Madras agric. J. 62 (8): 474 — 477, August, 1975.

Effect of Sowing Date and Seed Rate on the Yield and Effective Tillering of Punjab Wheats (*Triticum aestivum* L.)

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ABSTRACT

The suitable sowing date for Punjab Wheats is November 5, and the reduction in yield in the subsequent sowing dates was gradual in all the varieties except in K. Sona. K. Sona and WG 377 gave a higher yield at 90 Kg/ha. WL 212 performed well at 90 Kg/ha but to yields were on par at 80, 90 and 100 kg/ha. The dates vs seed rates interaction was not significant. November 15th planting was most favourable for tillering. November 5th to 15th sowings in 1971—72 yielded more than in corresponding sowings in 1970—71. The order, however was reversed in November 25th and December 5th, sowings.

INTRODUCTION

Cultivation of dwarf wheat varieties, responsive to assured irrigation and improved technology, has doubled the wheat yields in Punjab. Further gains are possible through the study of the effects of agronomic factors on the yield attributes of the varieties.

K. Sona, WG 357 and WG 377 are the approved varieties of the State and WL 212 is a promising new strain. The studies were undertaken to determine the response of these varieties to date of sowing, seed rate and their interaction.

MATERIALS AND METHODS

Field studies were conducted at the Punjab Agricultural University Farm, Gurdaspur during 1970—71 and 1971—72 with four wheat varieties. The trial was laid out in a split plot design with sowing dates, November 5 (D1), November 15 (D2), November 25 (D3) and December 5 (D4) in the main plots. The varieties, were K. Sona, WG 357, WL 377 and WL 212 with the seed rates 70 kg/ha (S1), 80 Kg (S2), 90 Kg (S3) and 100 Kg/ha (S4) after complete randomization in the sub-plots. There were replications with a net plot size of 4×0.92 m with 4 rows. The soil analysis showed 7.1 pH, 231.0, 25.0 and 457.0 Kg/ha of available N, P_2O_5, and K_2O. respectively Nitrogen at 120 Kg/ha was applied in two split doses, half at sowing and the balance with the first irrigation. 67Kg P_2O_5 and 34 Kg K_2O/ha were applied at sowing. In order to secure good germination, the plots were given pre-sowing irrigation. First irrigation was applied 14 days after emergence and subsequently three irrigations were given till maturity. The maximum atmospheric temperature in °C was

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recorded twice a day, i.e. at 7 a. m. and at 2.30 p. m. The data were recorded on grain yield and number of effective tillers per running metre.

RESULTS AND DISCUSSION

The highest mean yield was obtained in (D_1), followed by (D_2), (D_3) and (D_4) (Table 1). Narang *et al.* (1968) and Gupta *et al.* (1968) reported highest yields for mid November plantings but early November sowings also fell in the same significant group. (D_1) and (D_2) out yielded in 1971–72 and (D_3) and (D_4) in 1970–71; Congenial weather conditions for stripe and leaf rusts which appeared virulently late in the season during 1971—72 affected (D_3) and (D_4) adversely. Though the overall temperature during 1971—72 was mild yet there were wide fluctuations resulting in low yield due to late sowings. Chinoy (1963) also reported superiority of early sowings.

TABLE 1. Effect of sowing date and seed rate on grain yield in Kg/ha

Seed rate	Year	D_1	D_2	D_3	D_4	Mean
S_4	1970—71	4672	4609	4297	3707	4320
	1971—72	5938	4969	4188	3047	4535
	Mean	5305	4789	4243	3375	4428
S_3	1970—71	4859	4625	4344	3641	4367
	1971—72	5875	4844	4359	3172	4563
	Mean	5367	4735	4351	3406	4465
S_2	1970—71	4750	4547	4281	3548	4282
	1971—72	5797	4828	4203	3062	4473
	Mean	5273	4688	4242	3305	4378
S_1	1970—71	4391	4344	3953	3234	3981
	1971—72	5531	4906	3875	2906	4305
	Mean	4961	4625	3914	3070	4143
General Mean	1970—71	4668	4531	4219	3532	4238
	1971—72	5785	4887	4157	3047	4469
Over all Mean		5227	4609	4188	3289	4354
		Sowing date		*Variety*		*Seed rate*
C. D. at 5 per cent	1970—71	756		353		109
	1971—72	767		238		127

The varieties showed significant differences in grain yield (Table 1) during the period of study. Mean performance of all varieties except K. Sona was better in 1971—72. Low yield of K. Sona in 1971—72 was attributed to its vulnerability to stripe and leaf rusts, late maturity and sensitivity to wide fluctuations of temperatures at grain filling stage. WG 377, WG 357 and WL 212 yielded less in 1970—71 due to sharp rise of temperatures to 35°C or above after flowering which had a desiccating effect. WG 377 with mean yield of 5049 Kg/ha topped followed by K. Sona (4303 Kg/ha), WG 357 (4133 Kg/ha) WL 212 (3928 Kg/ha) Table 1.

The mean yield differences between (D_1) and (D_4) was 42.68 per cent in K. Sona, 38.68, in WL 212 29.90; in WG 357 and 28.73 in WG 377. WG 377 out yielded K. Sona in all the sowings, the excess ranging between 0.93 percent in (D_1) in 1970—71 to 60.64 per cent in (D_4) in 1971—72 (Table 1). Its average increase over K. Sona in (D_1), (D_2), (D_3) and (D_4) was 1.80, 25.50, 23.90 and 25.07 per cent respectively. WG 377 thus can be sown in preference to K. Sona in all the sowings, gains out from (D_2), (D_3) and (D_4) were however, substantial. Mean yield of WG 357 was less than K. Sona and the mean deviations ranged from 13.39 per cent in (D_1) to −0.58 per cent in (D_3). WG 357 being early ripener practically yielded as good as K. Sona in (D_2) (D_3) and (D_4) sowings, but yielded less than the the latter in (D_1). Mean yield of WL 212 was less than K. Sona during both the years. However, in 1971—72 it out yielded the latter in (D_2) and (D_3) and (D_4) (Table 1) due to its resistance to stripe rust and relatively early maturity.

WG 357 and WG 377 were early in maturity, less sensitive to temperature fluctuations and more resistant to the stripe and leaf rusts than K. Sona which resulted in the consistency in their yield from year to year and different sowings. They are valuable for stabilizing yields and can be sown in preference to K. Sona.

The seed rate employed showed a significant effect on mean yield during both the years, (S_3) gave the highest mean yield of 4465 kg/ha. (S_2), (S_3) and (S_4) were in the same significant group during both the years but were statistically superior to (S_1). K. Sona gave the highest yield at (S_2) in 1970—71 and at (S_3) in 1971—72. Mean yield, however, was highest at at (S_3). WG 377 at (S_3) yielded significantly more in 1970—71 but in 1971—72, (S_4) was superior. The highest mean yield of WG 377 was obtained at (S_3). In case of WG 357, (S_4) in 1970—71 and (S_2) in 1971—72 scored the first place but was statistically on par with (S_3). The mean of the two years was highest and equal at (S_3) and (S_4). Mean of WL 212 was highest at (S_3) but (S_2), (S_3) and (S_4) were in the same significant group. K. Sona, WL 212 and WG 377 have small seeds and gave good performance at (S_3).

Interaction of sowing date and seed rate had no significant effect on the yield of the varieties

TABLE 2. Effect of sowing date and seed rate on effective tillers (Tillers per running metre)

Seed rate	Year	D_1	D_2	D_3	D_4	Mean
S_4	1970—71	96	95	91	84	92
	1971—72	95	94	89	87	91
S_3	1970—71	97	98	97	89	95
	1971—72	96	100	94	86	94
S_2	1970—71	93	101	91	87	93
	1971—72	91	96	89	89	91
S_1	1970—71	98	101	96	83	94
	1971—72	91	94	92	84	90
General Mean	1970—71	96	99	94	86	94
	1971—72	93	96	91	87	92
C. D. 5 per cent level	1970—71	6.188				
	1971—72	5.466				

(D_3) ranked first in the production of effective tillers followed by (D_1) and (D_3) and (D_4) (Table 2). K. Sona had more number of tillers during both the years in (D_2) sowing. It (D_2) was significantly superior to (D_3) and (D_4) but in 1971—72 (D_2) was at par with (D_1) and (D_3). (D_2) with mean of 96 tillers in WG 377 topped in both the years.

The seed rates showed no significant effect on tillering due to plasticity in producing effective tillers. (S_2) during both the years produced higher number of tillers. The effect of sowing date x seed rate on tillering was not significant. However, there was a gradual decline in yields from (D_1) to (D_4) irrespective of the seed rate adopted.

REFERENCES

CHINOY, J. J. 1963. Physiological studies in the growth and development of wheat *I. C. A. R. Res. Buil., New Delhi.*

GUPTA, K. P., S. P. KURCHANIA, and S. P. SINGH, 1968. A study of the dates and rates of seeding on the yielding abilities of the dwarf wheats. *Indian J. Agron.* **13**: 271—5.

NARANG, R. S., M. K. MOOLANI and R. S. VARMA, 1968. Performance of high yielding wheat strains under late sown conditions of Haryana. *Symposium on Agronomy of New Crop Varieties under Irrigated and Unirrigated conditions*, held at Pantnagar. October 26—28, 1968.