

# Regulation of flowering in aonla (*Emblica officinalis* Gaertn.) cv. NA-7

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## Abstract

The cultural operations like stop of irrigation during winter season and binding of main trunk up to 5 cm width by jute thread and spraying of ethrel at 500 and 1000 ppm concentration increased the fruit set %, yield and take minimum time to mature the fruit than control during the both the year 2007-08 and 2008-09. The interaction all treatment ( $T_{13}$ ) i.e. stop of irrigation during December to February, girdling by the binding of main trunk up to 5 cm width with the help of jute thread, spraying of 500 ppm and of 500 ppm ethrel was most effective to increased the fruit set (69.41 to 71.02 %), yield (140.58 to 145.23 kg/tree) and take minimum time (215.26 -216.71 days) to mature the fruit during both the year. The treatment ( $T_{13}$ ) was also most effective to increase the fruit weight (46.02 to 46.52 g), TSS % (10.54 to 10.55) and shelf life (15.01 to 15.23 days) of fruit than other treatment and control.

**Key words:** Aonla, binding of main trunk, ethrel, girdling, shelf life

## Introduction

Aonla (*Emblica officinalis* Gaertn.) is an important and high remunerative arid fruit plant that grows under wide range of agro-climatic conditions like central U.P., some parts of central and western U.P (Ram, S. 1974) and also cultivated in Gujrat, Maharastra, Haryana and Rajasthan without much care. The aonla fruit has been recognized throughout the world as health care drug, valued to restore vitality and remedy of a number of body ailments. The fair amount of polyphenols and tannins (gallic acid, elagic acid and glucose), found in fresh and dried aonla fruit, retard the oxidation of vitamin C and functions as antiscorbutic element. In spite of being such a valuable crop, most of the aonla orchards of Baran district of Rajasthan are becoming irregular in flowering and fruiting due to sole reason of poor management and intact of older leaves for a longer time due to the heavy soil of the district. Hence, there is dire need to improve the health and regular productivity of such irregular unproductive/senile orchards through application of growth regulators and efficient cultural operation practices. With these objectives an investigation on response of growth regulator and cultural operations to aonla cv. NA-7 has been conducted during two consecutive years 2007-08 and 2008-09.

## Material and Methods

The field experiment was conducted during two consecutive years 2007-08 and 2008-09 at Krishi Vigyan Kendra, Anta to standardize the cultural operations and efficacy of growth regulators on flowering and fruiting of aonla. Thirty nine plants of aonla cv. NA-7 of uniform in

size and growth, planted at a distance of 7X7 m were selected for experiment. The treatment consisting of stop of irrigation during December to February, girdling by the binding of main trunk up to 5 cm width with the help of jute thread, spraying of 500 and 1000 ppm ethrel and it suitable treatment combinations were laid down in randomized block design with three replications. The binding of main trunk by jute thread and spraying of different concentration ethrel were done in the first fortnight of December. Ten fruits of uniform physiological age from each treatment were randomly selected for the observation of fruit weight, TSS % and shelf life of fruit. Total soluble solids content was determined by hand refractometer. The treatment details and its symbolic representation are given below.

1. Control ( $T_1$ )
2. Stop of irrigation during December to February ( $T_2$ )
3. Girdling by the binding of main trunk up to 5 cm width with the help of jute thread ( $T_3$ )
4. Spraying of 500 ppm ethrel ( $T_4$ )
5. Spraying of 1000 ppm ethrel ( $T_5$ )
6.  $T_2 + T_3$  ( $T_6$ )
7.  $T_3 + T_4$  ( $T_7$ )
8.  $T_2 + T_4$  ( $T_8$ )
9.  $T_3 + T_5$  ( $T_9$ )
10.  $T_2 + T_5$  ( $T_{10}$ )
11.  $T_4 + T_5$  ( $T_{11}$ )
12.  $T_2 + T_3 + T_4$  ( $T_{12}$ )
13.  $T_2 + T_3 + T_4 + T_5$  ( $T_{13}$ )

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## Results and Discussion

The data presented in table 1 showed that all the treatment increased the fruit set %, yield and take minimum time to mature the crop than control during both the year 2007-08 and 2008-09. Stop of irrigation during winter period slightly increased the fruit set % and yield of aonla during both the year. Similarly the treatments girdling by the binding of main trunk up to 5 cm width with the help of jute thread, spraying of 500 and 1000 ppm ethe rel were respectively increased the fruit set %, yield of aonla and takes minimum time to mature the crop than control plant. The interaction all treatment ( $T_{11}$ ) i.e. stop of irrigation during December to February, girdling by the binding of main trunk up to 5 cm width with the help of jute thread, spraying of 500 ppm and of 500 ppm ethe rel was most effective to increased the fruit set (69.41 to 71.02 %), yield (140.58 to 145.23 kg/tree) and take minimum time (215.26 -216.71 days) to mature the crop during both the year. The treatment  $T_{11}$  was effective to increase the yield due to leaves fall occurrence during the winter season and binding of main trunk by jute thread regulate the flowering by the

increase of C:N ratio. Maximum number of flower/ shoot (7.63) and minimum days taken to harvesting (115) were observed in 500 ppm ethe rel treatment in guava reported by Jain and Dashora, 2006. The cultural practices influenced the flowering characters to an appreciable extent (Tripathi, and Maity, 2007).

The data on quality of fruit parameter was presented in table 2, indicated that the interaction of all treatment ( $T_{11}$ ) i.e. stop of irrigation during December to February, girdling by the binding of main trunk up to 5 cm width with the help of jute thread, spraying of 500 ppm and of 500 ppm ethe rel was most effective to increased the fruit weight (46.02 to 46.52 g), TSS % (10.54 to 10.55) and shelf life (15.01 to 15.23 days) of fruit than other treatment and control. Higher TSS content in aonla increased the shelf life of fruit (Singh, et al., 2008). Chandra and Govind (1995) found maximum fruit yield (9.18 kg/tree) with 75% pruning in the month of February where as, good quality was obtained with 25% crop pruning in guava. The leaves falling in winter season favours the flowering, fruiting and quality production of aonla.

Table 1: Effect of cultural operations and growth regulators on fruiting of aonla cv. NA7

Treatment	Fruit set (%)		Days taken to fruit maturity		Fruit Yield (Kg/tree)	
	2007-08	2008-09	2007-08	2008-09	2007-08	2008-09
$T_1$	54.37	58.49	230.14	229.28	67.32	99.58
$T_2$	59.89	60.12	230.01	229.11	78.45	79.11
$T_3$	64.11	64.94	228.56	228.23	112.01	112.48
$T_4$	64.18	65.17	227.11	225.12	113.21	114.27
$T_5$	64.78	65.93	226.45	225.07	114.56	115.21
$T_6$	65.11	66.23	224.47	223.78	117.44	117.56
$T_7$	66.08	68.51	221.46	223.41	118.21	118.98
$T_8$	66.89	68.92	220.89	219.63	124.10	124.47
$T_9$	67.28	69.41	220.11	219.18	125.24	125.78
$T_{10}$	67.27	69.01	220.02	218.57	125.08	125.01
$T_{11}$	67.30	69.99	218.78	218.27	127.45	128.32
$T_{12}$	69.41	71.02	217.65	216.46	131.14	132.45
$T_{13}$	69.55	72.01	216.71	215.26	140.58	145.23
CD at 5 %	1.654	1.541	2.012	2.141	2.851	2.791

Table 2: Effect of cultural operations and growth regulators on fruit quality of aonla cv. NA-7

Treatment	Fruit weight (g)		TSS (%)		Shelf life (days)	
	2007-08	2008-09	2007-08	2008-09	2007-08	2008-09
$T_1$	41.10	41.12	8.73	8.74	9.3	9.98
$T_2$	41.54	41.60	8.88	8.91	10.11	10.56
$T_3$	41.65	41.78	8.98	8.99	10.18	10.78
$T_4$	41.68	41.81	9.12	9.45	11.12	11.56
$T_5$	42.01	42.15	9.45	9.51	11.25	11.91
$T_6$	42.13	42.33	9.49	9.51	11.78	12.08
$T_7$	42.35	42.56	9.89	9.94	11.89	12.45
$T_8$	42.44	42.75	9.99	10.12	12.01	12.89
$T_9$	42.45	42.89	10.11	10.23	12.32	13.11
$T_{10}$	42.56	42.98	10.45	10.47	13.45	13.67
$T_{11}$	42.78	43.02	10.48	10.53	13.25	13.99
$T_{12}$	44.53	44.68	10.49	10.53	14.41	15.01
$T_{13}$	46.02	46.52	10.54	10.55	15.01	15.23
CD at 5%	1.012	1.0531	1.0023	0.994	0.899	0.9178

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