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EFFECT OF ETHEPHON ON GROWTH AND YIELD IN *CAPSICUM ANNUUM* L.

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Introduction

Ethephon (2-chloroethyl phosphonic acid) is a well known plant growth regulator used for increasing yield, promoting fruit maturity, improving colour and advancing harvest timings¹⁾. This compound is known by several trade names such as Acp 68-64, Amchem 66-329, CEPA and ethrel. Ethephon is also known to induce flowering in quantitative short day plants²⁾.

The present investigation has been undertaken to study the effect of ethephon on growth and yield in *Capsicum annuum* L.

Materials and Methods

Capsicum annuum L. var. Pant C-1 were obtained from G. B. Pant University of Agriculture and Technology, Pantnagar (Nainital). The seeds are sown in earthen pots containing autoclaved soil. Foliar sprays of aqueous solution of ethephon at 100, 200 and 300 ppm were made. For control distilled water containing 0.1 Triton-X-114 was sprayed. Six sprays of each concentration were made in the morning hours on plants at 4-5 leaf stage once a week for six weeks. The first four treatments were made up to run off level using 2.5 ml solution on each plant. The remaining two treatments were made on the same plants up to run off level with 5 ml of each concentration. Thus the total quantity of the chemical received by each plant was 2.00, 4.00 and 6.00 mg in 100, 200 and 300 ppm ethephon treated plants respectively. Pollen viability was tested at regular intervals with Alexander's staining method³⁾. Data on the vegetative characters (plant height, leaf size and number of lateral branches per plant) and reproductive characters (days taken to first flower, number of flowers, pollen viability and fruits per plant) were obtained from treated and untreated plants. Data thus

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collected were statistically analysed.

Results and Discussion

The effect of ethephon on growth and yield on *Capsicum annuum* is given in Table 1.

It is clear from Table 1 that the plants treated with all three concentrations of ethephon exhibited a significant inhibition in height. Maximum inhibition in height (15.25 cm) was recorded in plants treated with 300 ppm ethephon solution (Fig. 1) as compared to untreated plants (Fig. 4) with 21.86 cm height. The leaf size of the treated plants was also reduced significantly. The minimum reduction in leaf size was shown by plants treated with 300 ppm ethrel. These findings are supported by the results of earlier workers^{2,5,6}. The number of lateral branches in ethrel treated plants increased and the plants became much more bushy in appearance (Figs. 2, 3 and 4).

It is also evident from Table 1 that all three concentrations of ethephon induced early flowering. However, the number of flowers per plant and fruits per plant increased with the increase in the concentration. These findings

TABLE 1. Effect of ethephon on growth and yield of *Capsicum annuum* L.

Treatment	Plant height (cm)	Leaf size (cm)		Number of branches
		Length	Width	
Control	21.86 ±0.70	6.15 ±0.14	2.54 ±0.20	2.20 ±0.40
100 ppm	17.74**±0.73	5.75 ±0.15	2.18**±0.18	2.60 ±0.80
200 ppm	16.10**±0.59	5.27 ±0.33	2.03**±0.05	3.40 ±1.01
300 ppm	15.25**±0.52	4.93**±0.07	1.85**±0.09	5.00**±1.41

Treatment	Days taken to first flower	Number of flowers	Pollen viability (%)	Fruits/plant
Control	118.20 ±5.63	15.40 ±1.01	92.50 ±1.50	7.00 ±1.09
100 ppm	103.80*±3.37	25.60**±3.00	79.04**±1.50	10.60 ±1.01
200 ppm	97.20*±3.81	28.80**±1.30	73.37**±1.44	12.60**±1.04
300 ppm	93.40*±6.08	36.80**±0.74	68.92**±0.46	18.60**±1.02

± Standard deviation.

* Significant from control at 5% level.

** Significant from control at 1% level.

are supported by those of YADAV⁶ in *Abelmoschus esculentus*.

The viability of pollen in treated plants decreased with the increase in the concentration of ethephon. The percentage of pollen viability was 92.50, 79.04, 73.37 and 68.92 in control, 100, 200 and 300 ppm ethephon treated plants respectively. These findings are also supported by earlier findings of YADAV⁶ and SAXENA⁵. The number of fruits per plant increased with the increase in the concentration of ethephon. Maximum number of fruits per plant was shown by plants treated with 300 ppm ethephon.

Summary

The effect of ethephon (100, 200 and 300 ppm) on growth and yield in *Capsicum annuum* was studied. All the treatments caused inhibition in plant height and leaf size. However, the number of lateral branches in treated plants increased to make plants bushy. Ethephon treatments induced early flowering and increased the number of fruits per plant. There was a slight reduction in pollen viability of treated plants.

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Literature Cited

1. ALEXANDER, M. P. 1980 A versatile stain for pollen, yeast and bacteria. *Stain Tech.* 55(1): 13-18.
2. KRISHNAMOORTHY, H. N. 1981 Plant growth substances. *Tata McGraw Hill Co. Ltd.* New Delhi, India.
3. Mohan RAM, H. Y. and V. S. JAISWAL, 1972 Ethephon and Plant Development: An appraisal. *Adv. Pl. Morph.* 304-314.
4. NICKELL, L. G. 1978 Plant Growth Regulator, *Chemical and Engineering News.* 56: 18-34.
5. SAXENA, B. K. 1987 Studies on modification of sex-expression in castor (*Ricinus communis* L.) *Ph. D. Thesis, Agra University, Agra, U. P., India.*
6. YADAV, S. 1986 Studies on the effect of some growth substances on *Abelmoschus esculentus* (L.) Moench. *Ph. D. Thesis, Rohilkhand University, Bareilly, U. P., India.*

Explanation of plates

Figs. 1-4. Effect of ethrel on *Capsicum annuum* L.

Fig. 1. Untreated plant.

Fig. 2. 100 ppm ethrel treated plant.

Fig. 3. 200 ppm ethrel treated plant.

Fig. 4. 300 ppm ethrel treated plant.

