

Effect of protective irrigation on early and mid-late transplanted paddy

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ABSTRACT

Field experiments were conducted during wet season of 1999, 2001 and 2002 at three locations of Agricultural Research Station, Sindewahi, Sakoli and Nagegaon bandh of Eastern Vidarbha Zone (M.S.) to study the effect of protective irrigation on transplanted paddy of mid-late and early varieties. The location pooled means indicated that two protective irrigations during dry spell increased grain yield of transplanted paddy by 14 and 33 percent over one irrigation and control, respectively. The performance of mid-late variety Sye-75 (135 day duration and Sye-1 (120 day duration) were similar in respect of grain yield. The interaction effect of protective irrigation and variety was absent.

Key words: Protective irrigation, variety

Paddy grown in Eastern Vidarbha zone is totally dependent on rainfall. Through average annual rainfall of this zone is more than 1200 mm erratic distribution of rainfall and continuous dry spell is the major constraint for low productivity of paddy during the reproductive stage. Mostly zone, Paddy is most sensitive to water deficit during the reproductive stage of crop. Water deficit at early growth stages may reduce vegetable growth. The yield is least affected if adequate water is provided to the crop before panicle initiation. This problem can be overcome if efforts are being made to collect excess rain water in watershed and use for protective irrigations. Keeping this in view the experiment was conducted to boost up the productivity of paddy by giving one or two protective irrigations during reproductive phase of crop.

Field experiment were conducted during wet season of 1999, 2001 and 2002 at the farms of Agricultural Research Stations, Sindewahi, Sakoli and Nevegaon bandh of Eastern Vidarbha Zone of Maharashtra. The soils at three locations were sandy clay loam in texture, neutral in reaction (pH-6.7 to 7.2), low in electrical conductivity (EC-0.12 to 0.22 dsm⁻¹), low in organic carbon (0.42 to 0.58%), low in available N (211 to 241 kg ha⁻¹), medium in available P (27.0 to 38.5 kg ha⁻¹) and in available K (230-242 kg ha⁻¹).

Three protective irrigation treatments i.e. I₀-N₀ irrigation (control), I₁—one irrigation during dry spell

of 10 days (after monsoon break) and I₂—two irrigations during two dry spell of 100 days (after monsoon break) each were taken as main plots treatments and two varieties i.e. V₁-SYE-1 (Early 120 days duration) and V₂-SYE-75 (Mid late 135 days duration) as sub plot treatments were tested in split plot design with four replications. Protective irrigations were given during reproductive stage of crop. Every year nursery was sown during June and transplanting was completed by the end July. The recommended fertilizer dose of 100:50:50 kg NPK ha⁻¹ was applied. The spacing of 20 cm x 15 cm was used for transplanting. Plant protection measures were taken as per recommendation and necessity. The average annual rainfall received during 1999-2002 at three locations of Eastern Vidarbha Zone was 1280.4 mm. Excess rains than the requirement of crop was mostly received in the month of July and August. That excess runoff was collected in watershed and used for one or two protective irrigations. The average rainfall received after transplanting to harvest i.e. from 29th MW to 46th MW was 708.7 mm at three locations. The average rainy days from transplanting to harvest were 36. Drought period, have been observed about 37 days in two or three splits during reproductive phase at three locations.

Three years pooled data of grain yield of paddy (Table 1) at different locations viz., Sindewahi, Sakoli

Table 1. Mean grain yield as influenced by various treatment over locations

Treatments	Mean grain yield (t ha ⁻¹)			Location pooled means (t ha ⁻¹)
	Sindewahi	Sakoli	N.bandh	
II ₀ – No irrigation	27.54	21.16	17.61	22.12
I ₁ – One irrigation during dry spell	32.45	24.33	20.82	25.87
I ₂ – Two during irrigation dry spell	35.88	28.80	24.43	29.51
SE ±	0.98	0.47	0.42	0.29
CD (P=0.05)	3.39	1.65	1.45	1.02
V ₁ – Sye -1	30.74	24.56	19.85	25.04
V ₂ – Sye – 75	30.18	24.62	22.05	26.62
SE ±	0.51	0.80	0.37	0.56
CD (P=0.05)	1.64	NS	1.19	NS
Interaction				
SE ±	2.05	1.38	1.55	1.30
CD (P=0.05)	NS	NS	NS	NS

Table 2. Mean cost of cultivation, gross, net monetary return and C:B ratio as influenced by protective irrigation and varieties

Treatment	Cost of cultivation	Grain yield (t ha ⁻¹)	Straw yield (t ha ⁻¹)	Gross return (Rs ha ⁻¹)	Net return (Rs ha ⁻¹)	C:B ratio
Protective irrigations						
I ₀ – No irrigation	10464	22.12	27.95	11796	1332	1.12
I ₁ – One irrigation	10805	25.87	31.18	137.65	2960	1.27
I ₂ – Two irrigation	11146	29.51	36.16	15714	4568	1.40
Varieties						
V ₁ – Sye -1	10872	25.04	31.42	13799	2927	1.26
V ₂ – Sye – 75	10738	26.62	33.23	13708	2970	1.27

(Average seed cost-Sye-1 Rs.1600 q⁻¹ and Sye-75 Rs. 1333 q⁻¹, Average selling rate of grain Sye-1 Rs.526 q⁻¹ and Sye-75 Rs.490 q⁻¹, average cost of irrigation Rs.341 per irrigation)

and Navegaon bandh indicated that two protective irrigations during dry spell gave significantly higher grain yield over one irrigations and control. At Sindewahi, Sakoli and Navegaon bandh the percent increase in grain yield due to application of two protective irrigations over control were 30.28, 33.27 and 38.72 percent, respectively and 10.57, 15.90 and 17.33 percent over one irrigation Pande, 1976.

Location pooled means of grain yield in respect of paddy varieties indicated that midlate variety SYE-75 and early variety SYE-1 were similar in grain yield. Patra and Nayak (2001) reported non significant differences in grain yield of 135 days duration Bipura and 100 days duration Parijat under irrigated condition.

The interaction effect was absent. From the economics (Table 2) it was found that two protective irrigations increased the net monetary returns (Rs. 4568 ha⁻¹) and cost benefit ratio (1.40) over control and one irrigation.

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