

## EFFECT OF NAPHTHALENEACETIC ACID ON THE FRUIT YIELD OF TOMATO (*LYCOPERSICON ESCULENTUM* MILL)

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### Abstract

The effect of foliar sprays of naphthaleneacetic acid (–NAA), 5, 10, 15, 20 and 25 ppm at the time of 50% flowering on T-10, Summer Giant and Roma VF tomato varieties was investigated. The yields in all the three cultivars significantly increased with increasing concentrations but Summer Giant gave the highest yield and number of fruits at 25 ppm NAA treatment. The increase in yield was due to an increase in the number of fruits retained and not due to increase in fruit size.

### Introduction

A wide variety of growth regulators like NAA, GA<sub>3</sub> and IAA have been used to obtain beneficial effect on the growth and yield of vegetable and horticultural crops. The effects of naphthaleneacetic acid (–NAA) on tomato (Younis & Tigani, 1977; Rao *et al.*, 1977), gram (Gowda, 1977), *Capsicum* (Chandramony & George, 1976; Warade & Singh, 1977; Naqvi & Alam, 1980), apple (Hays, 1957) and mango (Naqvi & Alam, 1980) have been studied. The present report describes the effect of naphthaleneacetic acid as a growth regulator in reducing pre-harvest fruit drop resulting in increased number of fruits and yield in 3 different cultivars of tomato.

### Materials and Methods

Seeds of tomato cvs., T-10, Summer Giant and Roma VF surface sterilized with 3% chlorox for 3 minutes were washed in tap water and dried on filter paper. The seeds were sown in wooden trays filled with sterilized sand and irrigated with tap water. After seed germination the seedlings were irrigated with 1/10 Hoagland solution, the concentration of which was gradually raised to half and then to full strength. The seedlings were kept in a growth room at 26±2°C with a photoperiod of 14 h. After 15 days of growth, individual seedling was transferred to perforated plastic bags (15x10cm) filled with desert sand and irrigated with nutrient solution.

One month old tomato seedlings were transplanted, one seedling per hill at a distance of 75cm with 100 cm distance from row to row in plots measuring 9 sq. meter at the AEARC, Experiment Farm, Tando Jam. There were three rows having 4 plants in each row for each variety. A basic dressing of 100 kg N/ha and 50 kg P<sub>2</sub>O<sub>5</sub>/ha in the form of urea and single superphosphate was broadcast prior to transplanting. The sandy clay loam

Table 1. Effect of naphthaleneacetic acid (NAA) on number and yield of fruits of tomato cultivars.

Treatment NAA (ppm)	Yield of tomato kg/3 plants				Number of fruits/3 plants			
	T-10	Summer Giant	Roma VF	Mean of varieties	T-10	Summer Giant	Roma VF	Mean of varieties
Control (distilled water)	3.08	1.55	2.15	2.26f	226	38	199	154f
5	5.18(+68)	2.81(+82)	3.76(+75)	3.92c	436(+93)	75(+97)	373(+87)	295e
10	6.89(+124)	3.57(+130)	5.09(+137)	5.18d	594(+163)	149(+292)	417(+110)	386d
15	7.64(+148)	5.13(+231)	6.93(+222)	6.56c	721(+219)	206(+332)	518(+160)	482c
20	9.30(+202)	6.23(+302)	7.17(+233)	7.57b	887(+292)	272(+614)	599(+201)	585b
25	10.62(+245)	8.18(+428)	9.01(+319)	9.27a	929(+311)	313(+724)	745(+273)	662a
Mean of treatment	7.11a	4.58c	5.68b		632a	175c	475b	
L.S.D. at 1%		V = 0.04 Tr = 0.07 V x Tr = 0.09						V = 3.74 Tr = 8.60 V x Tr = 9.50

Figure in parenthesis is percent increase over control.

is typical of the soils on which most of the tomatoes are grown in Sindh with textural composition of sand, silt and clay (56:28:16). The mean average temperatures for the tomato growing season from November to March was  $20\pm 5^{\circ}\text{C}$ . There was no rainfall during the experimental period, so the only source of water was irrigation which was applied at appropriate times.

At approximately 50% flowering time tomato plants were sprayed to the point of run off with aqueous solutions of O(distilled water), 5, 10, 15, 20 and 25 ppm of NAA. Tween-80 @ 0.1% was used as wetting agent. To prevent insect attack, the plants were regularly sprayed with an insecticide, anthio 0.1%. Ripe fruits were harvested from time to time and their weights and number recorded. The data were pooled to get total weight and number for statistical analysis.

### Results and Discussion

Foliar spray of naphthaleneacetic acid showed a pronounced effect in increasing yield of tomato fruits in all the three cultivars. Increasing concentrations of NAA significantly increased the yield by increasing the number of fruits retained in all the three tomato cultivars tested (Table 1). At the highest concentrations of 25 ppm NAA, Summer Giant showed higher yield and more fruits than the other two cultivars. Compared with control, the percent increase was 428 for yield and 724 for the number of fruits. Increase in yield was not due to increase in size of the fruits but was due to increased retention of fruits per plant. Similar pattern was observed in cvs. Roma VF and T-10.

Our results on the increase in yield of tomato fruits with NAA treatments are similar to those reported by Rao *et al.*, (1977) and Younis & Tigani (1977). In another study Chandramony & George (1976), comparing six cultivars, reported 5.8% (local blue) to 132% (Kantari) increase in fruit yield of chilli by spraying 20 ppm NAA. Similarly Naqvi & Alam (1980) observed an increase of 62% yield in chillies (cv. Ghotki) using 10 ppm of NAA. It would suggest that spraying of naphthaleneacetic acid at the time of flowering prevents preharvest flower abscission by increasing the available auxin concentration at this critical phase of reproductive development.

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