

EFFECT OF UREA SUPER GRANULE (USG) ON THE PERFORMANCE OF BANANA

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ABSTRACT

An experiment was conducted at farmer's field of the MLT site, Goneshpur, Shibgang, Bogura during 2014-15 in medium highland of AEZ-3 to observe the efficiency of USG application on banana production in comparisons to application of prilled urea. There were four treatments viz. T₁ = Recommended (100%) dose of N as prilled urea, T₂ = Recommended (100%) dose of N as urea super granules (USG), T₃ = 10% less than recommended dose of USG and T₄ = 20% less than recommended dose of USG. The highest yield (73.70 t/ha) was obtained from recommended dose of N as USG which was statistically similar with other treatments. The higher gross return, net return and BCR were obtained from the USG treatments, even 20% less USG showed higher BCR than 100% prilled urea.

Key words: USG, nitrogen, banana, yield.

Introduction

Banana (*Musa sapientum* L.) is a leading tropical fruit in the world market with highly organized and developed industry (Anonymous, 1999). It is easily digestible and rich with carbohydrate and minerals (Bhan, 1977). For desired banana yield nutrients especially nitrogen is the most deficit nutrient element in Bangladesh soil. In general, farmers traditionally apply nitrogenous fertilizer to their crops for better yield. It is said that Urea super granule (USG) is more efficient than that of prilled urea. USG minimizes N leaching, volatilization, gaseous and surface run off loss to a greater extent. About 20-30% nitrogen could be saved by using USG compared to prilled urea. In Bangladesh first USG/IBDU works on rice was conducted by Sattar in 1973-75 under BAU and Hawaii University USAID project and the results were presented by Prof. Bhuiya in 1974 and Prof. Idris in 1977 at Hawaii University, USA. Crasswell and De Datta (1980) reported that broadcast application of urea on the surface soil causes loss up to 50% but USG showed negligible loss. Savant *et al.* (1991) observed that USG can save 30% nitrogen than prilled urea in rice field. Now, USG has been considered as a proven technology in rice production (Kumar, *et al.* 1989; Savant and Stangel, 1990). During the last couple of years farmers are applying USG in upland vegetable and fruit crops like brinjal, cabbage, cauliflower, tomato, potato, papaya, banana etc. and it is also reported that use of USG can save 10-20% nitrogenous fertilizer cost in upland crops (Anon., 2003). Banana being a long duration upland crop needs a good amount of nitrogenous fertilizer for its production but the efficiency of USG to banana is yet not tested. In this context the present study was undertaken to know the effect of USG on banana crops, to minimize the loss and to reduce the fertilizer cost.

Materials and Methods

The experiment was carried out at the MLT site, Goneshpur, Shibganj, Bogura during Rabi season of 2014-15 in the medium highland under AEZ-3. The soil characteristics are illustrated in Table 1. The study was laid out following RCB design with six dispersed replications. The unit plot size was 8 m X 4 m, with spacing 2 m X 2 m. The variety was Rangin meher sagar. The suckers were planted on October 20, 2014. The size of the USG granule was 2.7g. There were four treatments viz. T₁ = Recommended (100%) dose of N as prilled urea, T₂ = Recommended (100%) dose on N as urea super granules (USG), T₃ = 10% less than recommended dose of USG and T₄ = 20% less than recommended dose as USG. Here recommended 100% N (345 kg/ha) used as urea @750 kg/ha. Prilled urea (top dressed) and USG was applied in three equal

splits at 90, 160, 235 days after planting (DAP). First application of USG was done by making holes, at 6-8cm depth, following ring method, 25 cm apart from the base of the plant. Similarly second and third applications of USG were made at 35 and 45 cm apart, respectively. After placing USG, the hole was covered with soils. A blanket dose of P, K, S, Zn and B were applied 98, 313, 90, 4 and 0.85 kg/ha. Full dose of cow dung (5 t/ha), TSP, Boric acid, Zinc sulphate, half of MoP and Gypsum were applied in the pit. Again rest amount of Mop were applied in two equal splits at second and third top dressing, after top dressing light spading and mulching were made. The crop was irrigated four times at 45, 90, 141 and 162 days after planting (DAP). For controlling banana leaf and fruit beetle, Savin 85 SP was sprayed @ 0.5g/l of water. Tilt (0.05%) was sprayed to protect sigatoka disease. Other intercultural operation viz. weeding, earthing up were done when necessary. At maturity different data were collected accordingly and subjected to statistical analysis. The gross economic return was calculated on the basis of prevailing market price of the commodities.

Table 1. Soil analysis values of different samples collected from MLT Site (Multilocation Testing) at Goneshpur Shibgonj, Bogura.

Site	pH	OM %	Total N (%)	(meq/100g soil)			(ug/g soil)				
				Ca	Mg	K	P	S	Mn	Zn	B
Shibganj	6.3	1.15	0.06	3.6	0.7	0.17	15.0	13.0	8.0	1.1	016
Status	Slightly acidic	Low	Very Low	M	Low	M	M	M	VH	M	Low

M= Medium

Results and Discussion

The results presented in Table 2 indicated that there was a significant difference among the treatments in respect of all the studied characters except plant height, no. of cluster/bunch and yield. Significant higher length of peduncle/plant, no. of banana/cluster, length of banana/and circumference was obtained from the treatment T₂ (recommended dose of N as USG) followed by T₃ (10% less of recommended N as USG). The highest yield (73.70 t/ha) was attained from the treatment T₂ (recommended dose of N as USG) and it was statistically similar to all other treatments. The banana yield obtained from 10% less and even 20% less N as USG were statistically identical with recommended USG and recommended prilled urea. It is indicated that the efficiency of USG is found better over prilled urea.

Table 2. Yield and yield contributing characters of banana at the MLT site of Bogura during 2014-15

Treatment	Plant height (cm)	No. of clusters/bunch	Length of peduncle/plant (cm)	No. of banana/cluster	Length of banana (cm)	Circumference of banana (cm)	Length of bunch (cm)	Yield
T ₁	429.5a	9.83a	101.83c	16.448c	16.46d	15.83c	77.73c	71.00a
T ₂	439.9a	439.9a	109.1a	19.63a	18.70a	17.80a	82.93a	73.70a
T ₃	448.3a	448.3a	104.7b	18.05b	17.86b	17.00b	81.39ab	72.30a
T ₄	432.1a	4.54a	102.2c	16.93c	17.01c	16.07c	78.82bc	71.43a
CV(%)	13.81	6.57	5.38	5.15	2.37	2.14	2.65	8.09

Means is a column having same letter did not differ significantly.

Nazrul *et al.* (2007 a) observed that USG is better than prilled urea even 10% less than recommended dose of USG produced is more profitable in comparison to prilled urea in banana cultivation. It could be due to maximum utilization of nitrogen fertilizers, which ultimately helped increase the yield. In an another experiment, Nazrul *et al.* (2007b) also reported that application of USG in cabbage at 10 days after

transplantation at a depth of 8 cm gave the highest yield. Shahidullah *et al.* (2009) conducted an experiment to find out the effect of USG on potato and reported that farmers can easily reduce 10% N as USG without significant yield reduction in potato cultivation. A similar result was also reported by Rahman *et al.* (2004). Haque (2005) found maximum yield of potato (26.50 t/ha) with placement of USG (109 kg/ha).

Cost and return analysis: Higher gross return and net return was obtained from the treatment T₂ followed by T₃ (Table 3). Treatment T₂ (where recommended N as USG) showed higher gross return than T₁ where 100% (6.58) prilled urea was used. The highest BCR was recorded from the treatment T₂ (6.58) followed by T₃ (6.48), T₄ (6.43) and T₁ (6.37).

Table 3. Cost and return of Banana as affected by USC application at the MLT site of Bogura during 2014-15

Treatment	Yield (kg/ha)	Gross return (Tk/ha)	Total variable cost (Tk/ha)	Net return (Tk/ha)	BCR
T ₁	71000	852000	133590	718410	6.37
T ₂	73700	884400	134340	750060	6.58
T ₃	72300	857600	133815	733785	6.48
T ₄	71.43	857160	133290	723870	6.43

Market price of banana TK 12/kg

Conclusion

USG has a significant positive effect on growth and yield of banana than prilled urea. Farmers can save at least 20% urea if they use USG as a source of N in banana cultivation.

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