Farm, College of Agriculture, Dapoli, District Ratnagiri during *Kharif* season of 2014. The experiment was laid out in plot No. 56 of 'C' block. The topography of the experimental plot was uniform. The selection of site was considered on the basis of suitability of the land for cultivation of direct seeded rice. The experiment was laid out in a randomized block design. There were ten treatments which were replicated thrice. The treatments mainly comprised of Bispyribac-Na PoE (T_1), Pendimethalin PE fb Bispyribac-Na PoE (T_2), Oxadiargyl PE fb Bispyribac-Na PoE (T_3), Pyrazosulfuron PE fb Bispyribac-Na PoE (T_4), Pendimethalin PE fb Bispyribac-Na PoE fb Manual weeding (T_5), Pendimethalin PE fb Manual weeding (T_6), Bispyribac-Na + (Chlorimuron + Metasulfuron) PoE (T_7), Three mechanical weedings (cono/rotary weeder at 20, 40 and 60 DAS) (T_8), Weed free check (Hand weeding at 20, 40 and 60 DAS) (T_9) and Weedy check (T_{10}). Thus, the gross plot size was 5.00 m x 3.00 m and net plot size was 4.60 m x 2.70 m, respectively.

The soil of the experimental plot was sandy clay loam in texture, acidic in pH and medium in organic carbon content. It was low in available nitrogen, medium in available phosphorus and available potassium. The seed of rice variety *Ratnagiri-1* was treated with thirum at the rate of 3 g kg^{-1} of seed used for sowing. The duration of the variety is 110-115 days which yields about 35-40 q ha^{-1}. The variety is resistant to blast and also moderately resistant to bacterial blight. The sowing of rice was done in the experimental plot on 7th June 2014 by drilling method at a distance of 20 cm in between the rows. The crop was fertilized with 100 kg N, 50 kg P_2O_5 and 50 kg K_2O ha^{-1}. At the time of sowing 40 kg N ha^{-1} with full dose of P_2O_5 and K_2O was applied as a basal dose. The remaining 40 kg N ha^{-1} was applied at 30 DAS and 20 kg at panicle initiation stage. Nitrogen was supplied through urea having (46% N) while phosphorous and potash was supplied through single super phosphate (16% P_2O_5) and muriate of potash (60% K_2O). The other common package of practices was followed time to time and periodical growth observations were recorded.

Results and Discussion

Effect of different weed management practices on yield and quality of rice

The grain and straw yield (q ha^{-1}) were observed maximum under weed free check (T_9) followed by Pendimethalin fb Manual

weeding (T_6) and Pendimethalin fb Bispyribac-Na fb Manual weeding (T_5) which were significantly superior over all the remaining treatments but at par with each other. Dixit *et al*., (2008) concluded that, the Pendimethalin effectively controlled weeds were till the advanced growth stages of rice, which reduced weed competition favouring better utilization of available resources and it increases the yield of crop. Rawat *et al.*, (2012) reported in his findings that, the crop under weed free plots attained lush growth due to elimination of weeds from inter and intra row spaces besides better aeration due to manipulation of surface soil and thus more spaces, water, light and nutrients were available for the better growth and development, which resulted in to superior growth and yield and consequently the highest yield of crop.

Table.1 Effect of different weed management practices on yield and quality of rice

Treatments	Grain yield (q ha^{-1})	Straw yield (q ha^{-1})	Protein content in Grain (%)
T_1: Bispyribac-Na	28.65	49.11	6.60
T_2: Pendimethalin fb Bispyribac-Na	35.19	54.75	7.43
T_3: Oxadiargyl fb Bispyribac-Na	36.76	52.87	7.10
T_4: Pyrazosulfuron fb Bispyribac-Na	29.24	41.86	7.14
T_5: Pendimethalin fb Bispyribac-Na fb Manual weeding	39.14	58.54	7.83
T_6: Pendimethalin fb Manual weeding	39.45	55.55	7.68
T_7: Bispyribac-Na + (Chlorimuron+Meta-sulfuron)	27.73	46.69	6.91
T_8: Three mechanical weedings (cono/ rotary weeder) (20,40,60 DAS)	35.58	52.87	7.25
T_9: Weed free check (HW at 20,40,60 DAS)	39.64	59.58	8.08
T_{10}: Weedy check	19.96	34.35	6.25
S.E.±	0.27	0.54	0.05
C.D. at 5%	0.74	1.49	0.14

Table.2 Effect of different weed management practices on nutrient uptake of rice

Treatments	N uptake in grain kg ha^{-1}	N uptake in straw kg ha^{-1}	Total uptake of N kg ha^{-1}	P uptake in grain kg ha^{-1}	P uptake in straw kg ha^{-1}	Total uptake of P kg ha^{-1}	K uptake in grain kg ha^{-1}	K uptake in straw kg ha^{-1}	Total uptake of K kg ha^{-1}
T_1: Bispyribac-Na	30.27	18.47	48.75	8.33	3.33	11.67	9.33	43.67	53.00
T_2: Pendimethalin fb Bispyribac-Na	41.88	25.67	67.55	10.00	4.33	14.33	12.00	46.67	58.67
T_3: Oxadiargyl fb Bispyribac-Na	41.74	23.11	64.86	10.67	4.11	14.78	12.33	50.00	62.33
T_4: Pyrazosulfuron fb Bispyribac-Na	33.41	17.45	50.86	9.33	3.67	13.00	10.33	45.00	53.33
T_5: Pendimethalin fb Bispyribac-Na fb Manual weeding	49.05	32.60	81.65	13.33	7.00	20.33	17.67	54.33	72.00
T_6: Pendimethalin fb Manual weeding	48.52	30.32	78.83	12.33	6.67	19.00	16.00	52.67	68.67
T_7: Bispyribac-Na+(Chlorimuron+Meta-sulfuron)	30.68	19.13	49.80	8.67	3.33	12.00	10.00	45.67	55.67
T_8: Three mechanical weedings (cono/ rotary weeder) (20,40,60 DAS)	41.27	22.54	63.81	10.33	5.20	15.53	10.67	45.67	56.33
T_9: Weed free check (HW at 20,40,60 DAS)	51.27	35.15	86.41	15.33	9.33	24.67	19.33	56.67	76.00
T_{10}: Weedy check	19.96	12.26	32.21	4.33	2.67	7.00	6.33	39.33	45.67
S.E.±	0.28	0.34	0.34	0.47	0.56	0.36	1.15	0.36	0.69
C.D. at 5%	0.76	0.95	0.94	1.31	1.55	0.99	3.18	1.01	1.90

These results are in confirmation with those obtained from Veeraputhiran and Balasubramanian (2013) and Verma *et al.*, (2013). Weedy check (T_{10}) recorded the lowest values of grain and straw yield. This was due to severe weed competition exerted by grasses, sedges and broad leaved weeds for space, light, moisture and nutrients throughout the growth period. Similar results were reported by Hussain *et al.,* (2008). Data pertaining to the grain yield and straw yield (q ha-^{1}) is influenced by various treatments are presented in table 1 indicated that, the weed free check (T_9) produced the highest grain and straw yield and was found significantly superior over all the treatments, except treatments T_5 and T_6 which were at par with treatment T_9.

In respect of quality aspects protein content in grain of rice significantly influenced due to different weed control treatments. The protein content of rice grain increased significantly under weed free check (T_9) followed by treatment T_5 and T_6 which were significantly superior over rest of the treatments. Weedy check (T_{10}) recorded significantly the lowest protein content in the grain than the remaining treatments. These results are similar to those reported by Sawant (2003) and Tendulkar (2004).

Effect of different weed management practices on nutrient uptake of rice

Weed free check (T_9) recorded significantly higher N, P and K uptake in grain and straw over rest of the treatments followed by treatments T_5 and T_6 which were at par with each other. Ramamoorthy (1991) reported that, the pre-emergence application of Pendimethalin with one hand weeding at 30 DAS recorded higher uptake of nutrients by rice this was due to significantly reduced weed crop competition and weed density. In general, increased uptake of these nutrients by rice was due to increase in grain and straw yields and N, P and K content of grain and straw under treatments T_9, T_5 and T_6. These results are similar to those reported by Kolhe and Tripathi (1998), Choubey *et al.,* (1999) and Verma *et al.,* (2013). Weedy check (T_{10}) recorded significantly minimum uptake of the major nutrients N, P and K than the other weed control treatments. This was due to the more weed growth under the weedy check. These results are in close conformity with Mane (1997), Singh *et al.,* (2013) and Verma *et al.,* (2013) (Table 2).

In conclusion, from the results of the present investigation, it can be concluded that the combination of chemical and cultural/physical control measures (Pendimethalin fb Manual weeding and Pendimethalin fb Bispyribac-Na fb Manual weeding) has proved better for obtaining higher growth and yield with from rice than the application of chemical herbicides, cultural and mechanical control alone.

References

Chauhan, B. and Yadav, A. 2013. Weed management approaches for dry-seeded rice in India: a review. *Indian J. Weed Sci*., 45(1): 1–6.

Choubey, N.K., Tripathy, R.S. and Ghosh, B.C. 1999. Effect of fertilizers and weed management in direct seeded rice on nutrient utilization. *Indian J. Agron.*, 44(2): 313-315.

Hussain, S., Ramzan, M., Akhter, M. and Aslam, M. 2008. Weed management in direct seeded rice. *J. Anim. Pl. Sci.*, 18: 2-3.

Kolhe, S.S. and Tripathi, R.S. 1998. Integrated weed management in direct seeded rice. *Indian J. Weed Sci.,* 39: 51-53.

Mane, R.B. 1997. Effect of sowing dates and weed control in drilled rice (*Oryza*

sativa L.. M.Sc. Ag.) Thesis, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, India.

Ramamoorthy, K. 1991. Effect of integrated weed management on nutrient uptake by upland rice and associated weeds. *Indian J. Agron.,* 36(2): 213-217.

Rawat, A., Chaudhary, C.S., Upadhyaya, V.V. and Jain, V. 2012. Efficacy of Bispyribac-Sodium on weed flora and yield of drilled rice. *Indian J. Weed Sci.,* 44(3): 183-185.

Sawant, Y.C. 2003. Effect of differment weed management practices on the performance of direct seeded drilled rice. M.Sc. Ag.) Thesis, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, India.

Singh, A., Singh, R., Kumar, P. and Smita Singh. 2013. Growth, weed control and yield of direct-seeded rice as influenced by different herbicides. *Indian J. Weed Sci.,* 45(4): 235–238.

Tendulkar, D.D. 2004. Integrated weed management in upland drilled rice. M.Sc. Ag.) Thesis, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, India.

Veeraputhiran, R. and Balasubramanian, R. 2013. Evaluation of Bispyribac-sodium in transplanted rice. *Indian J. Weed Sci*., 45(1): 12-15.

Verma, P.K., Dhama, V. and Yadav, P. 2013. Efficacy of different herbicides in transplanted Basmati rice (*Oryza sativa* L.) under different nutrient Option. *Plant Arch.,* 13(2): 1123-1128.

How to cite this article:

Shendage, G.B., V.M. Kanade, Bheru Lal Kumhar, P.P. Sarawale and Raut, S.D. 2017. Response of Different Weed Management Practices on Yield, Quality and Nutrient Uptake of Kharif Drilled Rice (*Oryza sativa* L.). *Int.J.Curr.Microbiol.App.Sci.* 6(4): 1274-1279.
doi: https://doi.org/10.20546/ijcmas.2017.604.155