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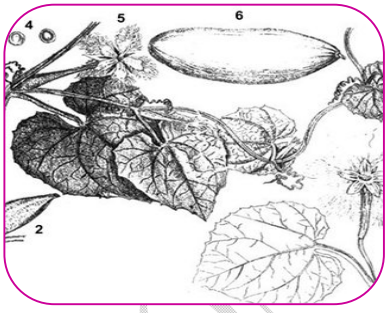
EFFECT OF FOLIAR SPRAYING OF PLANT GROWTH REGULATORS ON VINE LENGTH, INTERNODE LENGTH AND YIELD OF POINTED GOURD (*Trichosanthes dioica* Roxb.)



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ABSTRACT

A field experiment was conducted to study the effect of plant growth regulators in two varieties of pointed gourd (FP-260 & FP-307) during 1999-2001 at Instructional farm of Narendra Deva University of Agriculture & Technology, Kumarganj, Faizabad. In this study, two group of plant growth regulators i.e. growth retardants (Cycocel & Alar @ 500, 1000 & 2000 ppm) and growth promotor (Kinetin @ 10, 20 & 30 ppm) were sprayed on plant to modulate the vegetative growth and to study its impact on yield of pointed gourd. The plant growth regulators were first sprayed at active vegetative stage (200 days after planting, DAP) in the month of February with hand sprayer, second and third spraying was done at fortnight interval of first one. There was a progressive and significant reduction in vine and internode length with the increasing concentration of retardants. However, promoter increased the vine & internode length with increasing concentration over control. Fruit yield per plant was significantly more in variety FP-260 than in variety FP-307. Alar 1000 ppm produced significantly higher yield as compared to rest of the treatments.

KEYWORDS: *plant growth regulators , Agriculture & Technology.*

INTRODUCTION:

Pointed gourd (*Trichosanthes dioica* Raxb.) is one of the important cucurbitaceous vegetable of Eastern India during summer season. Out of its 44-reported species only 22 occurs in India (Chakravarty, 1982). Plant of pointed gourd is perennial and indeterminate type. Major constraints in its productivity are excessive vegetative growth during season. Among the members of cucurbitaceae most research effort by growth regulators have been devoted to improving cucumber productivity followed by melon & watermelon. Not much attention has been paid by researchers to improve the productivity of pointed gourd. Thus, the present experiment was planned to see the effect of retardants & promoter on the behavior and yield of pointed gourd plant.

MATERIAL & METHODS:

This field experiment was conducted in factorial Randomized block design with two varieties of pointed gourd (FP-260 & FP-307) at Instructional farm of Narendra Deva University of Agriculture & Technology, Kumarganj, Faizabad. The plant cutting was planted in second week of August. Cutting was planted in the pits having 30 cm depth and 30 cm diameter. Each pit was filled with a mixture of 3 Kg soil, 2 Kg sand and 4 Kg FYM. Pits were filled in such a manner that a mound was raised before planting. Vines measuring about 1-2 meters in length were separated from mother plant and folded to form a bundle of 20-25 cm length. Each bundle was tied at central place with the vine itself to form the shape of English number "8". In order to plant the vine bundles, small pits on each mound were dug, bundles were kept across, pressed in the center and covered them with FYM to facilitate sprouting. Cuttings were also covered with rice straw (Puwal) to maintain moisture and suitable condition for sprouting. Plant spacing was maintained

1.5m x 1.5 m. In this experiment, three different growth regulators in three different concentration were used. These are cycocel and alar (both retardants) each @ 500, 1000 & 2000 ppm and kinetin (promotor) is used @ 10, 20 and 30 ppm. The plant growth regulator solutions were prepared by dissolving cycocel in distilled water, alar in organic solvent (ethanol), Kinetin in NaOH (0.1N). The plant growth regulators were first sprayed at active vegetative stage (200 days after planting, DAP) in the month of February with hand sprayer, second and third spraying was done at fortnight interval of first one. The plants were sprayed from top to bottom thoroughly wetting every leaf of the plant. Some drop of detergent (teepol) was also added with spray material for proper adherence of the growth regulators on leaves.

Vine length (m) was taken from the base of plant to the growing tip of the plant with the help of meter scale. To measure internode length (cm) three internodes were randomly selected from each treatment and their length was measured using simple mathematical & computational calculations. Yield is calculated by the total number of fruits produced by each treatment during fruiting season (kg per plant).

RESULT & DISCUSSION:

Data collected on vine length as influenced by foliar spraying of plant growth regulators have been summarized in table 1, There is significant varietal difference in vine length. Maximum vine length was recorded in FP-260 in both the years. There was a progressive and significant reduction in vine length with the increasing concentration of retardants. However, promoter increases the vine length over control, significantly with increasing concentrations. Among retardants, the range of retardation in vine length in first year was from -13.66% to -19.66% over control while it was from -6.05% to -17.67% over control in the second year. Minimum & maximum vine length was recorded in cycocel 2000 ppm & Alar 500 ppm, respectively in both the years. Among promoters, maximum vine length was measured in kinetin 30 ppm in both the years.

Data for the internode length as affected by foliar spraying of various plant growth regulators have been furnished in table 2. A significant difference in internode length between both the verities have been observed and were found comparatively higher in FP-260. There was a progressive and significant reduction in the internode length with the increasing concentration of retardants. However, promoters increased the internode length significantly with the increasing concentrations. Among retardants, minimum internode length was observed in cycocel 2000 ppm (-19.46% and -15.03%) and maximum inter node length was found in cycocel 500 ppm (-4.7% and -4.03%) in year 2000 & 2001, respectively over control.

Growth of vine and internodal length has paramount inportance in the development of reproductive sink and keeping the balance between source and sink. Greater vine and internodal length produces excess source development, which restrict and compete with the growth of flower bud development. Cycocel has greater impact than alar to limit the vine & internode length, while alar had moderately affected the vine & internodal growth. Retardants restricts the vine and internodal length by reducing the level of GA_3 in the tissues, it acts as antiGA_3. Enhancement of vine & internodal growth due to kinetin was due to well known kinetin effect of cell divsion. (Gianfagna, 1995, Li *et al*, 1999, Shinde *et al*, 1994).

Data pertaining to fruit yield per plant of pointed gourd as influenced by foliar spraying of growth regulators have been presented in table 3. An examination of data indicated that variety FP- 260 produce significantly more fruits than that of FP- 307 during both the years of investigation. Use of different growth regulators also caused tremendous improvement towards fruit yield of pointed gourd. Among retardants, maximum fruit yield was recorded in alar 1000 ppm (111.03% and 89.84%) and minimum in cycocel 2000 ppm (6.89% and -20.00%) over control respectively in first & second year of experiment. Among promoters, maximum fruit yield was recorded in kinetin 20 ppm (48.62% and 64.61) over control in both years. The increase in yield by retardants might be due to diversion of photosynthates from vegetative growth to reproductive growth that's why plant treated with growth retardants produced cluster of flower buds in place of further vegetative growth. The restriction of growth presumably alters the metabolism and creates condition conductive to flower initiation (Ingle *et al* 2000; Rafeekher *et al*. 2001).

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TABLE-1 Effect of foliar spraying of plant growth regulators on vine length of two varieties of pointed gourd (m)

Treatments	1999 - 2000				2000 - 2001			
	FP-260	FP-360	Mean	Reduction %	FP-260	FP-360	Mean	Reduction %
CCC- 500 ppm	3.45	3.66	3.55	-14.86	3.93	3.66	3.80	-7.99
CCC- 1000 ppm	3.41	3.58	3.50	-16.06	3.73	3.46	3.60	-12.83
CCC- 2000 ppm	3.25	3.46	3.35	-19.66	3.45	3.35	3.40	-17.67
Alar- 500 ppm	3.52	3.67	3.60	-13.66	3.90	3.85	3.88	-6.05
Alar- 1000 ppm	3.51	3.59	3.55	-14.86	3.85	3.74	3.79	-8.23
Alar- 2000 ppm	3.39	3.51	3.45	-17.26	3.67	3.46	3.56	-13.8
Kinetin- 10 ppm	5.43	5.09	5.26	26.13	5.21	5.05	5.13	24.21
Kinetin- 20 ppm	5.57	5.16	5.36	28.53	5.33	5.14	5.24	26.87
Kinetin- 30 ppm	5.58	5.22	5.40	29.49	5.43	5.22	5.33	29.05
Control	4.25	4.10	4.17		4.18	4.08	4.13	
Mean	4.14	4.11			4.27	4.10		
CD at 5%	V= 0.012 T= 0.03 VxT= 0.043				V= 0.024 T= 0.062 VxT= 0.088			

TABLE-2 Effect of foliar spraying of plant growth regulators on internode length of two varieties of pointed gourd (cm)

Treatments	1999 - 2000				2000 - 2001			
	FP-260	FP-360	Mean	Reduction %	FP-260	FP-360	Mean	Reduction %
CCC- 500 ppm	7.90	6.30	7.10	-4.70	9.30	6.40	7.85	-4.03
CCC- 1000 ppm	7.50	6.00	6.75	-9.40	9.00	6.20	7.60	-7.09
CCC- 2000 ppm	6.60	5.40	6.00	-19.46	8.30	5.60	6.95	-15.03
Alar- 500 ppm	7.57	6.40	6.98	-6.30	9.20	6.33	7.77	-5.01
Alar- 1000 ppm	7.10	5.80	6.45	-13.42	8.80	6.07	7.43	-9.16
Alar- 2000 ppm	7.00	5.60	6.30	-15.44	8.60	5.67	7.13	-12.83
Kinetin- 10 ppm	9.00	7.50	8.25	10.74	9.80	7.43	8.62	5.37
Kinetin- 20 ppm	9.50	7.90	8.70	16.78	10.20	7.90	9.05	10.63
Kinetin- 30	9.90	8.40	9.15	22.82	10.50	8.40	9.45	15.52

ppm								
Control	8.20	6.70	7.45		9.60	6.77	8.18	
Mean	8.03	6.60			9.33	6.67		
CD at 5%	V= 0.102 T= 0.261 VxT= 0.369				V= 0.085 T= 0.218 VxT= 0.308			

TABLE-3 Effect of foliar spraying of plant growth regulators on yield of two varieties of pointed gourd (kg)

Treatments	1999 - 2000				2000 - 2001			
	FP-260	FP-360	Mean	Reduction %	FP-260	FP-360	Mean	Reduction %
CCC- 500 ppm	4.82	2.35	3.59	23.79	4.72	2.63	3.68	13.25
CCC- 1000 ppm	6.47	3.82	5.15	77.58	5.98	4.84	5.41	66.46
CCC- 2000 ppm	4.75	1.46	3.11	6.89	3.47	1.72	2.60	-20.00
Alar- 500 ppm	7.52	2.17	4.85	67.24	6.19	2.74	4.47	37.53
Alar- 1000 ppm	8.79	3.44	6.12	111.03	8.14	4.20	6.17	89.84
Alar- 2000 ppm	5.25	1.91	3.58	23.44	5.37	2.00	3.69	13.53
Kinetin- 10 ppm	4.66	2.10	3.38	16.55	6.84	2.30	4.57	40.61
Kinetin- 20 ppm	4.72	3.90	4.31	48.62	7.83	2.86	5.35	64.61
Kinetin- 30 ppm	4.39	2.32	3.36	15.86	4.75	2.57	3.66	12.61
Control	3.89	1.90	2.90		4.24	2.25	3.25	
Mean	5.53	2.54			5.75	2.81		
CD at 5%	V= 0.19 T= 0.49 VxT= 0.69				V= 0.03 T= 0.08 VxT= 0.12			

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