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Effect of Irrigation Intervals, Post-sowing Planking and Sowing Methods on Wheat

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A field experiment with four irrigation intervals and two methods of sowing seeds and drilling fertilizer with and without post sowing planking was conducted in 1970—71 and 1971—72. Higher yield was obtained when irrigation was given at 16 days intervals. Water use efficiency varied with the wheat varieties tested. Post sowing planking was found to be a waste and dispensing with this practice increased the grain yieldby 2.5 q/ha. in wheat.

Wheat is an important crop on clay loam calcareous soils of Udaipur and Kota rogions, where assured irrigation is available. The potential evaportranspiration during wheat growing season in this area is approximately 500 mm and consumptive use is about 80% of this. To supply 400 mm of water, eight irrigatiens of 50 mm water each will be required.

It would, therefore, be of interest to ascertain the extent of reduction in yield with each decrease of 50 mm in irrigation. Variation in methods of sowing and post-sowing planking may also affect water use efficiency. Post sowing planking compacts the seedbed and leads to enhanced evapotranspiration and weed growth. This study was taken up to investigate the effect of irrigation leads, and post-sowing planking on wheat.

MATERIAL AND METHODS

Treatments of the experiment consisted of irrigation at four intervals, two methods of sowing i.e. drilling seeds, urea and diammonium phosphate together and broadcasting urea before sowing, drilling diammonium phosphate and sowing behind it, with and without post-sowing planking. Variety S 308 in the first year and variety HD 1941 in the second year was used as test crop. The crop was planted after pre-sowing irrigation of 50 mm and first irrigation was given 21 days after sowing in both the years. Each time 50 mm of water was given. The irrigation intervals were 33, 25, 20 and 16 days after first irrigation in treatments receiving 4, 5, 6 and 7 irrigation respectively, in addition to a common pre-sowing irrigation. The experiment was conducted at the Agronomy farm of the College of Agriculture, University of Udaipur, Udaipur, in 1970—71 and 1971-72. The crop received 100 46 and 30 Kg/ha of N, P_2O_5 and K_2O, respectively.

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TABLE I Effect of irrigation, methods of sowing and post-sowing planking on wheat.

Treatments	Grain Yield (q/ha)		Straw Yield (q/ha)		weed dry matter (q/ha)	
	1970—71	1971—72	1970—71	1971—72	1970—71	1971—72
4 irrigations	29.96	24.55	60.37	34.65	19.39	16.82
2 irrigations	32.11	32.92	67.25	39.62	20.38	18.59
6 irrigations	32.25	39.00	62.78	45.70	22.18	20.61
7 irrigations	37.04	50.35	70.93	54.28	24.32	22.61
SEm ±	1.54	1.80	1.75	0.50	1.92	2.06
CD at 5%	4.25	5.06	4.82	1.41	NS	NS
Seed and fertilizer drilled together	32.70	37.90	64.87	42.91	21.04	19.57
Drilling fertilizer and sowing behind the plough	33.00	38.37	65.78	45.14	21.84	19.71
SEm ±	1.09	1.27	1.23	0.35	1.37	1.46
CD at 5%	NS	NS	NS	0.87	NS	NS
Post-sowing planking	31.54	35.33	65.06	42.69	22.03	20.53
No post-sowing planking	34.12	37.95	65.59	44.45	20.82	18.74
SEm ±	1.09	1.27	1.23	0.35	1.37	1.48
CD at 5%	NS	NS	NS	0.87	NS	NS

TABLE II Effect of irrigation levels on water use efficiency by wheat

Treatment	Water use efficiency (q/ha cm of water)	
	1970—71	1971—72
25 cm of water	1.18	0.98
30 cm of water	1.07	1.09
35 cm of water	0.92	1.11
40 cm of water	0.92	1.26

RESULTS AND DISCUSSION

The highest yield of wheat grain and straw was obtained with 7 irrigations in both the years (Table I). Yield of wheat grain obtained with 4, 5 and 6 irrigations was 7.08, 4.93 and 4.79 q/ha less than that obtained with 7 irrigations in the first year and 25.80, 17.43 and 11.35 q/ha less in the second year, raspectively. The variety HD 1941 was more sensitive to moisture stress than S 308. Variety S 308 was not benefitted as much from increased irrigation as variety HD 1941.

Increasing the number of irrigations slightly increased the harvest index of HD 1941, whereas the harvest index of variety S 308 was not affected. Drilling of seeds, urea and diammonium phosphate together did not reduce yield in comparison with standard practices of sowing seed behind the plogh. Dispensing with post-sowing planking increased the grain yield by about 2.5 q/ha in both the years.

Weed dry matter production increased with increasing number of irrigations. Dispensing with post-sowing planking reduced the growth of weeds but the differences were not significant.

There was a significant correlation between the amount of water used and grain yield in both the years (0.92 and 0.99 in 1970—71 and 1971—72 respectively). Beyond four irrigations every increase of 50mm in the amount of irrigation water increased grain yield of wheat S 308 bv about 2.0 q/ha and of variety HD 1941 by about 8.0 q/ha.

Water use efficiency of wheat S 308 was the maximum with 5 irrigations including the pre-sowing one, whereas it was the highest with eight irrigations in the case of H D 1941 (Table II). Water use efficiency in S 308 tended to decrease from 1.19 q/ha per cm of water used with 5 irrigations to 0.92 q/ha per cm of water used with 8 irrigations, whereas it increased from 0.9 q/ha per cm of water used to HD 1941 with 5 irrigations to 1.26 q/ha per cm of water used with 8 irrigations. Increasing water use efficiency of wheat HD 1941 with increased total water applied may be due to better plant type and capacity of this variety to photosynthesise better under high moisture regimes.

In heavy calcareous soils wheat seed could be drilled along with urea and diammonium phosphate to supply not moret han 50Kg N/ha. This operation economises the use of labour (Kulhari. 1972). Post-sowing planking seems to be a wasteful practice in heavy and calcareous soils and decreased the grain yield by 2.5 q/ha in both the years. This decrease in the yield of wheat due to post sowing planking over no post sowing planking was due to poor germination of the crop and an enhanced weeds growth in the former. (Singh and Shaktawat, 1972).

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