

Effect of Exogenous Auxin Application on Fruit Drop and Fruit Cracking in Litchi (*Litchi chinensis* Sonn.) Cv Dehradun.

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Abstract

The study was carried out to assess the performance of exogenous auxin application on fruit set, fruit drop and cracking in litchi (*Litchi chinensis* Sonn.) Dehradun. Fruit set increased as a result of all the concentration of NAA and 2, 4-D (5—15 ppm) with best results achieved with NAA 40 ppm (14.14%) compared to control (8.47). Fruit drop reduced significantly by NAA 40 ppm treatment resulting in least fruit drop of 26.34% as compared to control 30.66%. However 2, 4-D at 10—15 ppm also reduced fruit drop percentage significantly. Cracking was observed to be lowest in 2, 4-D 20 ppm (6.01%), followed by NAA 50 ppm (6.95%) as observed in control 14.77%.

Key words : Auxin, Fruit drop, Fruit cracking, Litchi.

In India litchi (*Litchi chinensis* Sonn.) is grown on area of 48,570 ha with a production of 36, 4, 613 mt. The production per unit area is 7.51 mt / ha. Although the litchi is grown in several countries but yet litchi has not emerged as major horticultural crop anywhere because of its fruit drop, fruit cracking and poor yield after profuse flowering. A single panicle may bear thousand of flowers but yields only few or no fruit mainly because of high rate of flower and fruit abscission between floral emergences and fruit maturation. Fruit cracking is another universal problem in litchi. Losses due to this are sometime as high as 75% apart from this alternate spells and dry heat in summer is believed to be the cause of fruit cracking in litchi (1, 2). The present study was therefore carried with the objective to determine the optimum concentration of exogenous of auxin viz., 2, 4-D and NAA for effective reduction of fruit drop and fruit cracking in litchi cv Dehradun, besides studying physico-chemical characters of fruit on its maturity.

Methods

The study was carried out at Dr B. R. Ambedkar University, Agra. The material consisted of 23-year old litchi trees cv Dehradun of uniform growth and vigor growing under uniform cultural practices. The treatments assigned to them were NAA 20, 30, 40 and

50 ppm ; 2, 4-D 5, 10, 15 and 20 ppm with control. The treatments were replicated three times under randomized block design.

The spray solution of NAA and 2, 4-D treatments was prepared fresh just before use of required quantity. Each chemical was weighed on a scientific balance and dissolved in 10 ml of 95% methyl alcohol. The solution was diluted with distilled water to required concentration and entire trees were drenched by spraying with rocking pump. The observations were recorded on the four branches each having two

Table 1. Effect of exogenous auxin (NAA, 2, 4-D) application on fruit set in litchi cv Dehradun.

Treatments	Concentration (ppm)	Percent fruit set	Percent increase/decrease over control
NAA	20	10.11	19.36
	30	12.67	49.58
	40	14.14	66.94
	50	12.89	51.18
2, 4-D	5	9.65	13.93
	10	11.84	39.78
	15	11.25	32.82
	20	7.90	- 6.73
Control		8.47	
		0.39	
CD at 5%		1.17	

Table 2. Effect of exogenous auxin (NAA, 2, 4-D) application on weekly drop in litchi cv Dehradun.

Treat-ments	Concen-tration (ppm)	Date								
		24/4/05	01/5/05	8/5/05	15/5/05	22/5/05	29/5/05	5/6/05	12/06/05	19/06/05
NAA	20	27.77	28.23	11.77	6.27	5.09	2.53	1.59	1.47	2.37
	30	26.65	27.86	11.59	6.18	4.85	4.42	2.46	1.63	–
	40	26.03	26.34	10.87	5.89	4.19	2.45	2.12	1.53	–
	50	26.14	27.57	11.01	5.70	4.69	2.65	2.22	1.62	–
2, 4-D	5	27.90	3.45	12.47	7.40	5.67	1.79	1.85	1.11	–
	10	27.13	28.94	11.48	7.35	5.21	3.13	2.40	1.70	1.06
	15	27.34	28.41	11.73	5.26	5.52	2.25	2.06	1.46	2.02
	20	26.34	36.66	13.82	7.37	4.15	1.35	2.33	1.90	1.69
Control		28.57	30.66	12.65	7.14	5.62	1.99	1.85	1.46	0.92
SE		NS	0.74	0.52	0.37	NS	NS	NS	NS	NS
CD at 5%			2.24	1.56	1.12					

panicles making total of eight panicles per tree for recording observation. The number of fruits on each panicle was counted at weekly intervals from fruit set up to maturity to assess the weekly fruit drop percentage and the fruit carried to maturity the cracked fruits were counted from each panicle at the time of maturity for calculating percentage of cracked fruits.

Results and Discussion

The observation on the effect of different treatments on the fruit set derived on the basis of averages and expressed in terms of percentage fruit set are presented in Table 1. NAA at all concentrations registered significantly superior fruit set compared to control; however, NAA at 40 ppm was found to be the most effective registering an increase of 66.94% more fruit set over control 8.47%.

The treatment of 2, 4-D at 5, 10, 15 ppm also increased fruit set significantly over control. The most effective concentration of 2, 4-D at 15 ppm reduced the fruit drop percentage significantly during second week after the fruit set. Besides, NAA at 40 and 50 ppm, 2, 4-D at 10 and 15 ppm showed no significant effect on fruit drop at weekly intervals Table 2 revealed that intensity of drop was severe during first fortnight after fruit set followed lesser intensity during next three weeks. During first week after fruit set none of treatments showed significant results in reducing fruit drop, however after second week all treatments showed results at 40 ppm of NAA with

least fruit drop of 26.34% compared to 30.66% in control; 2, 4-D at 10–15 ppm also reduced fruit drop by 28.41% but at 20 ppm 2, 4-D increased the fruit drop percentage to about 36.66% (highest). The results on application of different treatments in respect of cracked fruit are expressed as percent cracked fruit (Table 3). The increase in concentration of NAA caused a corresponding decrease in percentage of cracked fruit. NAA at 50 and 40 ppm treatments was at par with each other but significantly superior. The application of 2, 4-D at 5, 10, 15 and 20 ppm also reduced fruit cracking compared to control. The least cracking percentage of 6.01% achieved under 2, 4-D at 20 ppm was considerable superior when compared to all other treatments of this chemical. The effect of 2, 4-D 10 ppm was at par with that of 15 ppm treat-

Table 3. Effect of exogenous auxin (NAA, 2, 4-D) application on fruit cracking in litchi cv Dehradun.

Treat-ments	Concen-tration (ppm)	Percent cracked	Percent increase/decrease over control
NAA	20	11.86	– 19.71
	30	10.58	– 28.37
	40	7.66	– 48.14
	50	6.95	– 52.95
2, 4-D	5	11.60	– 21.47
	10	9.52	– 35.55
	15	9.99	– 32.37
	20	6.01	– 59.31
Control		14.77	
SE		0.58	
CD at 5%		1.73	

ment. Both the treatments were significantly superior to 5 ppm. The cracking was observed to be lowest at 2, 4-D 20 ppm that is 6.01% followed by NAA 15 ppm (6.95) cracking of 14.77 was observed in control.

The investigation reveals that fruit drop during first four weeks after fruit set was severe with more than 70% fruit falling during this period. None of the treatments at pre-bloom stage resulted in any significant effect on fruit drop. However, response to pea stage spray, (24 April 2005) was encouraging with

NAA at all concentrations and 2, 4-D at 5—15 ppm reducing weekly drop percentage considerably compared to control.

References

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