

Impact of improved agro-techniques on wheat (*Triticum aestivum*)

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ABSTRACT

Three field trials were conducted during winter (*rabi*) seasons of 1996–97 and 1997–98 on the farmer's fields under National Watershed Research Project, Kaldakhedi, Khandwa (East Nimar) of Madhya Pradesh. Sowing of wheat in fourth week of November proved significantly better than the earlier or later sowing dates, significantly maximum seed yield being 41.4 q/ha and net return up to Rs 20,738/ha. Fertilizer placement below the seed proved significantly superior to that of fertilizer mixed with seed (farmer's practice), and the significantly maximum seed yield being 40.15 q/ha and net return Rs 19,798/ha. Seed rate of 125 kg/ha was found significantly superior to lower or higher seed rates. The highest value of seed yield and net return was 41.8 q/ha and Rs 20,818/ha respectively.

Key words: Sowing date, Fertilizer placement, Seed rate, Farmer's practice, Wheat

The productivity of wheat in East Nimar tract of Madhya Pradesh can be increased considerably if farmers may adopt improved technology of wheat production. Farmers, generally, sow wheat early by the last week October which results lower yield due to higher temperature during this period. It was therefore essential to compare yield from November–December sowing with early sowing. Similarly, the farmer's practice of sowing seed mixed with fertilizer was compared with the method fertilizer drilled below the seed. Farmers of this tract, generally, use higher seed rate

more than 200 kg/ha, which results higher population and thereby poor yields. Therefore the seed rates lower than 200 kg/ha were compared with the higher seed rate. Keeping all these points in view the trials were carried out on the farmer's fields.

MATERIALS AND METHODS

Three separate field trials were conducted during (*rabi*) season of 1996–97 and 1997–98 on the farmer's fields under National Watershed Research Development Project, Kaldakhedi, Khandwa (East Nimar), Madhya Pradesh. The soil was

clay loam in texture, with pH 6.2–7.4, electrical conductivity 0.17–0.89 mmhos/cm, organic carbon 0.27–0.31%, available P_2O_5 12.5–20.3 kg/ha and available K_2O 250–400 kg/ha. The annual rainfall of the area was about 800 mm spread over 72 rainy days.

In the first trial, 4 sowing dates (third and fourth week of November, first and second week of December) were taken; in the second trial 2 methods of fertilizer application (drilled mixed with seed and below the seed) and in third trial, 4 seed rates (100, 125, 150 and 200 kg/ha) were taken. The treatments of each trial were laid out in randomized block design on 10 different locations on the farmer's fields and considered as 10 replications. The data so obtained were statistically analysed in the randomized block design. Pre-sowing irrigation was given in each season to facilitate better land preparation and crop stand. The wheat variety 'Lok 1' was sown at the row spacing of 15 cm. Fertilizer was applied @ 120 kg N, 60 kg P_2O_5 and 40 kg K_2O /ha. Half dose of N along with full dose of P and K was applied basal. The remaining N was applied in 2 splits, i.e. at the first and the second irrigation. The crop was harvested during the first week of April.

RESULTS AND DISCUSSION

Sowing date

The grain and straw yields were significantly highest when wheat was sown in the fourth week of November than those of other sowing dates (Table 1). The increased yield at this sowing date may be owing to significantly higher number of

tillers/m row length as well as higher values of other yield attributes. The same date, i.e. sowing in fourth week of November, also recorded the maximum harvest index and significantly highest net return (Rs 20, 738/ha) over rest of the sowing dates. The best results at this sowing date may be owing to the most suitable weather conditions, particularly temperature prevailed during this period for the seed emergence and growth of wheat crop. Rout and Satapathy (1994) and Pal *et al.* (1996) also reported that 21 and 24 November being the best sowing date for wheat respectively.

Method of fertilizer application

Fertilizer placement below the seed proved the best compared with fertilizer mixed with seed, the seed yield being significantly higher. Tillers/row length and other yield attributes were found mainly responsible to augment seed yield, as these were enhanced significantly in most of the cases under fertilizer placement below the seed compared with fertilizer mixed in the seed. This treatment resulted in the maximum harvest index as well as net return (Rs 19,798/ha). Bishnoi *et al.* (1983) and Singh *et al.* (1992) also found similar results.

Seed rate

A seed rate of 125 kg/ha gave significantly higher seed and straw yields than higher seed rate up to 200 kg/ha. The seed yield was found lowest under 200 kg/ha seed rate, the farmers practice. Although the plants/m row length were significantly highest at 200 kg/ha seed rate, the tillers/row length were found to be significantly

Table 1. Yield attributes and yield of wheat as influenced by sowing dates, methods of fertilizer placement and seed rates (pooled data of 2 years)

Treatment	Plants/m row length	Tillers/ m row length	Grains/ spike	Spike length (cm)	1,000-grain weight (g)	Grain weight/ plant (g)	Grain yield (q/ha)	Straw yield (q/ha)	Harvest index (%)	Net returns (Rs/ha)
<i>Sowing date</i>										
III week of November	50.0	150.0	8.0	42.8	41.54	5.2	38.8	41.6	47.08	18,998
IV week of November	52.0	176.8	7.7	43.2	41.32	5.2	41.4	43.4	47.69	20,738
I week of December	51.0	137.7	7.4	42.0	40.12	4.6	37.2	40.8	46.50	17,958
II week of December	51.0	127.5	6.3	36.4	26.12	4.3	35.8	38.2	46.49	16,858
CD (P = 0.05)	NS	6.76	0.32	0.46	0.62	0.23	1.40	1.31		838
<i>Method of fertilizer application</i>										
Fertilizer mixed with seed (FP)	49.0	137.2	7.3	40.8	39.12	4.7	37.9	40.5	47.17	18,378
Fertilizer placement below the seed	53.0	152.0	7.4	41.4	40.43	4.9	40.2	41.5	47.99	19,798
CD (P = 0.05)	2.6	4.26	NS	0.32	0.42	0.19	1.65	NS		955
<i>Seed rate (kg/ha)</i>										
100	42.0	130.2	7.9	40.2	41.65	4.9	38.3	40.2	46.99	18,958
125	46.0	162.8	8.3	46.6	41.25	5.3	41.8	44.3	47.45	20,818
150	51.0	152.5	7.3	38.4	40.00	4.7	36.5	40.1	46.44	16,968
200	65.0	124.1	5.9	35.2	36.20	4.4	35.6	39.4	46.23	15,858
CD (P = 0.05)	3.46	7.43	0.28	0.72	0.73	0.24	1.76	2.17		1,001

highest in 125 kg seed rate. This was owing to more space, light, moisture and nutrients available to plants with lower plant population. The other yield attributes were also found significantly higher in 125 kg seed rate than those found under increased seed rates up to 200 kg/ha. The same seed rate of 125 kg/ha also resulted in the maximum harvest index as well as significantly highest net return up to Rs 20,818/ha, compared with rest of the seed rates. The results confirm the findings of Singh *et al.* (1992) and Parihar and Singh (1995).

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