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A Study of Water Soluble Fertilizers and Micronutrients on fruit firmness during growing periods of Banana (CV. Grand Nain)

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ABSTRACT

During the present studies Different water soluble treatments with and without micronutrients treatments were applied to the banana plants of cv. grand nain cultivar. The treatments were applied for two years. The fertilizer treatment applied by conventional methods was served control. During two trial years. Average length of the two central fingers, pooled analysis and statistical analysis were worked out. Similarly the length of the two central fingers in the top row of the test banana plant under conventional method of application of fertilizers and micronutrients was recorded and served as control.

It is evident that the firmness in fruits of banana cultivar grand nain was increased by the application of water soluble fertilizers through drip irrigation as compared to the control treatment. The fruit firmness was found to be more by the 75 % RDF through WSF (12:61:00, 13:0:45 and Urea) M_2 treatment and it was found to be very less by the 75% RDF through WSF (Urea, Orthophosphoric acid and White potash) M_4 treatment as compared to the other treatments applied during both the trial years.

Introduction:

The banana (*Musa paradisiaca* L.) an important fruit crop of the world. It is consumed by human beings since centuries long back. It is known to be man's first food and hence called it as Adams fruit. It is highly nutritious. It is cheap and hence nicknamed as **poor man's apple**.Apart from using banana as food, the fruit, leaves and other plant parts are used in several occasions and religious purposes.It is evident from the literature that there are about 250-300 cultivated banana varities in India. About 90 per cent farmers in Nanded district used to grow grand nain cultivar. Grand Nain is suitable for Nanded region in terms of vigour, yield, quality and long shelf-life.The yield and quality of banana requires vegetative growth and good vegetative growth requires recommended dose of macro and micronutrients. The macronutrients (Nitrogen, Phosphorous and Potassium) promote vegetative growth and production. The micronutrients in small dose promote enzymatic activities and synthesis resulting into high yield and quality (Kumar, 2002, Das, 2003)

Considering these facts the research topic entitled A Study of Water Soluble Fertilizers and Micronutrients on Phosphorous content of leaves during growing periods of Banana (CV. Grand Nain) was carried out.

Materials and Methods

During the present studies firmness of fruit of grand nain cultivar of banana was studied by using penetrometer (fruit tester). For this two central fingers of the third hand in the bunch were selected. The pool of the fruits was eremoved. The penetrometer was penetrated through the pulp of both the fruits and the pressure on the penetrometer was recorded. Similarly second penetration was made in both the fruits and pressure was recorded. After an interval of two days two penetrations were made at two different locations on both the

selected pooled fruits and pressure was recorded. The average pressure was considered as the fruit firmness. The statistical and pooled analyses were worked out and the results are presented in table – 1, 1a and figure – 1.

Treatment Details

The details of application of fertilizers scheduled during the research work is

Details of application schedule of fertilizers

Treatmetns	Treatment Details
I. Main Plot treatments	
M_1	50 % RDF through WSF (12:61:00, 13:0:45 and Urea)
M_2	75 % RDF through WSF (12:61:00, 13:0:45 and Urea)
M_3	50% RDF through WSF (Urea, Orthophosphoric acid and White potash)
M_4	75% RDF through WSF (Urea, Orthophosphoric acid and White potash)
M_5	100 % RDF through soil application (Urea, SSP and MOP)
II. Sub-Plot treatments	
S_0	Without micronutrients
S_1	With micronutrients
Replications	4 (Four)
Design	Split plot Design (SPD)
Year (Seasons)	Two (2015-16 and 2016-17)
Location	A/P Pardi (Mukta) Tq. Ardhapur Nanded district of Maharashtra state
Crop and Cultivar	Banana Cv. Grand Nain
Spacing	Row to row 1.8 meters and plant to plant 1.5 meters
Number of plants/treatment	16
Total number of plants	640
Total number of treatments	10 (Main plot treatments 5 x Sub-plot treatments 2)

WSF = water soluble fertilizers through fertigation
RDF = Recommended Dose of Fertilizer (200:160:200 grams NPK per plant)
NPK=Nitrogen, Phosphorous and Potasssium
SSP=Single Super Phosphate
MOP=Murate of potash

Results

From the results presented in table – 1, 1a, and figure – 1. it is evident that the firmness in fruits of banana cultivar grand nain was increased by the application of water soluble fertilizers through drip irrigation as compared to the control treatment. The fruit firmness was found to be more (4.43 kg/cm^2) by the M_2 treatment and it was found to be very less (3.97 kg/cm^2) by the M_4 treatment as compared to the other treatments applied during both the trial years.

Table-1: Studies on application of water soluble fertilizers and micronutrients in relation to Fruit Firmness during growing period of Grand Nain cultivar of Banana.

Treatments	Fruit firmness (kg/cm^2)		
	Ist year	IInd year	Pooled
Main Plot treatments: Water soluble fertilizer treatments (M)			
M_1	3.84	3.91	3.88
M_2	4.43	4.49	4.46
M_3	3.45	3.53	3.49
M_4	3.97	4.02	3.99
M_5	3.16	3.36	3.26
S.Em. ±	0.16	0.14	0.10
CD@5%	0.51	0.42	0.27
Sub Plot treatments: Micronutrient treatments (S)			
S_0	3.61	3.73	3.67
S_1	3.93	3.99	3.96
S.Em. ±	0.07	0.09	0.06
CD@5%	0.22	0.26	0.17
Interactions			
M×S			
S.Em. ±	0.17	0.20	0.14
CD@5%	NS	NS	NS
Y×M			
S.Em. ±			0.14
CD@5%			NS
Y× S			
S.Em. ±			0.09
CD@5%			NS
Y×M×S			
S.Em. ±			0.19
CD@5%			NS
CV.	10.56	10.12	10.16
GM.	**3.77**	**3.86**	**3.81**

Significance and at par values of fruit firmness based on statistical analysis resulted by the treatments of water soluble fertilizers and micronutrients during growing periods of Banana cultivar Grand Nain								
Fruit firmness								
Year/ Pooled	**Main Plot**					**Sub Plot**		**Interactions**
I Year								

	M_2	M_4	M_1	M_3	M_5	S_1	S_0	NS
	4.43	3.97	3.84	3.45	3.16	3.93	3.61	
II Year	M_2	M_4	M_1	M_3	M_5	S_1	S_0	NS
	4.49	4.02	3.91	3.53	3.36	3.99	3.73	
Pooled	M_2	M_4	M_1	M_3	M_5	S_1	S_0	NS
	4.46	3.99	3.88	3.49	3.26	3.96	3.67	

Indicates values at a par with each other

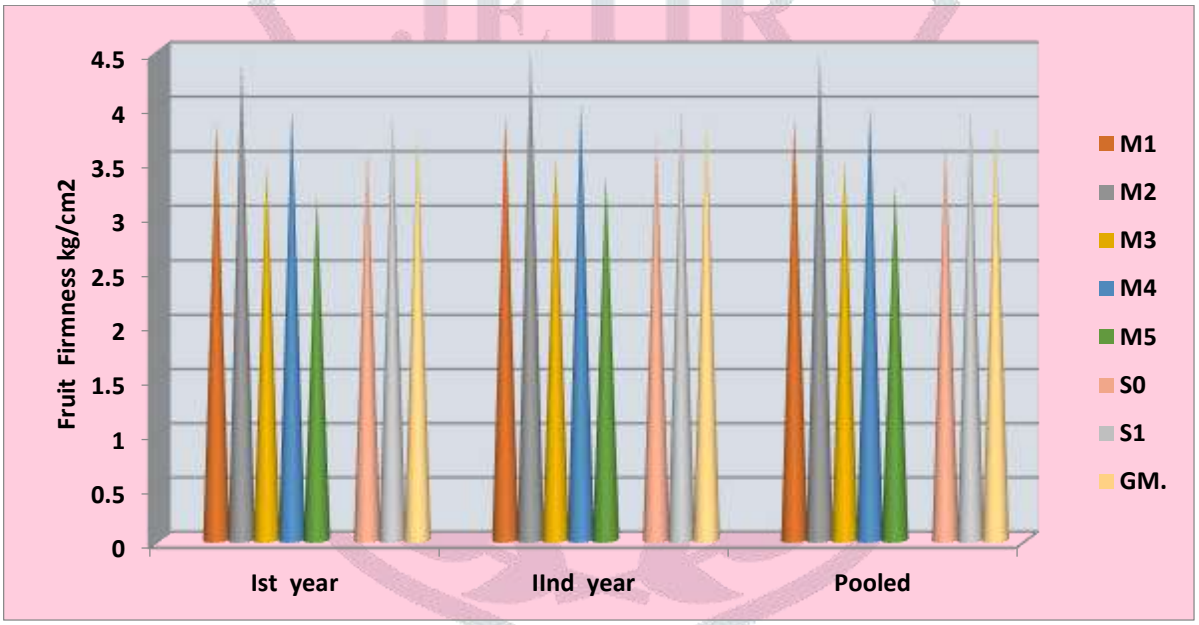

Figure-1: Studies on application of water soluble fertilizers and micronutrients in relation to fruit firmness during growing period of Grand Nain cultivar of Banana.

Discussion:

During the present studies the effect of water soluble fertilizers and micronutrients on fruit characters of grand nain cultivar of banana was observed during the period of two years. The fruit characters in terms of fruit firmness, were found to be greatly influenced by the application of dose of water soluble fertilizers through drip fertigation. The test cultivar under the fertilizer treatments found to be showed increase in fruit firmness as compared to the fruit firmness in the test cultivar under conventional method of application of fertilizers.

Conclusion:

The fertilizer treatment M_2 S_1 75 % RDF through WSF (12:61:00, 13:0:45 and Urea) with micronutrients was found to be superior and had longer fruit firmness.

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