

Effect of Certain Growth Regulants on Acid Lime (*Citrus aurantifolia* Swingle)

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Investigations were carried out at Sothuparai of Periakulam tract to assess the usefulness of growth regulants in acid lime. The results have indicated that (i) fruit retention was increased by 58.7 per cent over control when the trees were sprayed with 2, 4, 5-T at 20 ppm, (ii) the growth regulants improved the weight, diameter and juice volume of fruits and (iii) the quality of the fruits was not altered much by the growth regulants.

Acid lime (*Citrus aurantifolia* Swingle) is a citrus fruit popularly grown in Tamil Nadu. Among the many reasons, low fruit set and a heavy flower and fruit drop are considered to have direct effect on the poor yield in acid lime in many orchards. The fruit drop could be controlled by the use of growth regulants. In addition, the physiochemical characters like diameter, weight, juice volume, T.S.S. and acidity of fruits also play an important role on the yield of fruits. The reports on acid lime are very meagre. Hence trials were taken up to assess the effect of certain growth regulants on acid lime and the results are presented.

MATERIAL AND METHODS

Uniformly eight year old acid lime trees were selected at Sothuparai of Madurai district under the aegis of All India Co-ordinated Research Project on citrus Die Back, Periyakulam for the investigation. Aqueous solutions of 24-D, 2, 4, 5-T, GA and NAA were sprayed on

the entire tree at the concentrations of 20, 20, 50 and 30 ppm respectively. Uniform twigs were tagged for recording observations. Sprays were given at peak stage of fruit development. Observations were recorded on the percentage of fruit retention and fruit characters namely weight, diameter, volume of juice, T.S.S and acidity.

RESULTS AND DISCUSSION

The results of the investigations are presented in Table.

The percentage of fruit retention was significantly increased to 68.4 per cent when the trees were sprayed with 2, 4, 5-T at 20 ppm, the improvement being 58.7 per cent over control. The percentage of increase in fruit retention were 53.6, 44.1 and 36.4 over control when the trees sprayed with GA at 50 ppm, 2, 4-D at 20 ppm and NAA at 30 ppm respectively. Thus, the three growth regulants had fruit retention in acid lime. The useful effects of growth

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TABLE. Effect of Growth Regulators on Citrus Fruits

Particulars	T ₁	T ₂	T ₃	T ₄	T ₅	Sig. by 'F' test	S.E.	CD
% of fruit retention	66.2	62.1	63.4	58.8	43.1	Yes	4.18	12.87
% on control	153.6	144.1	158.7	136.4	100.0			
Weight of fruit (g)	28.2	27.6	28.7	27.5	23.8	No	1.30	—
% on control	115.5	115.9	120.6	115.6	100.0			
Diameter of fruit (cm)	3.7	3.6	3.8	3.6	3.5	No	0.07	—
% on control	105.7	102.9	108.6	102.9	100.0			
Juice volume (ml)	13.2	13.4	14.1	12.2	11.0	No	0.90	—
% on control	120.0	121.8	128.2	110.9	100.0			
T.S.S. (%)	8.5	8.7	8.3	8.6	8.4	No	0.19	—
% on control	101.2	103.65	98.8	102.4	100.0			
Acidity (%)	7.8	7.4	7.4	7.1	7.5	No	0.17	—
% on control	104.9	98.7	98.7	94.6	100.0			

T₁ : GA.50 ppmT₂ : 2,4-D. 20 ppmT₃ : 2,4,5-T. 20 ppmT₄ : NAA 30 ppmT₅ : Control (water spray)

regulants on fruit retention on various other citrus fruits have been reported by several investigators. Randhawa *et al.*, (1959) recorded increase in fruit retention in sweet lime (*Citrus limetoides* Tanaka). Similarly spraying of 2, 4, 5-T at 20 and 30 ppm reduced the fruit drop in three varieties of sweet orange (Randhawa *et al.*, 1961b). Sharma and Randhawa (1967) reported reduction in both summer and preharvest drop in 'Hamlin' sweet orange due to the spraying of 2, 4, 5-T and 2, 4-D at 20 ppm. But in the 'Valencia' sweet orange, only preharvest drop was controlled by 2, 4-D and 2, 4, 5-T at 10 and 20 ppm concentrations. They have also obser-

ved reduction in fruit drop in 'Valencia Late' sweet orange by spraying with GA at 25 ppm. Spraying of GA at 75 and 100 ppm and 2, 4-D at 5 ppm reduced the fruit drop in 'Pine apple', 'Jaffa' and Mosambi varieties of sweet oranges respectively (Randhawa and Sharma, 1962). Jawanda *et al.* (1972) stated that 2, 4-D at 10 ppm reduced the fruit drop in sweet orange. A significant reduction in fruit drop was recorded by Randhawa and Singh (1962) in 'Nagpuri' mandarins treated with 2, 4-D at 20 ppm and 2, 4, 5-T at 10 and 15 ppm. The preharvest fruit drop was significantly reduced by 2, 4-D and 2, 4, 5-T at 10 to 20 ppm when applied before the start of

summer. Maximum reduction in fruit drop was observed in grape fruit (*Citrus paradisi* Macf) by Chundawat and Randhawa (1972) when sprayed with 2, 4, 5-T at 7.5 ppm and 2, 4-D at 10 ppm. But in the present investigation all the three growth regulants improved the weight of fruit in acid lime. Spraying of 2, 4, 5-T at 20 ppm also increased the mean weight of fruit by 20.6 per cent over control. The increases in fruit weight were 18.5, 15.9 and 15.6 per cent over control respectively when the trees were sprayed with GA at 50 ppm, 2, 4-D at 20 ppm and NAA at 30 ppm. The diameter of the fruit was slightly increased by the growth regulants, the improvements being 8.6, 5.7 2.9 and 2.9 per cent over control respectively when sprayed with 2, 4, 5-T at 20 ppm, GA at 50 ppm, 2, 4-D at 20 ppm and NAA at 30 ppm. Similar effect on fruit size of 'Jaffa' sweet oranges was recorded by Randhawa *et al.* (1961 a) when sprayed with 2,4-D and 2, 4, 5-T at 50 to 100 ppm and the weight of fruit decreased progressively as the concentration of 2, 4-D and 2, 4, 5-T increased. Maximum increase in the weight of fruit was recorded in sweet oranges by Randhawa and Sharma (1962) when sprayed with 2, 4, 5-T at 5 and 10 ppm. Heaviest fruit weight was recorded by Sharma and Randhawa (1968) when sprayed with 2, 4,-D at 25 ppm. The increase in fruit weight and diameter due to 2, 4,-D and 2, 4, 5-T has been recorded by Erickson (1951) in Washington Navel Orange, Randhawa and Sharma (1962) in sweet orange, Sharma and Randhawa (1967) in sweet oranges by Randhawa *et al.* (1961 b) in sweet orange varieties,

Del Rivero *et al.* (1969) in mandarin and Singh and Randhawa (1961) in mandarin.

The juice content of the fruit was more (14.1 ml) in the trees which received 2, 4, 5-T spray at 20 ppm when compared to 11.0 ml in control. The fruit juice volume in other treatments ranged from 13.4 to 12.2 ml. Sharma and Randhawa (1967) recorded similar increase in juice volume when sprayed with 2, 4, 5-T and 2, 4,-D in sweet orange. The quality of fruits was not influenced by the growth regulants in the present studies which is in corroboration with the results reported by Randhawa *et al.* (1961 b) in three varieties of sweet oranges.

REFERENCES

- CHUNDAWAT, B. S. and G. S. RANDHAWA. 1972. Effect of plant growth regulants on fruit set, fruit drop and quality of Saharanpur variety of grape fruit (*C. paradisi* Macf). *Indian J. Hort.* 29 : 269-82.
- DEL RIVERO, P. VEYRAT and D. GOMEZ DE BANEDE, 1969. Improving fruit set in Clementine Mandarin with chemical treatments in Spain *Proc. Int. Citrus. Symp. Calif.* 3 : 1121-24.
- ERICKSON, L.C. 1951. Effect of 2.4-D on drop of sound and unsound Washington Navel Oranges. *Proc. Amer. Soc. Hort. Sci.* 59 : 46-52.
- JAWANDA, J.S., R.N. PAL and RAGHBIR SINGH 1974. Effect of 2, 4-D Alar and Cycocel on the preharvest fruit drop in sweet orange Cv. Blood Red. *Indian J. Hort.* 31 : 45-46.
- RANDHAWA, G. S. and B. B. SHARMA. 1962. Effect of plant regulators on fruitset, drop and quality of Sweet oranges (*Citrus sinensis* Obeck) *Indian J. Hort* 19 : 83-91.

- RANDHAWA, G. S. and J. P. SINGH. 1962. Effect of GA, 2,4-D and 2,4-5T on fruit drop in the mandarin (*Citrus reticulata* Blanco) *Indian J. Hort.* 19 : 174-78.
- RANDHAWA, G.S. J.P. SINGH and H.S. DURIA. 1959. Effect of gibberelic acid, 2,4-D chlorophenoxy acetic acid and 2,4,5-Trichlorophenoxy acetic acid on fruitset, drop, size and total yield in sweet lime (*Citrus limetoides* Tanaka). *Indian J. Hort.* 16 : 206-209.
- RANDHAWA, G.S., N.L. JAIN and B.B. SHARMA, 1961 a. Preharvest drop, size and quality of 'Jappa' oranges (*Citrus sinensis* Osbeck) as affected by dipping in aqueous solutions of plant regulators. *Proc. Amer. Soc. Hort. Sci.* 18 : 227-84.
- RANDHAWA, G.S., N.L. JAIN and B.B. SHARMA, 1961 b. Effect of plant regulators on fruit drop, size and quality of sweet oranges (*Citrus sinensis* Osbeck). Var. Jaffa, Pineapple and Mosambi. *Indian J. Hort.* 18 : 177-86.
- SHARMA, B. B. and G. S. RANDHAWA, 1967. Studies on fruit set and drop in sweet orange (*Citrus sinensis* Osbeck) *Indian J. Hort.* 24 : 109-17.
- SHARMA, B. B. and G. S. RANDHAWA, 1968. Studies on fruit drop in *Citrus sinensis* Osbeck (Sweet orange) *Indian J. Hort.* 25 : 41-47.
- SINGH, J.P. and G.S. RANDHAWA 1961. Effect of plant regulators on fruit drop, size and quality of mandarin (*Citrus reticulata* Blanco) var. Nagguri and Lahore Local. *Indian J. Hort.* 18 : 258-94.