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PERFORMANCE OF WHEAT VARIETY UNDER LIMITED MOISTURE SUPPLY CONDITIONS IN HEAVY SOILS

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ABSTRACT

Performance of wheat varieties under limited moisture supply conditions on heavy soils showed that two irrigations increased grain production over no post-sowing irrigation and one irrigation by 46 and 23 per cent respectively. Straw yield increased due to two irrigations at CRI and flag leaf stage by 56 and 14 per cent over no post-sowing irrigation and irrigation at CRI stage respectively. The variety HI-601 gave maximum grain yield followed by J-40, Kalyan Sona and Sonalika.

KEY WORDS: Wheat, Irrigation, Varieties.

The role of irrigation in wheat productions which incidentally is a limiting factor in

heavy soils area of central wheat zone. The water management studies on the irrigation given at different physiological stages of growth indicated that reduction in yield due to moisture stress at different growth stages affect production to a greater extent (Cheema et al., 1973 and Singh et al., 1975). Studies on number and time of irrigation under limited and sufficient water supply conditions have suggested different combinations of growth stages for one or other cultivar of wheat to obtain higher wheat production (Sharma, 1969; Chauhan et al., 1970 and Patel et al., 1971). In the condition of central wheat zone where sufficient water for two to three irrigation is available, by planting suitable variety, higher grain yield of wheat can be obtained. The present study was, therefore, undertaken to find out suitable variety for limited water supply conditions.

MATERIALS AND METHODS

A field experiment was conducted during rabi season of 1975-76 and 1976-77 at Agronomy Farm of College of Agriculture, Udaipur. The soil of the experimental field was moderately fertile clay loam and slightly alkaline in reaction

(pH 8.4). The treatment consisted of three irrigation levels (no irrigation, one irrigation at CRI and two irrigation at CRI and flag leaf) and ten wheat varieties (NP 718, NPO-190, JNK-4 W-184, HD-4530, J-40, J-142; HI-601, Sonalika, Kalyan Sona and Raj-911). The experiment was conducted in split plot design assigning irrigation levels to main plot and varieties to sub plot with three replications. The measured quantity of water was applied at each irrigation of 6 cm depth. One pre-sowing irrigation of 75 cm. depth was also applied uniformly to all the treatments to assure germination.

RESULTS AND DISCUSSION

Application of two irrigation at CRI and flag leaf stage produced significantly higher grain yield as compared to no post-sowing irrigation (Table). Application of two irrigations increased grain yield by 11.47 and 7.37 q/ha during 1975-76 and 6.68 and 3.26 q/ha during 1976-77 over no post sowing irrigation and one irrigation respectively. The mean increase in grain production due to two irrigations over no post-sowing irrigation and one irrigation was 9.03 and 5.32 q/ha representing 46 and 23 per

Table. Effect of irrigation and varieties on yield and its contributors

Treatments	Grain (kg/ha)		Straw (kg/ha)		No. of spikes/m row		1000 grain wt. (g)		
	1975-76	1976-77	1975-76	1976-77	1975-76	1976-77	1975-76	1976-77	
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	
Irrigation:									
No irrigation	1926	2041	2753	2922	2837	26.0	42.0	39.0	32.23
One irrigation	2336	2373	3786	3990	3888	44.7	56.7	50.7	32.47
Two irrigations	3073	2699	4227	4643	4435	50.8	62.3	56.5	36.31
C.D. 5%	666	564	878	585	-	7.9	11.9	-	2.42
Varieties									
NP-718	2220	2275	4542	3603	4072	48.4	57.5	52.9	31.86
NP0-190	2382	2094	3553	3945	3749	41.1	48.6	44.8	35.71
JMK-4 W-184	2341	2253	3988	3603	3345	44.0	47.6	45.8	34.80
HO-4530	2503	2072	2846	3422	3134	40.7	51.8	46.2	36.82
J-40	2765	2596	3533	4065	3799	45.2	51.7	48.4	32.64
J-142	1958	2275	2987	3804	3395	43.0	63.2	53.1	31.58
HI-601	2926	3059	3755	4670	4212	50.8	74.2	62.5	29.43
Sonalika	2523	2374	3654	3543	3598	46.3	46.1	46.2	39.21
Kalyan Sona	2503	2818	3977	4116	4104	41.2	66.6	53.9	28.63
Raj-911	2503	1891	4057	3643	3850	38.8	35.2	37.0	36.02
C.D. 5%	424	512	655	838	-	7.1	13.94	-	2.03

cent respectively. Applying one extra irrigation at flag leaf stage over CRI gave 23 per cent higher yield. Similar response was observed by Cheema et al. (1973) who found that irrigation missed at CRI caused a reduction of 27 per cent in grain yield and the decrease in yield was about 60 per cent when two consecutive irrigations were missed at CRI and late tillering stage.

Increasing levels of irrigations increased the straw yield significantly. Application of irrigation at CRI and flag leaf stage increased straw yield by 14.74 and 10.33 q/ha during 1975-76 and 17.31 and 9.68 q/ha during 1976-77 respectively. Mean increase in straw yield due to two irrigation at CRI and flag leaf stage was 15.98 and 10.51 q/ha representing 56 and 14 per cent over no post sowing irrigation and irrigation at CRI stage respectively.

The variety HI-601 out yielded JNK 4 W-184, NP-718, NPO-190 and J-142 by 4.85, 4.44, 4.85 and 8.68 q/ha during 1975-76 and 9.876, 9.65, 8.06 and 7.84 q/ha during 1976-77. The mean data show that variety

HI-601 gave maximum grain yield (29.42 q/ha) followed by J-40, Kalyan sona and Sonalika which produced 26.80, 26.60 and 24.40 q/ha respectively. The straw yield was significantly affected due to varieties during both years. The variety NP-718, Raj-911 and Kalyan sona produced maximum straw yield and difference among them were not significant during the year 1975-76. In the year 1976-77 the variety HI-601, Kalyan sona and J-40 produced higher straw yield. The mean data show that HI-601 produced maximum straw yield (42.12 q/ha) followed by Kalyan sona, NP-718 and Raj-911.

number of spikes per meter row length has increased with increase in number of irrigation during both years. The mean data show that application of two irrigation increased the number of spikes by 44.8 and 11.4 per cent over no irrigation and one irrigation respectively. The variety HI-601 bore maximum number of spikes/m row (50.8) followed by NP-718, Sonalika and J-40 during 1975-76. In the year 1976-77 the variety HI-601 recorded highest number of spikes/meter row length followed

by Kalyan sona and NP-718. The mean data show that maximum number of spikes (62.5) was recorded with variety HI-601 followed by Kalyan sona and J-142.

The test weight increased with increase in number of irrigation significantly during both years. Applications of one and two irrigation increased test weight by 2.65 and 7.39 grams during 1975-76 and 0.25 and 3.84 grams during 1976-

77 over no irrigation respectively. The mean data show that the increase in test weight due to one and two irrigations over no irrigation was 1.49 and 4.19 grams respectively. Among varieties Raj-911 recorded highest test weight during 1975-76 and Sonalika during 1976-77. The mean data show that variety Raj-911 recorded highest test weight (42.3 g) followed by Sonalika (41.6 g) and NPO 190 (40.5 g).

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