

control treatments significantly increased the yield and yield attributes as compared to weedy check. Yield attributing characters as also grain and straw yield were significantly enhanced by two hand weeding, butachlor at the rate of 2.5 kg. a.i. /ha. and the combination of butachlor at the rate of 2.5 kg. a.i. /ha. + one hand weeding. Two hand weedings recorded maximum grain yield during the experimentation. It might have been due to resultant comparatively weed free environment the crop plant received. Under the situation, the plants were able to express genetic potential to the maximum. Application of butachlor at the rate of 2.5 kg a.i. /ha. and butachlor at the rate of 2.5 kg. a.i./ha. + one hand weeding also had comparatively lesser weed population which reflected in better growth, increased yield attributes and ultimately greater yield. These observations are in conformity with the findings of Kumar and Gill (1981). The interaction effect of fertility levels, spacings and weed control treatments was not significant with dry matter of rice, yield and yield component.

Increase in the fertility levels and narrow spacing increased the net return during both years. Application of weed control measures increased the gross as well as net return from rice cultivation. All

the weed control treatments fetched more return over weedy check. Hand weeding twice gave the maximum net return. Butachlor at the rate of 2.5 kg. a.i. /ha. + one hand weeding and butachlor alone were the other treatments in order of superiority. Higher net return under these treatments may be due to effective check on weed growth of the crop (Table 2) and ultimately higher grain and straw yield (Table 1).

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EFFECT OF SOWING DATES AND WHEAT CULTIVARS IN LATE SOWN CONDITION

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ABSTRACT

A field experiment was conducted on clay loam soil during *rabi* seasons of 1986-87 and 1987-88 at the New Dairy Farm of C.S.A. University of Agriculture and Technology, Kanpur (U.P.) to find out the effect of sowing dates and wheat cultivars in late sown condition. It was observed that December 5 sown crop gave highest yield than crops sown subsequently. However, December 5 sown crop being at par with December 20, sowing produced significantly more yield than January 6 sowing. Among cultivars, UP-115 being at par with K 816, HW 135, Sonalika and HP 1209 gave significantly higher yield than HUW 37, HD 1982 and K 7410. December 5 sown crop gave the highest returns with the highest net profit derived from UP.115 in late sown condition.

The sowing time of wheat in the North and Central Uttar Pradesh takes place from early November to late December. More than 50 per cent of the total area under wheat in these areas is generally sown late due to the harvesting of long duration paddy and other crops like sugarcane,

carrot and cauliflower. In low lying areas also, sowing of wheat is often delayed till late December or early January. Khan and Chatterjee (1981) have sown that average reduction in yield due to late sowing was about 5 Q/ha for every fortnight's delay in sowing after November 15. Further, there

Table 1. Effect of sowing dates and cultivars on yield components of wheat

Treatments	Length of spike (cm)		No. of grains/spike		1000-grain wt (g)		Wt. of grain /spike (g)	
	1986-87	1987-88	1986-87	1987-88	1986-87	1987-88	1986-87	1987-88
Sowing dates								
December 5	11.0	10.8	50.6	49.5	44.0	42.0	2.23	2.09
December 20	10.5	10.5	46.0	46.8	42.8	41.3	1.98	1.95
January 6	9.4	9.3	37.2	39.1	41.0	40.1	1.53	1.57
C.D at 5%	0.6	0.8	5.1	3.2	1.5	0.9	0.30	0.30
Cultivars								
HM-135	11.0	11.3	50.5	47.1	44.0	41.7	2.22	1.96
K.816	11.0	11.0	51.3	47.8	44.2	42.0	2.26	2.01
Sonalika	10.9	10.7	46.4	46.9	44.9	42.3	2.36	2.13
H.D.1982	8.9	8.3	36.3	41.1	41.0	39.9	1.49	1.64
H.P.1209	10.7	10.5	46.3	46.3	43.3	41.3	2.00	1.98
HUW-37	9.0	8.5	39.5	42.9	41.1	40.0	1.58	1.72
K 7410	9.0	8.8	34.0	39.8	40.8	39.7	1.39	1.58
UP-115	11.9	12.2	52.5	49.0	44.6	42.3	2.34	2.07
C.D. at 5%	1.5	1.8	6.5	3.0	1.8	1.1	0.38	0.18

are few cultivars which have shown persistent good response in late sown condition. The present investigation was, therefore, undertaken to determine the magnitude of losses due to delayed sowing and to find out suitable cultivars for late sown condition.

MATERIALS AND METHODS

As experiment was laid out at the New Dairy Farm, Kanpur in split plot design with four replications during the *rabi* seasons of 1986-'87 and 1987-'88. Three sowing dates *viz.*, December 5, December 20 and January 6 were kept in main plots and eight cultivars *viz.*, HW 135, K 816, Sonalika, HD 1982, HP 1209, HUW 37, K7410 and UP 115 in subplots. The soil of the experimental plot was clay loam with pH 7.5, total nitrogen 0.06 per cent, available phosphorus 36.5 kg/ha and available potash 140 kg/ha. A seed rate of 125 kg/ha with 15 cm row to row spacing was followed. The fertility schedule of 80+60+40 kg/ha of N+P₂O₅+K₂O was given to crop. Five irrigations were given to crop at the important physiological stages of plant growth in both the years. It was harvested on April 14 and April 16 in first and second year, respectively.

RESULTS AND DISCUSSION

Sowing dates

The grain and straw yields were found significant due to sowing dates in both the years.

The maximum grain and straw yields were obtained on December 5 sowing and thereafter yields were recorded in descending order. However, December 5 sowing being at par with December 20 sown crop, brought out significantly more grain and straw yields than January 6 sowing in both the years. The yield attributes *viz.*, length of spike, number of grains/spike, 1000-grain weight and weight of grains/spike (Table 1) also followed almost similar trend indicating that these parameters are jointly responsible for higher yield of December 5 and December 20 sown crop (Table 2). The significant reduction in yields of January 6 sown crop might be due to swift reduction in all yield components. Similar results have been obtained by Singh *et al.*, (1984) Singh and Dixit (1985) and Patel *et al.*, (1987).

Cultivars

Among cultivars, UP-115 gave highest yield followed by K 816, HW 135, Sonalika and HP 1209. The differences in grain yield of cultivars may be due to differences in all yield components. UP-115 being statistically at par with cultivars Sonalika, HP 1209, HUW 37, HW 135 produced significantly more straw yield than K 7410, HD 1982 and K 816 in both the years.

Net return

The net returns presented in Table 2 revealed that December 5 sown crop gave highest net returns

Table 2. Effect of sowing dates and cultivars on yield and economics

Treatments	Grain yield (q/ha)		Straw yield (q/ha)		Gross return (Rs/ha)		Net return Rs/ha		Mean
	1986-87	1987-88	1986-87	1987-88	1986-87	1987-88	1986-87	1987-88	
Sowing dates									
December 5	34.3	30.2	50.0	45.3	12604	11174	7014	5584	6299
December 20	29.3	26.4	46.5	42.2	10994	9924	5404	4334	4869
January 6	22.7	19.7	41.0	34.5	8816	7586	3226	1996	2611
C.D at 5%	5.2	4.4	3.8	3.9	-	-	-	-	-
Cultivars									
HM-135	31.5	27.6	47.3	41.6	11658	10224	6068	4634	5351
K.816	32.9	28.5	39.4	34.7	11576	10062	5986	4472	5229
Sonalika	30.9	25.9	51.0	43.7	11712	9874	6122	4284	5203
H.D.1982	23.6	21.1	39.4	37.3	8972	8146	3382	2556	2969
H.P.1209	30.7	27.2	49.2	42.8	11548	10184	5958	4594	5276
HUW-37	25.1	22.3	47.8	42.6	9896	8800	4306	3210	3758
K 7410	21.0	20.4	40.3	38.1	8298	7998	2708	2408	2558
UP-115	34.4	30.5	52.4	44.6	12776	11216	7186	5624	6405
C.D. at 5%	4.1	4.9	6.2	3.2	-	-	-	-	-

Note : Prevailing local prices have been considered for grain and straw yield (May 1991) Grain @ Rs 280/q and straw @ Rs 60/q

followed by subsequent dates. UP-115 gave highest net profit (Rs.6405.00/ha) while K-7410 appeared to provide lowest income (Rs.2558.00/ha).

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NITROGEN FERTILISATION AND IRRIGATION SCHEDULING IN MUSTARD UNDER JAWAI COMMAND AREA OF RAJASTHAN

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ABSTRACT

Investigations carried out for two years (89-90 and 90-91) at ARS, Sumerpur (Rajasthan Agricultural University) in sandy loam soil reveal that increasing levels of nitrogen upto 90 kg/ha significantly increased yield attributes, chlorophyll content of leaves, seed yield and oil content of mustard during both the years. Three irrigations to this crop at vegetative, flowering and seed development stages were found appropriate when judged in terms of yield, yield attributes and chlorophyll content. Oil content of seed was also improved significantly due to two (at veg. + flowering stage) and three irrigations compared to one (at vegetative stage).

Mustard (*Brassica juncea* (L.) Czern and Coss) is an important crop of Jawai Command Area of Rajasthan in about 50,000 ha. However, average productivity of the crop is low (5.1 q/ha) due to low nitrogen fertilisation (30 kg/ha) and poor irrigation management. Generally, 2-3 irrigations are made available (excluding pre-sowing) in command area

due to shortage of water as a major portion is kept reserve for civil supplies. However, irrigation schedule is not properly defined due to lack of research based recommendations hitherto.

Since the judicious use of water and balanced nitrogen fertilisation are the two most important