

Effect of foliar application of macro and micronutrients on fruit drop, growth, yield, and quality of Kinnow Mandarin (*Citrus Reticulata*) on five-year-old plants

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ARTICLE ID: 001

Abstract

A field experiment was conducted from March to November 2019-2020 at the Horticulture Research Farm, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology & Sciences, Prayagraj to study the “Effect of Foliar Application of Macro and Micronutrients on Fruit drop, Growth, and quality of Kinnow Mandarin(*Citrus reticulata*) on Five-year-old plants under Prayagraj Agro-climatic conditions”. The experiment was conducted in Randomized Block Design on Kinnow Mandarin(*Citrus reticulata*) on fruit drop, Growth, and quality with 5 various treatments combinations (Control ,Urea -1%,Potassium – 1%, Zinc sulfate – 0.5%, Iron Sulfate – 1%, Boric acid – 0.2%)in three replications. The Maximum plant height ranged from 199.46 cm to 239.64 cm.

The minimum plant height (176.68 cm) was recorded in Control (Water spray) which was significantly over all other treatments. Based on the results obtained, the most number of flowers obtain in The treatment combination of (Urea1%+Zinc sulfate 0.5%+Iron sulfate1%), the maximum number of fruits per plant (171.45), maximum fruit weight per plant (110.42gm), and maximum fruit length per plant (6.30cm) was found superior at Treatment combination of Urea 1%+Zinc sulfate 0.5% +Boric acid 0.2%) foliar spray. Among these treatment combinations, the most effective combination of foliar spray for Plant height(cm), number of flowers, fruits per plant, fruit weight, fruit length is (Urea1%+Zinc sulfate 0.5%+Boric acid 0.2%).

Keywords: Kinnow Mandarin (*Citrus Reticulata*), Macro and Micronutrients, Fruitdrop, Growth, Quality.

Introduction:

Kinnow Mandarin (*Citrus Reticulata*) fruits act as an important constituent of daily nutrition. They are also nutritionally crucial and commercially predominant. Citrus are rich in vitamin-c vitamins (A and B complex) and minerals (calcium, iron, and phosphorus) in the diet to keep human health in a good state. In India Citrus is grown in 0.62 million ha area with a total production of 4.79 million tonnes Kinnow occupies 54.9% of the area under citrus. It is a hybrid of two citrus cultivars-King (*Citrus Nobilis*) x willow leaf (*Citrus deliciosa*). The genus *Citrus L.* belongs to the subfamily Aurantioideae of the family Rutaceae. It was first developed by Howard B. Frost in 1915 and released in 1953 at the University of California, Citrus experiment station.

Materials and Methods:

The experiment was carried out using Kinnow plants at the Cenral Research field of Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, during the year 2019-2020. The experiment was conducted in Randomized Block Design with 5 various treatments (Control, Urea - 1%, Potassium – 1%, Zinc sulfate – 0.5%, Iron Sulfate – 1%, Boric acid – 0.2%) in three replication. The experimental site is situated at of latitude of 20° and 15° North and longitude of 60° 3” East and at an altitude of 98 meters above mean sea level (MSL).



Fig.1. Field Visit with my Advisor Dr.V.M.Prasad Sir.

Results and Discussion:

Among all the different treatment combination shown in Table -1, the maximum height of the plant was observed in treatment combination foliar spray of Urea -1%, Zinc sulfate – 0.5%, Boric acid – 0.2% (239.64 cm), the minimum height of the plant was observed in Control (176.68). Maximum number of flowers per plant were observed in Treatment combination foliar spray of Urea -1%, Zinc sulfate – 0.5%, Boric acid – 0.2% (181.51), and a minimum number of flowers were observed in Control (110.30). The maximum number of fruits were observed in treatment combination foliar spray of Urea -1%, Zinc sulfate – 0.5%, Boric acid – 0.2% (171.45), and the minimum number of fruits were observed in control (95.58). The maximum fruit weight was observed in treatment combination foliar spray of Urea -1%, Zinc sulfate – 0.5%, Iron sulfate 1% (110.42gm), and minimum fruit weight were observed in control (96.47gm). The maximum fruit length was observed in treatment combination foliar spray of Urea -1%, Zinc sulfate – 0.5%, Boric acid – 0.2% (6.30cm), minimum fruit length observed in control (4.83cm). The maximum fruit yield per plant was observed in treatment combination foliar spray of Urea -1%, Zinc sulfate – 0.5%, Iron sulfate 1% (18.32 kg). Among all the treatment combinations, maximum total soluble solids (50.74) was observed in the foliar spray of Urea -1%, Zinc sulfate – 0.5%, Boric acid – 0.2%. The maximum Vitamin-c (24.42) was observed in the foliar spray of Urea -1%, Zinc sulfate – 0.5%, Boric acid – 0.2%.

Table 1 Treatment combination data of Foliar application of Macro and micronutrients used for Kinnow mandarin (*Citrus reticulata*). Here Urea (U), Pottassium Sulfate (K_2SO_4), Zinc sulfate ($ZnSO_4$), Iron Sulfate ($FeSO_4$), Boric Acid (H_3BO_3)

Treatments symbols	Treatment combination	Plant height Maximum	Number of flowers per plant	Number of fruits per plant	Fruit weight(gm)	Fruit length(cm)
T0	Control (Water spray)	216.56	110.30	95.58	96.47	4.83
T1	U 1% + K_2SO_4 1%	221.80	130.26	118.47	98.43	5.54
T2	U 1% + $ZnSO_4$ 0.5%	229.80	138.57	123.68	97.38	5.41
T3	U 1% + $FeSO_4$ 1%	228.94	132.53	119.55	101.43	5.32
T4	U 1% + H_3BO_3 0.2%	228.26	144.31	111.51	105.46	5.76
T5	U 1% + $ZnSO_4$ 0.5% + $FeSO_4$ 1%	222.43	163.72	148.59	110.42	5.21
T6	U 1% + $ZnSO_4$ 0.5% + H_3BO_3 0.2%	239.64	181.51	171.45	108.69	6.30

T7	U1% +H3BO3 0.2%+FeSO4 1 %	225.14	169.51	155.37	109.57	6.26
T8	K2SO4 1% + ZnSO4 0.5%	233.82	170.43	162.6	105.70	6.16
T9	K2SO4 1% +FeSO4 1 %	232.06	180.49	169.61	107.37	5.85
T10	K2SO41% + H3BO3 0.2%	228.57	162.53	149.47	106.84	5.94
T11	K2SO41 % + ZnSO4 0.5%+FeSO4 1 %	233.85	155.74	138.56	99.49	5.64
T12	K2SO4 1 % + ZnSO4 0.5%+ H3BO3 0.2%	230.73	166.72	140.35	101.33	6.21
T13	K2SO4 1% + H3BO3 0.2% + % + FeSO4 1 %	227.88	167.38	142.54	106.48	6.24
	F-test	S	S	S	S	S
	C. D. at 0.5%	1.426	0.223	0.279	23.315	0.295
	S.Ed.(±)	1.928	0.302	0.377	31.518	0.399

Conclusion:

Based on the result obtained, the most effective Treatment combination of foliar spray for optimum Plant height, number of flowers, fruit per plant, fruit weight, fruit length, Yield is found to be T6, having the proportions (Urea -1%, Zinc sulfate – 0.5%,Boric acid – 0.2%.) as shown in Table 1.

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