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Yield and economics of banana Cv. grand nain influenced by foliar spray of water soluble fertilizes on banana bunch

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Abstract

The present experiment entitled "Effect of post shooting foliar spray of fertilizers on yield and economics of banana (*Musa paradisiaca* L.) cv. Grand Nain" was conducted during the year 2011-12, 2012-13 and 2013-14 at Regional Horticultural Research Station, ASPEE College of Horticulture and Forestry, Navsari Agricultural University, Navsari (Gujarat). The experiment was laid out with eleven treatments in a Randomized Block Design (RBD) and replicated three times. The treatments included SOP (1.0%, 1.5% and 2.0%), Urea (1.0%, 1.5% and 2.0%), KNO₃ (0.5%, 1.0% and 1.5%) and Pouch feeding (300g fresh cow dung + 20g Ammonium Sulphate + 10g SOP) along with control. The first spray was done immediately after complete emergence of bunch and second spray was done 15 days after the first spray. All bunches were covered with 18μ blue polythene. Quantity parameters were recorded and analyzed statistically. Results of present investigation revealed that the minimum days taken from flowering to harvesting and maximum length of bunch, girth of bunch, weight of third hand, length of finger, girth of finger, weight of bunch and yield per hectare were recorded significantly in SOP 1.5%. Economics indicated that banana bunch sprayed twice with SOP 1.5% and sleeve with 18μ blue polythene found most remunerative as it gave the highest gross income and net realization with maximum benefit cost ratio.

Keywords: grain nain, sleeving, pouch feeding, SOP, urea and KNO₃

Introduction

India is the largest banana consumer and producing country in the world followed by Brazil, contributing about 15 per cent of the total world production. Among the fruits, banana holds first position in production and productivity in India. It ranks second in area after mango. Now-a-days, the practices of application of chemicals on banana bunch for improving the growth, maturity, yield and quality of fruits is gaining popularity. Urea as a nitrogenous fertilizer is well known for its growth promoting activity in plant tissues. Urea can be expected to prolong the growth period of developing fruits by keeping them in an active stage of growth (Gandhi, 1984) [3].

Bunch feeding in banana, the technology of enhancing the size of fingers of banana in suit the market demands by de-navelling and post-shooting feeding of N, K and S through the distal stalk-end of rachis was successfully developed by Navsari Agricultural University Scientists. De-navelling saves mobilization of nutrients into the unwanted rind of banana plant and earns additional income when the excised male bud is used as a vegetable.

Sulphate of Potash spray getting higher bunch size with good quality. It helps in photosynthesis thus, reflecting in fruit size and yield. The higher chlorophyll content in leaves and developing fruits reflects the efficiency of photosynthesis.

Material and Methods

An experiment was conducted at Regional Horticultural Research Station, Navsari Agricultural University, Navsari to study the "Effect of post shooting foliar spray of fertilizers on yield and economics of banana (*Musa paradisiaca* L.) cv. Grand Nain" during the year 2012-13. The experiment was laid out with eleven treatments in a Randomized Block Design (RBD) and replicated three times. The treatments included SOP (1.0%, 1.5% and 2.0%), Urea (1.0%, 1.5% and 2.0%), KNO₃ (0.5%, 1.0% and 1.5%) and Pouch feeding (300g fresh cow dung + 20g Ammonium Sulphate + 10g SOP) along with control. The first spray was done

immediately after complete emergence of bunch and second spray was done 15 days after the first spray. All bunches were covered with 18 μ blue polythene. The pits of 30 x 30 x 30 cm were dug out and planting was done in the month of August at

a spacing of 2.4 m x 1.2 m. All the packages of practices of banana crop are carried out as per recommendation of university.

Table 1: Effect of foliar spray of water fertilizers on yield and economics of banana cv. Grand Nain (mean of three years)

Treatments	Days taken from flowering to harvesting	Length of bunch (cm)	Girth of bunch (cm)	Weight of 3 rd hand (kg)	Length of finger (g)	Girth of finger (cm)	Weight of bunch (kg)	Yield (t/ha)	Net-Return (Rs. ha ⁻¹)	BCR
T ₁ - Control	91.66	67.35	84.84	1.84	19.98	11.87	18.38	63.80	511301	2.68
T ₂ - SOP 1.0%	88.27	81.65	103.95	3.05	22.35	13.74	23.19	80.53	694641	3.63
T ₃ - SOP 1.5%	86.55	84.43	107.27	3.43	23.98	14.19	24.89	86.41	758976	3.96
T ₄ - SOP 2.0%	91.55	77.06	98.23	2.39	21.58	12.75	21.63	75.09	634111	3.30
T ₅ - Urea 1.0%	93.61	76.25	96.30	2.19	21.35	12.59	20.74	72.00	601473	3.16
T ₆ - Urea 1.5%	95.60	80.06	100.72	2.94	22.36	13.41	22.66	78.69	675050	3.54
T ₇ - Urea 2.0%	102.89	84.01	105.54	2.91	22.30	13.51	23.04	79.99	689336	3.62
T ₈ - KNO ₃ 0.5%	96.73	74.84	93.85	2.06	21.09	12.40	20.11	69.81	576985	3.02
T ₉ - KNO ₃ 1.0%	99.10	78.76	100.02	2.62	21.71	12.97	21.82	75.77	642120	3.36
T ₁₀ - KNO ₃ 1.5%	88.77	83.05	106.20	3.41	23.82	14.16	24.25	84.18	734204	3.83
T ₁₁ - Pouch feeding	101.17	71.82	90.29	1.93	20.43	12.02	19.62	68.13	549162	2.74
S.Em \pm	1.98	1.80	2.39	0.08	0.46	0.28	0.55	1.92		-
CD at 5%	5.60	5.09	6.75	0.23	1.31	0.81	1.57	5.42		-
Y X T										
S.Em \pm	3.43	3.11	4.13	0.14	0.80	0.49	0.96	3.32		
CD at 5%	NS	NS	NS	NS	NS	NS	NS	NS		
CV%	6.30	6.91	7.24	9.17	6.36	6.59	7.58	7.58		

Results and Discussion

The data presented in table 1 on days taken from flowering to harvesting, length of bunch (cm), girth of bunch (cm), weight of third hand (kg), length of finger (cm), girth of finger (cm), weight of bunch (kg) and yield (t/ha) were affected due to various treatments. All these parameters have significant differences through various foliar sprays of fertilizers.

The minimum days taken from flowering to harvesting was recorded when bunch was sprayed with SOP 1.5% twice, first immediately after bunch emergence and second 15 days after first spray. In post shooting nutrient spray investigation, the reduction in days taken from flowering to harvesting is due to faster growth rate of fingers and higher leaf chlorophyll contents owing to additional nutrient supply and faster rate of translocation of assimilates from source to sink, aided by additional potassium because it is a general metabolic activator increasing the respiration and photosynthetic rate. Thus, additional K application as foliar spray induced earlier days from flowering to harvesting (Evans, 1971; Martin and Prevel, 1972) [2, 4].

In present investigation, foliar spray of urea delayed the harvesting. This might be due to urea as a nitrogenous fertilizer and is well known for its growth promoting activity in plant tissues. Urea can be expected to prolong the growth period of developing fruits by keeping them in active stage of growth (Gandhi, 1984) [3].

Length of bunch includes number of hand and finger length which were positively correlated to each other. The maximum length of bunch and finger were noted in SOP 1.5% treatment. In agreement with these findings, Baruah and Mohan (1992) [1] reported that banana bunch treated with 1.5% SOP resulted longest length of bunch.

Girth of bunch includes number and girth of finger in each hand. The maximum girth of bunch and finger were noted with SOP 1.5% treatment. The additional K application as foliar spray induced faster growth of fingers length, girth of fingers so ultimately increase in girth of bunch.

Significantly maximum yield, weight of 3rd hand and bunch were observed in SOP 1.5% treatment. The favourable influence of SOP on the production of heavier bunches might be due to the heavier dry matter and starch accumulation and additionally promoted by the sulphur present in SOP (Kumar and Kumar, 2008). Post shooting spray of SOP (1.5%) significantly altered the chlorophyll content of leaves at the time of harvest. The sprayed plants were more efficient in maintaining a better photosynthetic status which ultimately reflected on various bunch characters and ultimately in yield. Increase in bunch weight is associated with the corresponding significant increase in the number of hands, total number of fingers, finger weight, length and circumference (Kumar and Kumar, 2008) [5]. In banana, retention of higher chlorophyll pigment during post shooting stage help bunches to accumulate more of photosynthates. Thus, the reflecting in bunch size and yield (Kumar *et al.*, 2008) [5]. Studies also revealed the beneficial role of S nutrition in enhancing bunch weight in bananas (Martin and Prevel, 1972) [4]. The influence of sulphur in enhancing fruit yield in bananas was stressed by Lahav and Turner (1983) [8].

Economics of various treatments revealed that SOP 1.5 % recorded maximum net realization per hectare with BCR. This is might be due to SOP 1.5 % produce more yield as compare to other treatments. Similar results also associated with Kumar and Kumar (2007) [6] and Kumar *et al.* (2008) [7] in banana.

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