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EFFECTIVE WATER MANAGEMENT OF RAGI GROWN IN SUMMER RICE FALLOWS UNDER TANK IRRIGATION*

In the case of rice grown in summer season under tank irrigation, there is often a risk of crop failure due to the shortage of water at the end of the growing season. Since rice is a crop of high water requirement there is a need for crop diversification in the summer season in order to achieve maximum efficiency of the water stored in the tanks. Tank fed areas maintain a relatively high water table during periods of water availability in tanks. Studies on the effect of high water table and residual soil moisture on the water requirement of ragi grown in summer rice fallows are meagre. Water requirement of ragi grown in upland was reported to range from 38 to 65 cm as per the trials conducted in different agro-climatic regions (Patil *et al.*, 1969; Sivanappan and Balasubramanian, 1974; Hegde *et al.*, 1975; Rao, 1978).

Since ragi is a prominent cereal crop in Karnataka, a need was felt on estimating the water requirement of this crop when grown in summer rice fallows of tank fed areas. Hence a field experiment was taken up during the summer season of 1983 in randomised block design with three levels of irrigation replicated six times. The soil of the experimental site was sandy loam. For all the irrigation treatments one common irrigation was given at the time of sowing. The I_1 treatment received subsequent irrigation to maintain 60 to 100 per cent available soil moisture at 0 to 30 cm depth of soil. Stored soil moisture status (0 to 30 cm) was computed periodically to decide the necessity of irrigation and the depth of water to be applied. I_2 treatment received three subsequent irrigations i. e., at the time of fertilizer top dressing, flowering and grain filling. I_3 treatment received only two more irrigations i. e., at fertilizer top dressing and flowering.

Data on the biometric observations, yield and yield attributes are presented in the Table 1. The vegetative growth of plant as could be noticed through plant height and number of tillers per plant was better under the i_1 level of irrigation. This was reflected on the total dry-matter production and finally the grain yield also. However the grain yield and straw yield are statistically on par under both the I_1 and I_2 levels of irrigation, but there was a difference of 3.96 cm in the total water requirement. In the experimental site it was further observed that the depth to the water table was receding in summer from planting to harvest. The water table depths receded from 20.61 to 63.30 cm during the crop period. The total water use was calculated based on the water storage capacity and the soil moisture contribution of 0 to 30 cm depth of soil only. The contribution of high water table in meeting the water need of crops was earlier reported by Bertrand (1973) and Pande *et al.* (1979).

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Table 1

Effect of levels of irrigation on the biometric characters at harvest, yield and yield attributes of ragi grown in summer rice fallows

Treatments	Plant height (cm)	No. of tillers/ plant	Ear dry weight (g/ plant)	Total dry weight (g/ plant)	No. of ear heads/ plant	Length of ear head (cm)	Test weight (g/1000 grains)	Grain yield (q/ha)	Straw yield (q/ha)	Harvest index	Water use (cm)	Water use efficiency (kg/ha cm)
I_1	71.12	3.52	18.98	30.86	4.65	7.69	2.47	36.67	36.87	0.497	18.39	199.4
I_2	63.62	2.81	17.00	27.94	4.33	7.99	2.41	32.68	34.33	0.487	14.43	226.5
I_3	60.40	3.01	14.57	25.08	3.75	7.60	2.41	27.99	32.92	0.435	11.00	254.4
SEm±	1.764	3.043	1.135	1.294	0.260	0.292	0.041	1.891	1.306	0.020	—	12.514
CD(0.05)	5.558	NS	0.575	4.077	0.819	NS	NS	5.958	NS	NS	—	39.443

Hence under tank irrigated summer rice fallows with receding water table condition a good crop of ragi can be expected with four irrigation or about 14.43 cm of water.

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