

EFFECT OF PLANT GROWTH REGULATORS ON GROWTH AND SURVIVAL OF STRAWBERRY RUNNERS UNDER SEMI ARID REGION OF PUNJAB

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A study on the effect of plant growth regulators in strawberry (*Fragaria x ananassa Duch*) cv. Chandler was conducted during 2000-01. The application of GA₃ (25, 50, 75 ppm), 2, 4-D (10, 20, 40 ppm), TIBA (25, 50, 75 ppm) and NAA (25, 50, 75 ppm) caused highly significant reduction in plant (runners) survival during summer (May and June) as compared to untreated plant. The growth and population of runners was significantly higher than the control during mild summer (March-April) in this region. Withering, wilting and ultimate death of the plants was higher with the advancement of the summer. Maximum plant death was recorded during June with all the concentrations of GA₃. Hence, the application of GA₃, NAA, TIBA and 2, 4-D is not desirable for strawberry runner production in north western semi-arid region of Punjab.

Key words: Plants growth regulators, roots, runners, strawberry, survival.

Strawberry (*Fragaria x ananassa Duch*) is basically a temperate fruit but being grown successfully in tropical as well as sub-tropical region of India. This fruit is gaining popularity among growers and consumers. However, high initial investment on runners (which is about 1/3 of total production cost) limited its fast adoption by common farmers. In Northern plains of India effective and economic fruiting in strawberry lasts only up to end of the March and afterwards runner initiation starts and continues up to August. However, high temperature and low humidity during May-June (Table 1) causes high mortality of runners ranging from 60 to 100 per cent. Thus, farmers of Punjab and Haryana use to bring runners from Himachal Pradesh every year due to runners production constraints in plains. Use of plant growth regulators has been found to be highly beneficial for runners production in temperate climate. However, neither the effect of plant growth regulators on runner production nor on their survival has been reported in Northern plains conditions. Thus, considering the importance of the problem, this study was undertaken under semi-arid (Abohar) condition of Punjab.

Table 1. Different weather parameters recorded during the present study.

Month	Temperature (°C)	Relative Humidity (%)	Rainfall (mm)
October, 2000	25.73	54.20	-
November	20.25	56.12	-
December	14.09	62.12	-
January, 2001	10.18	80.03	5
February	15.52	64.69	-
March	21.88	60.91	-
April	24.84	51.72	15.83
May	32.82	52.55	-
June	32.00	59.36	8.57
July	29.25	69.90	20.00
August	31.87	64.97	39.00
September	35.02	54.30	-

The present study was carried out at research farm of Central Institute of Post Harvest Engineering and Technology, Abohar (Punjab) during 2000-2001. The

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EFFECT OF PLANT GROWTH REGULATORS ON STRAWBERRY RUNNERS

experiment was laid out in RBD with 3 replications comprising 16 plants in each replication. Runners of Chandler cultivar obtained from Dr. Y.S. Parmar University of Horticulture and Forestry, Solan (Himachal Pradesh). Healthy runners were transplanted on raised bed (25 cm) at 25 x 25cm distance in the last week of October and kept under an uniform cultural schedule during the entire season. Irrigation was provided through sprinkler and drip system according to the need and stage of the crop. The plants were treated with GA₃ (25, 50 and 75 ppm), NAA (25, 50 and 75 ppm), TIBA (25, 50 and 75 ppm), 2, 4-D (10, 20 and 40 ppm) and control (water spray) in the month of March. Observations on number of runners production, survival percentage, number of leaves, active roots, senile roots and total number of roots per runner were recorded from March to September. Observations on runner production, leaves production and survival percentage were recorded at 30 days interval and the number of senile roots, active roots and total roots were recorded at the time of runners separation (September) from the mother plant.

The results of the study showed that among the treatments, runner production per plant was maximum

with NAA (50 ppm), followed by GA₃ (75 ppm). Except NAA (50 ppm), non of the treatments was found significantly superior over control in respect of total runner production per plant (Table 2). With regard to total number of leaves per runner, NAA (25 ppm) recorded maximum among all the treatments and were significantly higher than the control. Findings were in confirmation with the results obtained by Singh and Singh (1978), Singh and Phogat (1983) in strawberry under temperate climatic conditions. TIBA (75 ppm) resulted in maximum number of senile roots per runner as compare to other treatments and control.

Other characters such as survival per cent, total number of roots per runner and active roots per runner were significantly influenced by treatments (plant growth regulators) and reduced over control. In general, a cessation of growth was observed in GA₃, NAA, TIBA and 2, 4-D treated runners with advancement of summer. However, with the onset of high temperature, all the GA₃ treated runners died alongwith mother plants (Table 2). On the contrary, use of GA₃ (50 ppm) on strawberry plant as a foliar spray enhanced the runner production and overall

Table 2. Effect of plant growth regulators on growth and survival of strawberry runners.

Treatments	Total no. of runners plant ⁻¹	Survival (%)	Total no. of leaves runner ⁻¹	Total no. of roots runner ⁻¹	No. of active roots runner ⁻¹	No. of senile roots runner ⁻¹
Control (water)	12.66	61.25	3.67	23.67	13.67	10.00
GA ₃ (25 ppm)	9.33	0.00	0.00	0.00	0.00	0.00
GA ₃ (50 ppm)	11.33	0.00	0.00	0.00	0.00	0.00
GA ₃ (75 ppm)	14.33	0.00	0.00	0.00	0.00	0.00
NAA (25 ppm)	12.67	53.97	5.66	21.33	12.33	9.00
NAA (50 ppm)	15.33	43.58	4.67	18.33	10.67	7.67
NAA (75 ppm)	14.33	34.23	4.33	13.66	7.33	6.33
TIBA (25 ppm)	9.33	50.95	3.33	16.67	10.33	6.33
TIBA (50 ppm)	9.33	40.80	4.00	23.67	12.66	11.00
TIBA (75 ppm)	7.00	28.72	4.00	21.67	8.00	14.00
2, 4-D (10 ppm)	7.67	25.05	3.33	18.33	10.00	8.33
2, 4-D (20 ppm)	7.33	37.71	3.67	20.00	8.33	11.67
2, 4-D (40 ppm)	6.00	16.91	4.00	16.33	6.00	10.33
CD(0.05)	1.98	1.23	0.71	2.11	1.48	1.14

growth parameters under temperate climatic conditions (Singh *et al.* 1960). The opposite effect of GA₃ on runner survival and total number of roots per runner in the present study may be attributed due to the hot climate prevailing during the runner production span in Northern plains of Punjab.

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