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Short Communications

Note on Response of Pearl Millet 'HB 3' to Soil Moisture Regimes, Nitrogen and Phosphorus in the Summer Season

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A field study was conducted during the year 1972 at Junagadh campus of the Gujarat Agricultural University, to investigate response of pearl millet 'HB 3' to N, P_2O_5 and soil moisture regimes (fixed for 0·45 cm soil depths) during the summer season. Eighteen treatment combinations with five replications in a split plot design involved three moisture regimes (I_1 — Dry regime—irrigation at 25% available moisture, I_2 — moist regime—irrigation at 50% available moisture and I_3 — wet regime—irrigation at 75% available moisture) in main plots and three levels of nitrogen (N_1 — 50 kg N/ha, N_2-100 kg N/ha and N_3-150 kg N/ha) combined with two levels of phosphate P_0-0 kg P_2O_5/ha and P_1-75 kg P_2O_5/ha) in the sub-plots. The soil of the experimental plot was clayey in texture with fair status of total nitrogen, low status of available phosphate and high status of available potash. It was alkaline having pH ranging from 8·1 to 8·5. The gross and net plot sizes were 8·0 m × 4·8 m and 6·0 m × 2·4 m, respectively. A blanket application of 75 kg/ha of K_2O was given to all the plots prior to sowing by a country seed drill. The values of soil moisture constants were as under:

Particulars	*Values at different soil depths (cm)*		
	0-15	*15-30*	*30-45*
Field capacity, %	24·6	23·8	21·8
Permanent witting point, %	9·8	10·3	13·6
Bulk Density, g/cm³	1·30	1·29	1·29

Data showing the effect of different treatments on grain and straw yield as well as yield attributes are presented in Table 1. The grain and straw yields were significantly affected by different soil moisture regimes. Significantly the highest grain yield was obtained under the treatment I_3 followed by the treatment I_2. The growth and yield attributing characters viz., effective tillers per plant, earhead length and 1000 grain weight increased with the decrease in the soil moisture stress and this was reflected in the highest grain and straw yields obtained under the treatment I_3. The water requirements under I_3, I_2, and I_1 were 67·69, 65·46 and 55·74 ha cm, respectively. It was thus obvious that it is better to irrigate summer pearl millet crop frequently to obtain higher yields during its life period of 90 days.

Significantly higher grain and straw yields were obtained by increasing the levels of nitrogen. The application of phosphate over no phosphate had a

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TABLE 1

Effect of different treatments on yield and other characters of pearl millet 'HB 3'.

Treatments	*Yield,kg/ha*		*Effective tillers/plant*	*Length of earhead, cm*	*Grain weight/ plant, g*	*1000 grain weight, g*
	grain	*straw*				
*Moisture regimes**						
I_1 (Dry)	1389	4564	2·30	18·48	21·38	5·90
I_2 (Moist)	1746	5209	2·81	18·74	22·85	6·14
I_3 (Wet)	2031	5646	3·24	18·93	23·43	6·18
S. Em ±	37	97	0·27	0·07	0·10	0·04
C. D. at 5%	118	310	0·84	00·23	0·33	0·13
Nitrogen (kg/ha)						
N_1 (50)	1460	4733	2·40	18·53	20·88	5·82
N_2 (100)	1772	5205	2·81	18·75	23·01	6·16
N_3 (150)	1933	5483	3·14	18·87	23·77	6·24
S. Em ±	34	62	0·04	0·09	0·16	0·04
C. D. at 5%	96	177	0·12	0·27	0·45	0·11
Phosphate (P_2O_5/ha)						
Po (0)	1564	4891	2·57	18·59	21·63	5·93
P_1 (75)	1880	5389	2·99	18·84	23·47	6·22
S. Em ±	28	51	0·03	0·08	0·13	0·03
C. D. at 5%	79	144	0·10	0·22	0·37	0·09

* I_1 = Five irrigations scheduled on 12th and 27th March, 11th and 25th April and 10th May.
I_2 = Eight irrigations scheduled on 8th, 18th and 28th March, 6th, 16th and 26th April, 4th and 15th May.
I_3 = Twelve irrigations scheduled on 5th, 11th, 17th, 23rd and 25th March, 5th, 11th, 17th, 23rd and 29th April, 8th and 14th May.

significantly favourable effect on plant height, number of internodes, effective tillers per plant, length and girth of earhead and 1000 grain weight which ultimately increased the grain and straw yields of pearl millet.

Data pertaining to the interaction between soil moisture regimes and levels of nitrogen are presented in Table 2. These data indicated that the treatment combination I_3N_3 gave significantly the highest grain yield (2271 kg/ha). Significantly the lowest grain yield was obtained under the treatment combination I_1N_1.

TABLE 2

Interaction effect of soil moisture regimes and levels of Nitrogen on grain yield (kg/ha) of pearl millet.

Levels of nitrogen	*Soil moisture regimes*		
kg/ha	*Dry*	*Moist*	*Wet*
50	1230	1433	1717
100	1473	1741	2104
150	1445	2055	2271
S.Em ±:59	C.D. at 5%: 165		

The results of this study thus indicated that the maximum production from summer pearl millet under Junagadh conditions can be obtained by scheduling irrigation at 75% available moisture and fertilizing the crop with 150 kg N and 75 kg $P_2 0_5$ per hectare.

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