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Short communication

Radiation use efficiency in pearl millet as influenced by various *in-situ* moisture conservation techniques

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Pearl millet, a staple food crop, is being grown during *kharif* season in scarcity zone of Maharashtra. In order to assess suitable moisture conservation techniques for increasing moisture and radiation use efficiency, in rainfed pearl millet crop, an experiment was conducted on shallow soil (30 cm depth) at Dry Farming Research Station, Solapur (17° 41' N, 75° 44' E and 479 m AM SL) during the year 1995.

Pearl millet crop (ICTP 8203) was sown under various *in-situ* moisture conservation techniques (Table 1) on 5th July, 1995 except dry seeding, which was done on 15th June, 1995. The experiment was laid out in Randomised Block Design with three replications. The crop received 50 kg N and 25 kg $P_2O_5 ha^{-1}$ at sowing. Photosynthetically active radiation viz., incident (PAR_o), transmitted (TPAR), reflected by canopy ($RPAR_c$) and soil ($RPAR_s$) were measured at 15 day interval by using line quantum sensor. Simultaneously biomass production was recorded. Periodical radiation use efficiency was estimated by dividing the amount of biomass production (g m^{-2}) to the amount of light absorbed (MJ m^{-2}) as per Gallow and Doughtny (1986).

Radiation use efficiency was initially low due to less leaf area index. From 30 days of crop growth the RUE increased and reached maximum at 60 days of the crop growth. It decreased later due to leaf senescence. Marshall and Willey (1983) also observed higher RUE at 60 days after sowing due to maximum leaf area in pearl millet. The results are also in consonance with those reported by Willey and Rao (1977).

Table 1 also reveals that grain yield was the highest in the treatment of preparation of ridges and furrows before sowing (32.04 q ha^{-1}) followed by inter-cultivation (31.07 q ha^{-1}). Ridge and furrow sowing as *in-situ* moisture conservation technique was found suitable for pearl millet crop as reported by Reddy et al. (1992).

Regression equation was worked out for estimating from grain yield RUE and leaf area index; it was found to be significant. The equation is as follows

$$Y = 1.21 + 5.03 X_1 + 2.37 X_2 \quad ...(R^2 = 0.92)$$

where,

Y = grain yield ;

X_1 = leaf area Index at 60 days after sowing and

X_2 = RUE .

Thus it can be concluded that the preparation of ridges and furrows before sowing for pearl millet crop can be advised for better harvest of natural sources like light and water for dryland area.

Table 1. Radiation use efficiency (RUE), Leaf area index (LAI), Grain and stover yield of pearl millet crop

Treatments	Radiation use efficiency (g MJ^{-1})						Leaf area index						Grain yield q ha^{-1}	Stover yield q ha^{-1}
Days after sowing :	15	30	45	60	75	90	15	30	45	60	75	90		
Normal sowing (45 x 15 cm)	0.23	1.08	3.14	3.78	3.32	3.06	0.05	1.48	3.19	3.97	1.10	0.56	30.65	36.01
Thinning to 1/3 plant population	0.21	1.06	3.04	3.57	3.23	2.99	0.03	1.11	3.10	3.58	1.10	0.51	26.67	37.04
Dry seeding +Thinning to 1/3 plant population	0.22	1.07	3.13	3.75	3.26	3.04	0.04	1.13	3.14	3.63	1.01	0.55	27.35	34.98
Mulching with sorghum stalks @ 5 t/ha	0.22	1.05	2.91	3.56	3.21	2.94	0.03	1.07	2.98	3.32	0.99	0.49	26.48	27.78
Preparation of ridges and furrows before sowing	0.25	1.16	3.37	3.94	3.57	3.27	0.06	1.98	3.94	4.21	1.74	0.65	32.04	44.24
Sowing with ridges and furrows	0.24	1.09	3.28	3.81	3.49	3.18	0.05	1.67	3.24	4.05	1.14	0.61	30.77	39.09
Inter-cultivation	0.25	1.11	3.31	3.81	3.55	3.25	0.06	1.68	3.44	4.12	1.29	0.63	31.07	41.15
1/3 seed rate (45 x 22.5 cm)	0.21	1.03	2.85	3.48	3.18	2.87	0.03	1.04	2.68	3.14	0.74	0.38	26.17	41.15
S. E.	0.006	0.014	0.066	0.056	0.057	0.052	0.005	0.126	0.129	0.139	0.102	0.031	0.864	1.781
C.D. (0.05)	0.014	0.034	0.157	0.134	0.134	0.122	0.110	0.298	0.306	0.330	0.242	0.074	2.044	4.212

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