

Yield of paddy influenced by weed control methods

Rajnish Anand¹, *Sima Kumari² and B. Sreedevi³

¹Chitarpur Block, RAMGARH (JHARKHAND) INDIA

²Holy cross, K.V.K. HAZARIBAG (JHARKHAND) INDIA

³Crop production section,
ICAR- Indian Institute of Rice Research (HYDERABAD) INDIA

* Corresponding Author

E-mail : simagromomy@gmail.com

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ABSTRACT

The experiment was conducted at Chhotakipona village, Chitarpur Block, Ramgarh, Jharkhand during *khari* season. The experiment was laid out in Randomised Block Design with 9 weed control methods T₁- Weedy check, T₂- Pretilachlore @ 0.75 kg a.i. ha⁻¹ as pre-emergence, T₃- Pretilachlore@0.75 kg a.i. ha⁻¹ + Bispyribac Na@25gm a.i. ha⁻¹, T₄- Pendimethalin @ 1 kg a.i./ha + 2,4-D @ 1.00 kg a.i. ha⁻¹ at 30 DAS, T₅- Pendimethalin @ 1 kg a.i./ha as pre-emergence + Bispyribac Na @ 25 gm a.i. ha⁻¹, T₆- Bispyribac Na @ 25 gm a.i. ha⁻¹ as post-emergence at 20 DAS, T₇- Hand weeding at 20 DAS + Hoeing at 40 DAS, T₈- Two hand weeding at 20 & 40 DAS and T₉- weed free and replicated 3 times. Application of IWM (Integrated weed management) in paddy Pretilachlore@0.75 kg a.i. ha⁻¹ + Bispyribac Na@25gm a.i. ha⁻¹ recorded maximum yield attributes resulting higher grain yield (4952 kg ha⁻¹).

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KEY WORDS : yield attributes, yield and IWM (Integrated weed management) in paddy.

Introduction

Paddy is one of the most important food crop of India. It feeds more than 50 % of the world population. It is the staple food of most of the people of South-East Asia. Asia accounts for about 90 % of world's rice area and production. Among the paddy growing countries, India having the largest area under paddy in the world is next to China in terms of production. However, productivity of India is much lower than that of Egypt, Japan, China, Vietnam, USA and Indonesia. It contributes 42 % of total food grains production and 45 % of the total cereal production in the country². The total area under paddy in India was 431.94 lakh hectares and production was 110.15 m. tones during 2017-18 annual report Gov.of India¹. With an ever increasing population, demand of paddy has been increased in the country. Thereafter, various efforts such as use of High Yielding varieties of paddy, Hybrid paddy, SRI method, responsive to high dose of fertilizers coupled with improved package of practices made to increase the production and productivity in the country through various Centrally sponsored schemes. Production has been increased considerably and country is self sufficient in paddy so far.

Paddy is a main crop of Jharkhand. Mainly Khari paddy is grown in the state whereas gamma (summer) paddy is being cultivated in some areas. Average productivity of paddy in the state is 1411 kg ha⁻¹ and it

belongs to low productivity group. The scope for expanding paddy production lies in enhancing productivity. Several studies have indicated that the adoption of recommended rice technology gives high yields and income to the farmers. The yield level of paddy which is comparatively low at present need to be increased substantially.

Weeds are the main problem of direct seeded wet land paddy as pre germinated seeds and already existed weed seed in soil weed seed bank grow simultaneously thereby inviting competition for resources like moisture, nutrient and light. Most of the introduced herbicides are selective and are specified to control only 1 or 2 types of weeds.

Materials and Methods

The experiment was conducted at Chhotakipona village, Chitarpur Block, Ramgarh, Jharkhand during *khari* season of 2018 in sandy-loam (sand 52%, silt 33% and clay 15%) in texture acidic in reaction (pH 6.2), low available N 240 kg/ha, available K 187 kg/ha., low in organic carbon (4.2 g/kg soil), available P 19.00 kg/ha. The experiment was laid out in Randomised Block Design with 9 weed control methods T₁- Weedy check, T₂- Pretilachlore @ 0.75 kg a.i. ha⁻¹ as pre-emergence, T₃- Pretilachlore@0.75 kg a.i. ha⁻¹ + Bispyribac Na@25gm a.i. ha⁻¹, T₄- Pendimethalin @ 1 kg a.i./ha + 2,4-D @ 1.00 kg a.i. ha⁻¹ at 30 DAS, T₅- Pendimethalin @ 1 kg

Table-1 : Yield attributes as influenced by different weed control methods on paddy.

	TREATMENT	No. of panicles (/m ²)	No. of grains/ panicles	Grain weight/ plant (g)	1000 grain weight (g)
T ₁	: Weedy check	262.33	130.40	33.67	17.56
T ₂	: Pretilachlore @0.75 kg a.i. ha ⁻¹ as pre-emergence	303.00	147.76	43.67	20.89
T ₃	Pretilachlore @0.75 kg a.i. ha ⁻¹ as pre-emergence + Bispyribac Na @25gm a.i. ha ⁻¹ as post-emergence at 20 DAS	353.00	156.73	51.00	23.67
T ₄	Pendimethalin @1.0 kg a.i. ha ⁻¹ as pre-emergence + Hand weeding at 20 DAS	326.33	150.11	45.00	21.89
T ₅	Pendimethalin @1.0 kg a.i. ha ⁻¹ as pre-emergence + Bispyribac Na @25gm a.i. ha ⁻¹ as post-emergence at 20 DAS	345.00	151.42	47.67	23.22
T ₆	Bispyribac Na @25gm a.i. ha ⁻¹ as post-emergence at 20 DAS	339.67	151.06	45.67	22.56
T ₇	Hand weeding at 20 DAS+ Hoeing at 20 DAS	285.33	141.12	36.00	19.73
T ₈	Two hand weeding at 20 & 40 DAS respectively	300.67	144.35	41.33	20.56
T ₉	Weed free check	399.00	158.28	54.00	24.11
	S Em±	17.49	2.94	1.65	0.49
	CD(P=0.05)	64.04	10.78	6.04	1.80

a.i./ha as pre-emergence + Bispyribac Na @ 25 gm a.i. ha⁻¹, T₆- Bispyribac Na @ 25 gm a.i. ha⁻¹ as post-emergence at 20 DAS, T₇- Hand weeding at 20 DAS + Hoeing at 40 DAS, T₈- Two hand weeding at 20 & 40 DAS and T₉- weed free and replicated 3 times. The total annual rainfall of about 1350 mm, 85 percent of which is received between mid June to mid September. The experimental plot was ploughed with tractor drawn disc plough followed by harrowing and planking. Sowing was done by opening very small furrows with the help of marker at a distance of 22.5 cm between the lines. The seed

was sown 2 to 3 cm deep by manual labours and was covered with soil. The seed rate was used 100 kg ha⁻¹. The paddy crop was fertilized with 120 kg N, 60 kg P₂O₅ and 40 K₂O per hectare form of urea, DAP and MOP respectively. Half dose of nitrogen and full dose of phosphorus and potassium was applied at sowing time and remaining half of nitrogen was applied in two equal splits at maximum tillering stage (30 DAS) and 20 per cent dose of nitrogen was applied at (60 DAS) . To maintain the optimum plant population the gaps observed in experiment plots were filled by using seedlings grown

Table-2 : Yield (q/ha) of paddy as influenced by different weed control methods.

	TREATMENT	Grain yield (q/ha)	Straw yield (q/ha)
T ₁	: Weedy check	22.25	33.38
T ₂	: Pretilachlore @0.75 kg a.i. ha ⁻¹ as pre-emergence	35.00	52.50
T ₃	: Pretilachlore @0.75 kg a.i. ha ⁻¹ as pre-emergence + Bispyribac Na @25gm a.i. ha ⁻¹ as post-emergence at 20 DAS	49.52	74.28
T ₄	: Pendimethalin @1.0 kg a.i. ha ⁻¹ as pre-emergence + Hand weeding at 20 DAS	38.42	57.63
T ₅	: Pendimethalin @1.0 kg a.i. ha ⁻¹ as pre-emergence + Bispyribac Na @25gm a.i. ha ⁻¹ as post-emergence at 20 DAS	44.85	67.28
T ₆	: Bispyribac Na @25gm a.i. ha ⁻¹ as post-emergence at 20 DAS	44.17	66.25
T ₇	: Hand weeding at 20 DAS+ Hoeing at 20 DAS	30.35	51.13
T ₈	: Two hand weeding at 20 & 40 DAS respectively	34.08	52.50
T ₉	: Weed free check	53.17	79.75
T ₉	: Weed free check	53.17	79.75
	S Em±	1.58	2.47
	CD(P=0.05)	5.79	9.05

at appropriate time.

Results and Discussion

Yield attributes

Data on yield attributes of paddy crop *i.e.* number of panicles/m², number of grains /panicle, weight of grains/plant and 1000 grain weight (g) as influenced by weed control methods (Table-1) presented.

Many morphological and physiological characters of the plant interacting with environment influence seed yield. There is also considerable amount of genetic variability in the plants in respect of physiological and morphological characters, which may be both quantitative and qualitative in nature. Thus, the yield is the final expression of physiological and metabolic activities of the plant and is governed by various factors of the plant.

Amongst these factors, numbers of panicles, number of grains per panicles, grain weight per plant and 1000-grain weight, biological yield are the most important yield attributing factors of paddy.

Among weed control methods, T₃ (Pretilachlore@0.75 kg a.i. ha⁻¹ + Bispyribac Na@25gm a.i. ha⁻¹) was most effective and recorded 34.56, 20.19, 51.47, 34.79, 122.56 and 122.53 percent higher numbers of panicles, number of grains per panicles, grain weight per plant and 1000-grain weight respectively due to better control of weeds at critical stages, thus providing the favorable environment for better growth and development leading to enhanced grain yield compared to weedy check *i.e.* 262 /m², 130, 33.67 (g), 17.56 (g), respectively. This confirms the previous findings²⁻⁵.

Yield (q/ha): Data on yield by paddy as influenced by weed control methods are presented in Table-2. Weed control methods influenced grain and straw yield of paddy significantly higher. Weed free treatment recorded higher grain (53.17 q/ha) and straw (79.75 q/ha) yield compare to weedy check. However it was similar with T₃ (Pretilachlore@0.75 kg a.i. ha⁻¹ + Bispyribac Na@25gm

a.i. ha⁻¹) respectively. The weedy check treatment recorded significantly lower grain (22.25 q/ha) and straw (33.38 q/ha) yield as compared to other treatment. Application of T₃ (Pretilachlore@0.75 kg a.i. ha⁻¹ + Bispyribac Na@25gm a.i. ha⁻¹) recorded higher 122.56 and 122.53 % significantly grain and straw yield by paddy. This confirms the earlier findings²⁻⁶.

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