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EFFECT OF CYCOCEL, ASCORBIC ACID AND GIBBERELLIC ACID AS SEED TREATMENT ON YIELD OF WHEAT UNDER DRYLAND CONDITION*

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The present study comprising of 11 pre-sowing seed treatments (viz; three doses of cycocel, ascorbic acid and gibberellic acid each and distilled water and control) was conducted at the Agricultural Research Farm, Institute of Agricultural Sciences of Banaras Hindu University during the winter seasons of 1981-82 and 1982-83 under rainfed condition to investigate their effects on the yield of Kalyan Sona wheat. pre-sowing treatments with CCC. Ascorbic acid and gibberellic acid recorded higher values of yield and yield contributing characters over distilled water and control during winter season of 1981 and 1982. Among the seed treatments CCC 1500 ppm was found superior to rest of the treatments in enhancing the the grain yield. Grain yield was found to be positively correlated with all the yield attributing characters.

In India about 60% of the wheat growing area totally depends upon the annual rainfall. And under this condition wheat is generally grown on conserved soil moisture received during the preceding monsoon, which gradually depletes with the passage of time and growth of crop. Increased water stress is evidently imposed on the crop as it grows, reaching extreme value at maturity. Among other techniques, pre-sowing seed hardening with different chemicals is reported to be one of the methods of overcoming this stress (Misra and Sen, 1981). This ensures proper growth and yield of crop under adverse conditions of soil and atmospheric drought, by virtue of its favourable effects on the physiobiochemical properties of plant cell. Keeping this in view the following experiment was conducted to study the effect of pre-sowing seed treatment with different chemicals on the growth and yield of Kalyan Sona wheat under rainfed condition.

MATERIALS AND METHODS

The field trial was conducted at the Agricultural Research Farm of Institute of Agricultural Sciences, Banaras Hindu University during the two consecutive winter seasons of 1981-82 and 1982-83. The trial consisting of three chemicals with three levels each viz; i) Cycocel (CCC) 500, 1000 and 1500 ppm, ii) Ascorbic acid (AA) 50, 100 and 150 ppm and iii) Gibberellic acid (GA_3) 50, 100 and 150 ppm along with distilled water and controls (no treatment) was laid out in a randomized block design with four replications A basal uniform dose of 60 Kg N, 40 Kg P_2O_5 and 30 kg K_2O per hectare was applied through urea (46% N), single superphosphate (16% P_2O_5) and muriate potash (60% K_2O) respectively. The seeds of Kalyan sona were sown @ 100 kg/ha in rows 25 cm apart on 11th Nov. 1981 and 8th Nov. 1982. The seed treatment was done as per the methodology of Chinoy (1968). 500 g of seed wan

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soaked in 300 ml of prepared solution (i.e.60% of the seed weight). This was kept moist for 12 Hours and then air dried under shade till the seeds regained their original weight.

The soil of the site was sandy loam in texture and alkaline in reaction (pH 7.6). A total amount of 102.2 mm and 59.5 mm rainfall was recorded during the crop growth period of 1981-82 1982-83 respectively. While 48.2 mm of rainfall was received just after sowing in 1982-83, most of the rainfall in 1981-82 was received after the crop attained the stage of flowering/heading.

RESULTS AND DISCUSSION

Significant differences in all the yield attributing characters except of test weight in 1981-82 due to different treatments were observed during both the years (Table 1 (a) and (b.) Higher concentration of CCC, AA and GA_3 significantly increased the number of ears/ha. This increase might be due to more number of bud primordia in the plant at tiller initiation stage and the higher concentration of growth regulators might have promoted their development to a greater extent resulting in the more number of effective tillers. Subramanyam and Misra (1979a) also observed an increase in the number of ears in wheat plant by cycocel treatment and they attributed this to an increaes in the number of effective tillers CCC @ 1500 ppm, GA_3 @ 160 ppm and AA @ 150 ppm increased the ear length and fertile spikelets per ear during both the years which resulted in more number of grains per ear. Schultz (1970) indicated that number of fertile spikelets and grains per ear in wheat plant could be increased by cycocel treatment. The increase in ear length by seed treatments might be due to an increase in cell elongation or cell division or both (Tonzing 1952).

Significant differences in test weight in second year might have been due to enhanced photosynthetic activity in the plant which resulted in bold and heavy grains. These results are in conformity with the findings of Patil and Lall (1973). Further with an increase in the concentration of chemicals an increase in the grain yield was observed. CCC @ 1500 ppm recorded the highest grain yield of 25.41 and 28.62 q/ha during first and second year respectively, followed by 150 ppm of AA (23.16 and 26.01 q/ha) and GA_3 (23.91 and 26.53 q/ha). It is clearly evident from the date that higher grain yield was the cumulative effect of higher Values of all yield contributing characters with higher concentration of chemicals. Exactly similar trend in case of straw yield was observed during both the years Subramanyam and Misra (1979b) and Krishnamoorthy and Goswami (1983) also reported an increase in the grain and straw yields by presowing seed treatments.

Table 1 (a): *Effect of treaments on yield and yield attributes of Kalyan Sona wheat*

Treatments	Effective tillers/plant at maturity		No. of ears/ha (lakhs)		Ear length (cm)		Fertile spikelets/ear	
	1981-82	1982-83	1981-82	1982-83	1981-82	1982-83	1981-82	1982-83
Control	1.20	1.71	12.0	17.1	7.25	7.32	12.62	13.00
Distilled water	1.81	2.13	18.1	21.3	7.97	8.05	12.71	13.78
CCC 500 ppm	2.04	2.16	20.4	21.6	8.27	8 32	13.12	14.00
CCC 1000 ppm	2.68	2.78	26 8	27 8	8.74	9.38	14.69	14.32
CCC 1500 ppm	2.81	3.01	28.1	30.1	9.81	9.95	14.88	14.77
AA 50 ppm	1.85	2.14	18.5	21 4.	8.00	8.05	12.93	13.98
AA 100 ppm	2.62	2.73	26.2	27 3	8.58	8.75	14.39	14.18
AA 150 ppm	2.74	2.86	27.4	28.6	8.81	9.00	14.72	14.48
GA_3 50 ppm	2.05	2.17	20.5	21.7	8.30	8.67	13.85	14.18
GA_3 100 ppm	2.66	2.76	26.6	27.6	8.59	8.78	14.50	14.30
GA_3 150 ppm	2.78	2.91	27.8	29 1	9.09	9.22	14 75	14.57
C. D.at 5%	0 52	0.40	5.20	4.00	0.76	0.60	1.20	0.77

CCC = Cycocel, AA = Ascorbic acid. GA_3 = Gibberellic acid.

Table 1(b): *Effect of treatments on yield and yield attributes of Kalyan Sona wheat*

Treatments	No. of grains/ear		Test weight (g)		Grain yield (q/ha)		Straw yield (q/ha)	
	1981-82	1982-83	1981-82	1982-83	1981-82	1982-83	1981-82	1982-83
Control	33.52	34.05	37.75	38.82	18.78	21.02	24.57	25.72
Distilled water	35.32	35.75	37.25	39.02	21.74	22.78	28.00	28.81
CCC 500 ppm	37.30	37.55	37 62	39.72	22.03	24.17	28.83	30.15
CCC 1000 ppm	38.11	38.32	38.00	39.98	23.06	25.32	30.83	32.00
CCC 1500 ppm	39.45	40 55	38.62	40.13	25.41	28.62	34.99	36.98
AA 50 ppm	36.75	36.80	37.62	39.68	21.83	23.51	28.71	29.31
AA 100 ppm	37.72	38.07	37.71	39.88	22.91	24.98	29.99	31.51
AA 150 ppm	38.23	38 42	38.12	40 08	23.16	26.01	31.24	32.42
GA_3 50 ppm	37.58	37.58	37.67	39.78	22.54	24.18	28.87	31.00
GA_3 100 ppm	38.01	38.11	37.75	39.92	22 83	25.01	30.41	31 92
GA_3 150 ppm	38.45	39.00	38.25	40.11	23.91	26.53	32 97	34.48
C.D. at 5%	3 17	2.62	N S.	0.77	1.12	1.21	4.04	3.18

CCC= Cycocel, AA = Ascorbic acid, GA_3 = Gibberellic acid.

Tabel 2: *Correlation coefficient among yield and yield attributing characters*

Treatments	Tillers/plant		Ears/ha		Earlength		Fertile spikelets/ ear		Grains/ear		Test wt		Straw yield
	1981-82	1982-83	1981-82	1982-83	1981-82	1982-83	1981-82	1982-83	1981-82	1982-83	1981-82	1982-83	1981-82
Grain yield	0 898	0.916	0.898	0.916	0.974	0.963	0 821	0.951	0.950	0.983	0.686*	0.862	0.977	0 991
Tillers/plant		0.999	0 999		0.904	0 917	0.951	0.905	0 926	0 900	0.651*	0.867	0.903	0 903
Ears/ha					0.905	0.917	0.951	0.905	0 926	0.900	0.651*	0 867	0 903	0.903
Ear lenth							0.870	0.936	0.928	0.959	0.806	0.872	0.990	0.963
Fertille spikelets/ear									0.869	0.972	0.761	0.937	0.850	0.952
Grains/ear											0 659*	0.938	0.928	0 977
Test wt													0.787	0.869

*—Significant at 5 per cent level. Rest are all Significant at 1 per cent level

In correlation coefficient studies (Table 2) a highly significant relationship among yield and other yield attributing characters was observed during both the years. Grain yield was found to be positively correlated with tillers/plant, ears/ha, ear length, fertile spikelets and grains/ear, test weight and straw yield.

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