

Original Research Article

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Chemical Control of Pre Harvest Fruit Drop in Nagpur Mandarin (*Citrus reticulata*) of Chhindwara District of Madhya Pradesh, India

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ABSTRACT

Orchard experiments were carried out in JNKVV, Zonal Agricultural Research Station, Mohagaon Farm at Sausar Block of Chhindwara District of Madhya Pradesh with the objective of Chemical Control of pre harvest fruit drop in Nagpur Mandarin (*Citrus reticulata*) on reducing fruit drop. The experiment was laid out in RBD in Nine treatments and two factors one is at pea stage second one is Gravel stage with tree replication. Season for experiment was selected Zaid (Ambia bahar) with Different concentration levels of Treatments in the 2013/2014 season. The application of Growth regulator in the orange fruit orchard can be helpful in controlling pre-harvest fruit drop, hence increasing yield and giving good returns to the growers. Application of growth regulator NAA 20 ppm at pea and gravel stage increased the fruit retention to 45.00 % as compared to 24.00 % in control. Due to Urea 2.00 % spray 100 fruit weight was increased from 15.33 Kg to 16.70 Kg. Plant Growth Regulators (PGR's) are used on citrus worldwide and active research programs are in progress in most citrus-growing countries. Principal uses for PGR's on citrus are for control of fruit maturity, reduction of fruit drop, prevention of rootstock sprouting, fruit thinning, preservation of fresh fruit peel quality, and control of the abscission process for harvesting.

Keywords

Citrus, Nagpur Mandarin, Fruit drop, Growth regulators, Plant growth

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Introduction

Citrus is an economically important crop of India, for its highly nutritive and commercial value. Phonology is one of the important aspects of citrus that needs to be studied. The information about phonological events and their variability can provide valuable data for planning, organizing and timely execution of certain standard management and cultural activities that require advanced information on

the dates of specific stages of crop development.

Whether you're growing your citrus tree for the fruit it produces or as an ornamental specimen for its form, foliage, flowers and fruit, you're likely alarmed when the citrus fruits begin to drop prematurely. Some amount of fruit drop at a certain stage of development is normal, but an excessive drop of older fruit could indicate a number of

problems. In cause of normal fruit drop Citrus trees normally drop some of their young fruits as a means to thin the fruit out and devote resources to the development of the fruits that remain. Beginning soon after blossom drop, and ending when the fruit has a diameter of about 1/2 inch, it is normal if approximately 80 to 90 percent of the fruit falls off the tree. A small amount of fruit may continue to drop as it grows on the tree.

A number of nutrient deficiencies can contribute to excessive fruit drop, and identifying the exact nutrient deficiency means you can apply the right fertilizer to correct the deficiency. A nitrogen deficiency appears first as a yellowing of older leaves, while a magnesium deficiency appears as a yellowing between veins on older leaves and leaf drop. Inadequate zinc causes young leaves to be abnormally small and have yellow blotches between veins, particularly on the south-facing side of the canopy. A citrus tree lacking manganese has leaves that turn a lighter green between leaf veins. An iron deficiency, most prevalent in alkaline soils with excessive moisture, appears as interveinal yellowing.

In heavy fruiting years, low potassium levels can impact fruit drop. Good water management is crucial to avoid excessive fruit drop and other citrus tree problems. Excessive watering, poorly drained soils or drought stress can lead to fruit drop. As a general rule, citrus trees prefer a slow, deep watering every five to 14 days during dry, hot weather, depending on the citrus tree's age, and every 14 to 30 days during cool, wet weather, or whenever the soil 6 inches below the surface near the tree feels dry to the touch. Excessive pruning can stress the citrus tree and remove too much of its foliage, forcing fruit drop. A severe pest infestation can also stress the tree enough to cause fruit drop. Sudden changes in temperature, particularly when high

temperatures occur at or shortly after fruit set, can cause fruit drop. Where citrus trees are planted in poorly drained or low-lying sites, fruit drop caused by brown rot can become problematic following extended periods of wet and warm weather in late summer and fall.

Materials and Methods

The experiment was conducted at Jawaharlal Nehru Krishi Vishwa Vidyalaya, Zonal Agriculture Research Station, Mohagaon Farm, Sausar Block of Chhindwara District Of Madhya Pradesh during 2013-14. The experiment was laid out in Randomized Complete Block Design (RBD) in Nine treatments and two factor one is At pea stage second one is Gravel stage with tree replication. Season for experiment was selected Zaid (Ambia bahar). The following treatment used

T₁ = NAA 20 ppm Spray

T₂ = NAA 20 ppm + Carbendazim 0.2 % spray

T₃ = NAA 10 ppm + 2,4-D 10 ppm Spray

T₄ = NAA 20 ppm + Urea 2.0 %

T₅ = NAA 20 ppm + Streptocycline 30 ppm Spray

T₆ = Urea 2.0 %

T₇ = Streptocycline 30 ppm Spray

T₈ = Carbendazim 0.2 % spray

T₉ = Control (Water) 0.2 % Spray

The data recorded on different parameters were subjected to analysis of variance (ANOVA) techniques observe the difference, between the different treatment as well as their interaction.

Results and Discussion

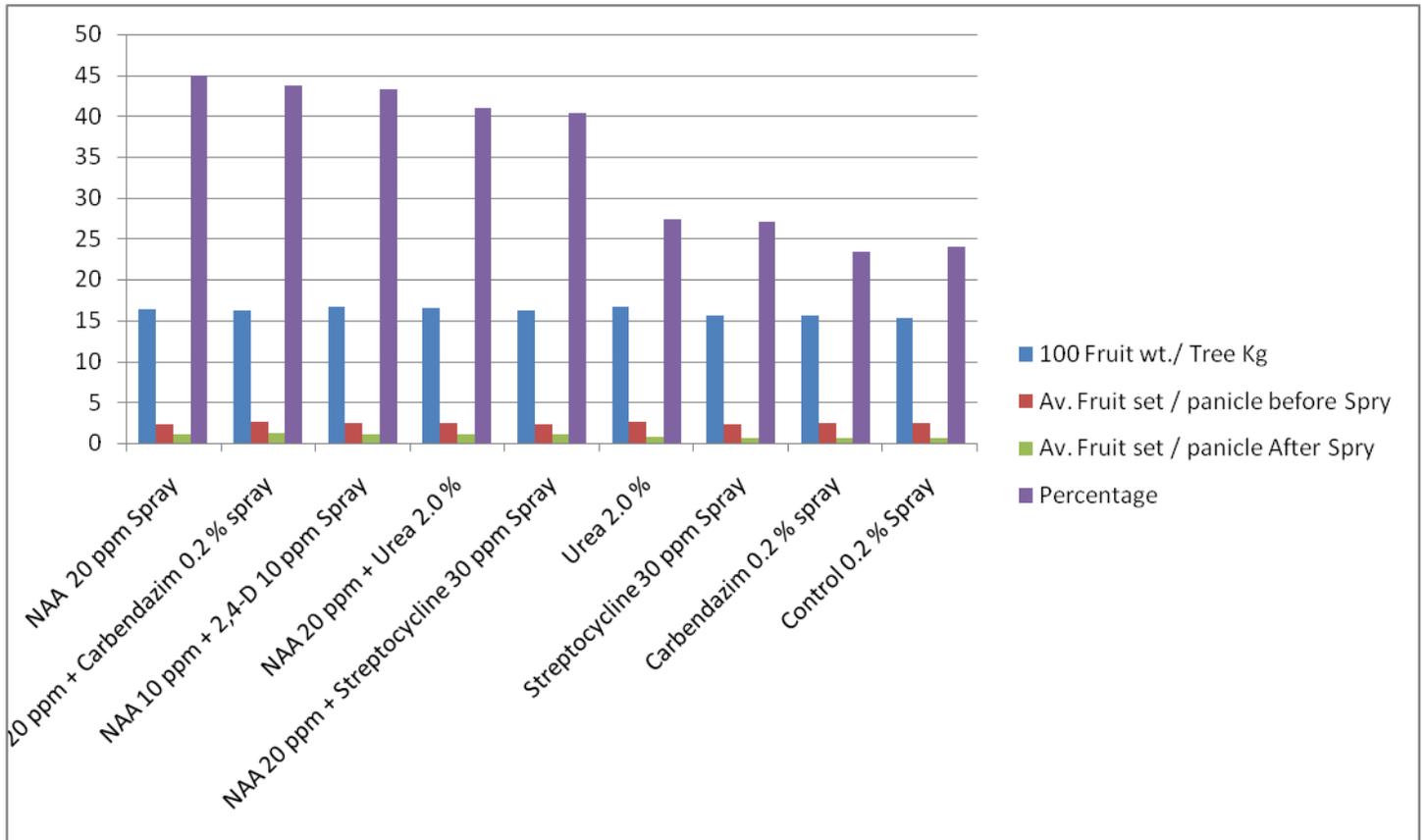
The data regarding the fruit drop as affected by different orientations were collected and analyzed. It is clear from the data presented in Table 1 that orientation had non-significant difference with reference to fruit drop. In this experiment application of growth regulators, fungicides and nitrogen (Urea farm) have not show any significant difference. However the maximum fruit retention 45.00 was observed

with the application NAA 20 ppm at pea and gravel stage. Followed by NAA 20 ppm + Carbendazim 0.2 % (43.67 %), NAA 10 ppm + 2,4-D 10 ppm (43.33 %) and NAA 20 ppm + Urea 2.0 % (41.00 %) while application of simple water spray gave 24.00 % fruit retention only. With the application of Nitrogen in the form of Urea 2.0 % spray increased the 100 fruits weight to 16.70 Kg in comparison 15.33 Kg with the application of simple water spray.

Table.1 Effect of growth regulators, fungicides and nitrogen on fruit retention and fruit weight in Nagpur Mandarin

S.No.	Treatment	100 Fruit wt./ Tree Kg	Av. Fruit set / panicle before Spry	Av. Fruit set / panicle After Spry	Percentage
01	NAA 20 ppm Spray	16.33	2.33	1.06	45.00
02	NAA 20 ppm + Carbendazim 0.2 % spray	16.23	2.67	1.17	43.67
03	NAA 10 ppm + 2,4-D 10 ppm Spray	16.66	2.47	1.10	43.33
04	NAA 20 ppm + Urea 2.0 %	16.50	2.43	1.00	41.00
05	NAA 20 ppm + Streptocycline 30 ppm Spray	16.16	2.33	1.00	40.33
06	Urea 2.0 %	16.70	2.57	0.70	27.33
07	Streptocycline 30 ppm Spray	15.66	2.23	0.60	27.00
08	Carbendazim 0.2 % spray	15.66	2.43	0.57	23.33
09	Control 0.2 % Spray	15.33	2.50	0.57	24.00
SEm _+		0.046	-	-	8.328
C.D.@ 5 %		NS	-	-	NS
C.V. %		4.95	-	-	41.21

Fig.1 100 fruit weight / tree, average fruit set / panicle before spray, average fruit set / panicle after spray



It is general observation that most of the citrus fruits drop due to formation of abscission layer and fungal disease. This may be due to shortage and imbalance of some hormones and some pathological and bacterial problem. It has been also reported by several workers that this pre harvest fruits drop in citrus can be very effectively controlled by spraying of hormones and used of some fungicides.

The application of Growth regulator in the orange fruit orchard can be helpful in controlling pre-harvest fruit drop, hence increasing yield and giving good returns to the growers. Application of growth regulator NAA 20 ppm at pea and gravel stage increased the fruit retention to 45.00 % as compared to 24.00 % in control (Fig. 1). Due

to Urea 2.00 % spray 100 fruit weight was increased from 15.33 Kg to 16.70 Kg.

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