

## Effect of different weed control measures on weed control efficiency in drilled rice under varying sowing dates

R.B. MANE\*, J.R. RAMTAKE AND U.V. MAHADKAR

B.S. Konkan Krishi Vidyapeeth, Dapoli, RATNAGIRI (M.S.) INDIA

### ABSTRACT

A field experiment was conducted at Dapoli during the *kharif* season, 1996 to study the “effect of different weed control measures on weed control efficiency in drilled rice under varying sowing dates”. The treatments consisted of four sowing dates (Premonsoon sowing, onset of monsoon, 10 and 20 days after onset of monsoon) and six weed control measures (weedy check, weed free, oxadiazon and oxadiagyl pre-emergence spray, oxadiazon and oxadiagyl pre-emergence and post emergence spray). The results revealed that the pre and post-emergence application of oxydiazon @ 0.4 kg a.i./ha significantly reduced the weed intensity and their dry weight in direct seeded rice. Both grain and straw yields were significantly increased with two spray of oxadiazon over rest of weed control treatments. While comparing two herbicides application of oxydiazon recorded higher grain yield than oxadiargyl. The average reduction in grain yield was recorded to the extent of 68.54 % in unweeded check as compared to spraying of oxydiazon. The crop sown at 20 days after monsoon recorded significantly highest grain yield and lowest weed intensity.

**Key words :** Rice, Sowing dates, Herbicides

### INTRODUCTION

In Konkan, rice is mostly transplanted, however, in some pocket direct seeding of rice is done by drilling or broadcasting. Due to increasing transplanting cost, labour scarcity and declining productivity of rice, direct seeding is gaining importance over transplanting method of stand establishment. But in this method weed problem is more intense and causes 45 % reduction in grain yield (Moody and Mian, 1972). It was reported that earlier sowing decreases the grain yield (Lakpale *et al.*, 1994). Under such situation traditional method of hand weeding becomes non-profitable. It is, therefore, essential to find out the alternative herbicides in direct seeded rice as there was meager research work has been carried out so far related to sowing dates of drilled rice particularly in heavy rainfall region. Keeping these aspects in view, the present study was undertaken to evaluate the effect of different weed control measures on weed control efficiency in drilled rice under varying sowing dates.

### MATERIALS AND METHODS

A field experiment was conducted during *kharif* season of 1996 at B.S. Konkan Krishi Vidyapeeth, Dapoli (M.S.). The soil of the experimental field was clay loam in texture and acidic in reaction (5.4). The fertility of the soil was medium in organic carbon (1.48 %), available nitrogen (298 kg/ha), phosphorus (18 kg/ha) and moderate in available potash (240 kg/ha). Experiment was laid out in Split Plot Design with three replications keeping four sowing dates in main plots and six herbicide doses in sub-plots. The sowing dates were premonsoon, onset of

monsoon, 10 days after onset of monsoon and 20 days after onset of monsoon and the herbicide treatments were weed check, weed free upto 60 days after sowing, oxdiazon @ 0.4 kg a.i./ha pre-emergence and two spray at pre-emergence and 45 days after sowing, oxadiargyl @ 100 g/ha pre-emergence and two spray pre-emergence and 45 days after sowing. The crop was fertilized with 100 kg N, 50 kg P<sub>2</sub>O<sub>5</sub> and 50 kg K<sub>2</sub>O/ha with 40 % N and entire phosphorus and potassium basal dose and remaining nitrogen was top dressed in two splits 40 % and 30 days and 20 % at primordial stage. All other recommended package of practices were followed uniformly to raise the rice crop.

### RESULTS AND DISCUSSION

The results obtained from the present investigation are summarized below :

#### *Effect of sowing dates on yield:*

The sowing dates significantly influenced the yield and yield contributing characters (Table 1). The crop sown twenty days after onset of monsoon produced significantly higher number of panicles/sq.m., weight per panicle (g), panicle length (cm) and test weight than rest of sowing dates. The lowest values for these characters were noted in pre-monsoon sowing. Sowing on twenty days after onset of monsoon produced significantly higher grain yield (23 q/ha) compared to remaining sowing dates. Twenty days after onset of monsoon sowing recorded 12.69, 31.13 and 47.44 per cent higher grain yield over ten days after onset of monsoon, onset of monsoon and pre-monsoon

\* Author for correspondence. Present Address : Regional Sugarcane and Jaggery Research Station, KOLHAPUR (M.S.) INDIA

**Table 1 : Effect of sowing dates and weed control treatments on yield and yield attributing characters of rice**

Treatments	Panicles/ sqm	Weight/ panicle (g)	Panicle length (cm)	Test weight (g)	Grain yield (q/ha)
Sowing dates					
D <sub>1</sub> : Pre-monsoon	247.83	2.30	17.59	33.89	15.60
D <sub>2</sub> : Onset of monsoon	252.83	2.39	17.70	34.06	17.54
D <sub>3</sub> : Ten days after onset of monsoon	260.67	2.43	17.86	34.31	20.41
D <sub>4</sub> : Twenty days after onset of monsoon	266.67	2.66	18.07	34.49	23.00
C.D. (P=0.05)	3.05	0.06	0.30	0.23	0.77
Weed control measures					
W <sub>1</sub> : Unweeded control	235.00	1.88	16.58	28.88	5.72
W <sub>2</sub> : Weed free upto 60 DAS	261.00	2.60	17.51	34.87	21.68
W <sub>3</sub> : One spray of oxadiazon @ 0.4 kg a.i./ha	255.25	2.51	17.34	34.07	19.40
W <sub>4</sub> : Two sprays of oxadiazon @ 0.4 kg a.i./ha	277.25	2.71	19.58	37.63	26.37
W <sub>5</sub> : One spray of oxadiargyl @ 100 g a.i./ha	249.50	2.36	17.04	33.64	17.80
W <sub>5</sub> : Two sprays of oxadiargyl @ 100 g a.i./ha	264.00	2.63	18.72	36.05	23.85
C.D. (P=0.05)	3.72	0.06	0.34	0.39	0.71

sowing, respectively. Similarly, ten days after onset of monsoon sowing also recorded its superiority by recording 16.36 and 30.83 per cent higher grain yield over onset of monsoon sowing and pre-monsoon sowing, respectively. The similar findings were reported by Khan *et al.* (1990).

The two spray of oxadiazon @ 0.4 kg a.i./ha produced significantly higher number of panicles/sq.m., weight per panicle (g), panicle length (cm), test weight (g) and grain yield as compared to remaining sowing dates. Similarly, two sprays of oxadiargyl @ 100 g a.i./ha and weed free upto 60 days after sowing also proved significantly superior than one spray of oxadiazon @ 0.4 kg a.i./ha, one spray of oxadiargyl @ 100 g a.i./ha and unweeded control. The highest grain yield (26.37 q/ha) was recorded due to the two spray of oxadiazon. This is obviously due to efficient control of weeds at critical stages. The lowest grain yield (5.72 q/ha) was recorded in unweeded control due to weed competition prior to panicle formation stage, hindered the development of spikelets and ultimately affected grain yield. The two sprays of oxadiazon @ 0.4 kg a.i./ha and oxadiargyl @ 100 g a.i./ha produced 361 and 316 per cent higher grain

yield compared to weedy check, respectively. This results are close conformity with results reported by Tiwari *et al.* (1990) and Patil (1980).

#### **Effect of weed control measures on weeds:**

The dominant weed species observed in unweeded plot were *Echinochloa* spp., *Echinochloa colonum*, *Cyperus rotundus* and *Mimosa pudica*. The weed population and mean dry weight were significantly higher in pre-monsoon sowing and lowest values observed in twenty days after monsoon sowing followed ten days after monsoon sowing at harvest (Table 2). There was significant reduction in dry weight of weeds and total weed count with the imposition of weed control treatments over unweeded check. Two sprays of oxadiazon @ 0.4 kg a.i./ha reduced weed population and weed dry weight significantly over remaining treatments followed by two sprays of oxadiargyl @ 100 g a.i./ha. Among different herbicides two sprays of oxadiazon pre and post-emergence (45 days after sowing) had maximum weed control efficiency (60.70 %) which was followed by two sprays of oxadiargyl. The effective weed control with

**Table 2 : Grain yield (q/ha) as affected by interaction of sowing dates x weed control measures**

Treatments	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>
W <sub>1</sub> : Unweeded control	3.88	4.60	4.80	9.60
W <sub>2</sub> : Weed free upto 60 DAS	17.52	20.80	22.80	25.60
W <sub>3</sub> : One spray of oxadiazon @ 0.4 kg a.i./ha	16.70	18.03	20.10	22.78
W <sub>4</sub> : Two sprays of oxadiazon @ 0.4 kg a.i./ha	22.80	23.80	28.67	30.20
W <sub>5</sub> : One spray of oxadiargyl @ 100 g a.i./ha	14.50	16.00	19.70	21.00
W <sub>5</sub> : Two sprays of oxadiargyl @ 100 g a.i./ha	18.20	22.00	26.40	28.80
C.D. (P=0.05)	1.47			

**Table 3 : Total weed population per 0.25 m<sup>2</sup>, mean dry weight of weeds (g) per 0.25 m<sup>2</sup> and weed control efficiency (%) as affected by various treatments at harvest**

Treatments	Total weed population (0.25 sq.m.)	Mean dry weight (g)	Weed control efficiency (%)
Sowing dates			
D <sub>1</sub> : Pre-monsoon	106.49	72.10	-
D <sub>2</sub> : Onset of monsoon	100.17	67.03	-
D <sub>3</sub> : Ten days after onset of monsoon	94.62	63.74	-
D <sub>4</sub> : Twenty days after onset of monsoon	87.62	59.30	-
C.D. (P=0.05)	4.65	2.72	-
Weed control measures			
W <sub>1</sub> : Unweeded control	143.41	90.18	-
W <sub>2</sub> : Weed free upto 60 DAS	88.09	59.22	54.94
W <sub>3</sub> : One spray of oxadiazon @ 0.4 kg a.i./ha	98.17	65.82	53.48
W <sub>4</sub> : Two sprays of oxadiazon @ 0.4 kg a.i./ha	70.42	51.85	60.70
W <sub>5</sub> : One spray of oxadiargyl @ 100 g a.i./ha	105.84	70.01	50.75
W <sub>5</sub> : Two sprays of oxadiargyl @ 100 g a.i./ha	77.41	55.18	57.90
C.D. (P=0.05)	4.58	3.68	-

post emergence application of herbicides (45 DAS) may be due to slowing down the process of dry weight accumulation by weed flora. Further, the vigorous crop growth may have also had a smoothening effect on weeds and there by reduced weed dry weight. Trivedi *et al.* (1986) observed oxadiazon was most effective for weed control in rice.

#### Interaction:

The interaction effect of sowing dates and weed control measures was also found to be significant and showed a positive correlation due to higher crop canopy and less density of weeds (Table 3). Twenty days after onset of monsoon sowing produced significantly higher grain yield (30.20 q/ha) where the weeds were controlled by using two sprays of oxadiazon @ 0.4 kg a.i./ha over the remaining sowing dates followed by two spray of oxadiargyl @ 100 g a.i./ha (28.8 q/ha). Twenty days after onset of monsoon sowing was constantly superior over all the weed control measures. All the sowing dates recorded lowest and almost similar grain yield in unweeded control except twenty days after onset of monsoon sowing in which yield was more than double as compared to rest of unweeded treatment.

## REFERENCES

**Dayanand (1987).** Studies on weed control in drilled sown upland paddy (*Oryza sativa* L.). *Mysore J. Agril. Res.*, **21** (1) : 86-87.

**Khan, I.M., Namdeo, K.N. and Singh, R. (1990).** Performance of upland rice cultures under different dates of sowing. *Indian J. Agron.*, **35** (3) : 298-300.

**Lakpale, Tuteja, S.S., Pandey, N. and Tripathi, R.S. (1994).** Effect of planting time and fertility level at grain yield of rice. *Indian J. Agron.*, **39** (4) : 624-626.

**Moody, K. and Mian, A.L. (1972).** Weed control in rainfed rice selected papers from. *Int. Rice Res. Conf. Has Banos, Philippines*, 235-245.

**Patil, N.C. (1980).** Comparative studies on chemical and cultural methods of weed control in direct selected upland khat rice. Var. R-24 under high rainfall condition. M.Sc. (Ag.) Thesis, Dr. B.S. Konkan Krishi Vidyapeeth, Dapoli.

**Singh, R.S., Ghosh, D.C. and Srivastava, V.C. (1991).** Studies on production factors imitating yield attributes and yield of rainfed rice. *Indian J. Agron.*, **36** (2) : 159-164.

**Tiwari, A.N., Suresh Chandra and Singh, V. (1990).** Chemical weed control in direct seeded paddled rice. A paper presented at Biennial conference of Indian Society of Weed Science held at Jabalpur, pp. 10.

**Trivedi, K.K., Tiwari, J.P. and Bisen, C.R. (1986).** Integrated weed control in upland drilled rice. *Field Crop Abstract*, **39** (6) : 487.

Received : September, 2009; Accepted : November, 2009