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Response of Fertility Levels and Plant Growth Regulators on Character and Yield of Potato

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Poor productivity of potato in Madhya Pradesh was observed due to the low soil fertility and also imbalenced use of fertilizer. Therefore the balanced application of fertilizers (N, P, K) reported by Shukla and Singh (1976) and exogenous application of plant growth regulators (PGRs) by Sarkar and Singh (1984) at optimum concentration and at proper stage on the crop can play a vital role in enhancing the yield. A field experiment was carried out to show the efficacy of different levels of fertility and PGRs on Kufri Jyoti variety.

The field experiment was conducted in factorial randomized block design with four replications during 1998-99 at the Research Farm, College of Agriculture, Indore. The crop was planted on 10 November 1998 at 60 X 20 cm at a depth of 4.5 cm fifteen treatments comprising of fertility levels 150:200:100 (Recommended dose of NPK), 112, 5:75:75 (25 per cent less of recommended dose of NPK) 187.5:125:125 (25 per cent more of recommended dose of NPK) and plant growth regulators GA_3 100, 200 $Mg1^{-1}$ and cycocel 250, 500 $Mg1^{-1}$ were used. The chemical fertilizers were applied manually before sowing in the form of urea, single super phosphate and muriate of potash. The half of nitrogen with full quantity of P and K were applied as basal and the remaining quantity of nitrogen was top dressed at 30 days after planting. Gibberellic acid and distilled water were sprayed at 33 days after planting at 4-5 leaf stage of plant and cycocel at 50 days after planting. The stage of application of both PGRs are different due to the growth promoting and growth inhibiting nature of plant growth regulators. Five plants were tagged at random in each treatment for recording the observation on number of sprouts, number of levels, plant height, leaf area, fresh and dry weight of shoot fresh and dry weight of tuber and tuber yield.

Perusal of the data (Table 1) indicate that the plant height, fresh weight of shoot fresh weight of tubers were significantly affected by both the fertility levels and the PGRs. Among the fertility levels F_3 was found superior as compared to the other levels while 200 ppm conc. of Gibberellic acid was found superior for these characters. Similar findings were also reported by Patel *et al.* (1996) in potato crop.

The average number of leaves per plant was significantly affected by fertility levels only, while the dry weight of shoot dry weight of tubers and tuber yield are only influenced by growth regulators. The maximum dry weight of shoot and dry weight of tubers is found with 200 $mg1^{-1}$ GA_3 and 250 $mg1^{-1}$ cycocel respectively. The cycocel treatment gave the maximum tuber yield due to increased photosynthetic efficiency of plants by persistant greenness of leaves for longer tuber yield was asociated with cycocel 500 $mg1^{-1}$ similar results were also reported by Alam and Islam (1989), Shadeque and Pandita (1982) and Patel *et al.* (1996).

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TABLE 1

Response of fertility levels and plant growth regulators on Kufri Jyoti variety of potato for growth and tuber yield.

Treatment	No. of sprouts (30 DAP)	No. of leaves (90 DAP)	Plant height (90 DAP)	Leaf area/ plant (90 DAP)	Fresh wt. of shoot (90 DAP) (g)	Dry wt. of shoot/ plant (0 DAP)(g)	Fresh wt. of tuber (90 DAP) (g)	Dry wt. of tuber (90 DAP) (g)	Tuber yield (q/ha)
A. Fertilizer levels									
150:100:100 (F_1)	2.50	34.67	63.70	40.87	312.46	22.78	215.35	48.40	297.88
112.5:75:75 (F_2)	2.48	33.49	62.50	38.41	311.53	22.76	200.00	48.62	295.23
187.5:125:125 (F_3)	2.87	35.15	64.40	41.14	313.30	22.73	218.80	50.00	298.40
S.E.(m) ±	0.048	0.31	0.31	0.55	0.26	0.19	2.70	2.40	1.36
C.D. at P = 0.05	0.138	0.90	0.89	1.57	0.25	N.S.	7.70	N.S.	N.S.
B. Growth regulators									
None (G_0)	2.45	33.69	63.10	36.71	313.84	24.63	180.85	44.00	270.10
100 ppm GA (G_1)	2.82	34.74	66.40	37.61	320.46	24.72	220.39	48.19	281.48
200 ppm GA (G_2)	2.73	35.34	67.40	39.87	321.87	24.78	215.45	53.14	281.03
250 ppm cycocel (G_3)	2.48	33.77	60.30	43.04	319.48	24.68	220.00	58.41	323.01
500 ppm cycocel (G_4)	2.49	33.83	60.00	43.71	318.49	24.02	224.25	58.39	339.68
S.E. (m) ±	0.062	0.41	0.40	0.71	0.34	0.02	3.48	3.09	1.76
C.D. at P = 0.05	0.17	—	1.16	2.03	0.98	0.07	9.95	8.84	5.09

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