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Research Notes

EFFECT OF NAA ON FRUIT SIZE AND MATURITY IN PINEAPPLE VAR. KEW

Pineapple, which is one of the most important fruits of Kerala, is commercially utilized to a major extent for canning purposes and therefore uniformity in fruit size is of paramount importance. A good percentage of fruits fall below the standard size and their utilization for canning purposes is thus difficult.

The application of growth regulators has yielded successful results in regulating fruit size and maturity in several fruit crops including pineapple (Clark and Kerns, 1942; Van Overbeek, 1946; Hayes, 1957; AM and Talukdar, 1965 and Norman, 1978). Among the growth regulators, NAA has been found to be most beneficial. In this paper the results of studies on the effect of NAA on fruit size and maturity in pineapple are presented.

The studies were conducted at the Pineapple Research Centre, Vellanikkara, Trichur during 1978-79 utilizing the first ratoon crop of the variety Kew. The crop was nine month old. The experiment was superimposed in split plot design with four replications. The main plot consisted of 150 plants and the sub plots 30 plants per plot, with a spacing of 30 x 60 cm, the distance between trenches being 90 cm. The main plot treatments consisted of application of NAA at different stages of growth ie., at inflorescence emergence and at one, two, three and four months after inflorescence emergence. The sub plot treatments consisted of four concentrations of NAA (50, 100, 200 and 300 ppm) along with a control. Five to eight ml of prepared NAA solution was required per plant.

The NAA solutions were thoroughly sprayed with a hand atomizer on the inflorescence andfruits as the case may be depending upon the stage of application. The control treatment consisted of water spray. The observations on fruit characters such as weight, length and girth of fruits were recorded. The time taken for fruit maturity was also calculated.

The effect of NAA on fruit development and fruit size at harvest was conspicuous. With respect to fruit weight with crown as well as without crown, the effects due to different concentrations of NAA and also due to interactions were significant (Table 1). Maximum fruit weight with crown was observed with 300 ppm NAA applied one month after inflorescence emergence, NAA at 200 ppm applied at the same stage and 300 ppm applied at inflorescence emergence had similar effects (Table 1). The treatments, 300 ppm NAA applied two months after emergence, 200 ppm NAA at inforescence emergence and two months after emergence were found to be on par and were the next best treatments. The treatments 50 ppm NAA and control applied at all stages recorded significantly lower fruit weights. The effect of NAA on fruit weight without crown followed a similar

trend as in the case of fruit weight with crown, and here also maximum fruit weight was recorded when 300 ppm NAA was applied one month after inflorescence emergence.

Table 1

Effect of NAA on fruit weight with crown (kg)

Concentrations of NAA(ppm)	Stage of application					
	At inflorescence emergence	1 month after	2 months after	3 months after	4 months after	Mean
0	1.69	1.68	1.57	1.62	1.60	1.63
50	1.66	1.70	1.58	1.66	1.62	1.64
100	1.72	1.73	1.69	1,65	1.57	1.67
200	1.85	2.03	1.82	1.59	1.58	1.77
300	2.00	2.16	1.87	1.67	1.59	1.86
Mean	1.78	1.86	1.71	1.64	1.59	

	C.D. (0.05)	SEm±
Stages of application	NS	0.08
Concentration of NAA	0.13	0.04
Combinations	0.28	0.10

Observation of the fruit length showed that the effect due to different concentrations of NAA was significant (Table 2). NAA at 300 ppm sprayed one month after inflorescence emergence was found to give the highest fruit length and it was found to be on par with 300 ppm NAA applied at inflorescence emergence. The treatments 300 ppm NAA applied at two months after inflorescence emergence 200 ppm NAA at inflorescence emergence and one month after emergence had some effect and were the second best category of treatments. The other treatments including control recorded lower values for fruit length.

The effect of NAA on fruit girth was also clear (Table 3). There was no significant difference in fruit girth between 300 ppm and 200 ppm NAA applied on month after inflorescence emergence and 300 ppm and 200 ppm NAA applied at inflorescence emergence. However, 300 ppm NAA applied one month after emergence tended to record the highestfruit girth. The increase in fruit size was found to be the net result of increase in weight, and length and girth of fruits by the application of NAA. Experiments conducted in pineapple by Clark and and Kerns (1942), Huang (1973) and Norman (1978) had clearly shown the efficacy of NAA in increasing the fruit size at concentrations ranging from 100 ppm, to 500 ppm, when applied during the early stages of fruit development.

Table 2

Effect of NAA on length of fruit (cm)

Concentrations of NAA (ppm)	Stages of application					
	At inflorescence emergence	1 month after	2 months after	3 months after	4 months after	Mean
0	15.53	16.50	16.28	16.90	16.38	16.32
50	16.68	16.20	16.60	16.80	16.28	16.51
100	17.43	16.80	17.13	17.14	16,85	17.07
200	18.17	18.10	17.85	16.60	17.15	17.57
300	19.20	20.48	18 43	16.68	16.85	18.53
Mean	17.40	17,82	17.26	16.82	16.70	

	C.D. (0.05)	SEm±
Stages of application	NS	0.32
Concentration of NAA	0,87	0.31
Combinations	1.94	0.69

Table 3

Effect of NAA on girth of fruit (cm)

Concentrations of NAA (ppm)	Stages of application					
	At inflorescence emergence	1 month after	2 months after	3 months after	4 months after	Mean
0	37.55	38.89	38.63	38.68	38.08	38.37
50	39.58	38.80	37.78	38.33	37.50	38,40
100	40.76	40.53	38.33	38.31	38.00	39.09
200	43.28	44.00	40,53	37.58	37.58	40.50
300	43.65	44.50	41.33	38.98	38.65	41.42
Mean	40.96	41.24	39.32	38.38	37.96	

	C.D, (0.05)	SEM±
Stages of application	1.85	0.60
Concentrations of NAA	1.59	0.56
Combinations	3.55	1.25

Table 4

Effect of NAA on the time taken (days) for fruit maturity

Concentrations of NAA (ppm)	Stages of application					
	At inflorescence emergence	1 month after	2 months after	3 months after	4 months after	Mean
0	133.6	132.9	133.4	134.0	133.8	133.5
50	133.9	134,9	133.6	133.5	134.7	134.1
100	136.8	137.1	136. 9	136,7	138.1	137.1
200	136.6	137.2	137.0	140.9	141.8	138.7
300	138.4	141.5	140.5	140.0	144.1	140.9
Mean	135.9	136.7	136.3	137.0	138.5	

	C.D. (0.05)	SEm±
Stages of application	NS	1.05
Concentrations of NAA	2.04	0.72
Combinations	NS	1.61

The present study clearly showed that the more critical period for the application of NAA was between the time of inflorescence emergence and two months after emergence. It would however appear that application of 300 ppm NAA one month after inflorescence emergence might be more effective. The relationship between fruit growth and endogeneous auxin level is well established (Nitch, 1950). The auxin requirement for developing fruit is more during the early stages. The effectiveness of exogeneous application of NAA in early stages observed in the present study and reported by earlier workers could thus be attributed to a supplementary effect of auxins.

It was observed that the fruit maturity was delayed by the application of NAA, maximum being effected by 300 ppm followed by 200 ppm and 100 ppm NAA (Table 4). Between these three treatments there was no significant difference. The study showed that NAA applied at 300 ppm and 200 ppm one month after inflorescence emergence was effective in increasing fruit size. NAA application delayed fruit maturity the maximum being at a concentration of 300 pprn.

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References

AM, M. K. and Talukdar, M. R. 1965. Effect of planofix on the flower induction: maturity and fruit size of pineapple. *Agriculture Pakist.*, **16**, 145–148

Clark, H. E. Kerns, K. P, 1942. Effects of growth regulating substances on a parthenocarpic fruit. *Bot. Gaz.*, **104** (13): 639-644

Hayes, W. B. 1957. *Fruit Growing in India.* Kitabistan, Allahabad, 375-376

Huang, C. C. 1973. Studies on the effect of plant hormones on the development of pineapple fruits. Types of plant hormone and the effect of their concentration on pineapple fruit. *Taiwan Agric. Quart.*, (2): 92-102

Nitch, J. P. 1950. Growth and morphogenesis of the strawberry as related to auxin. *Am. J. Bot.*. 37: 211-215

Norman, J. C. 1978. Response of developing ethephon induced fruits of 'sugar leaf pineapple to some growth regulators. *Gartenbauwissenchaft.*, 43 (2): 62-65

Van Overbeerk, J. 1946. Control of flower formation and fruitsize in the pineapple. *Bot. Gaz.*, **108** (4): 64-73