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Short communication

Effect of different levels of N and P on ratoon crop of banana cv. Grand Naine

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ABSTRACT

An investigation was carried out to study the effect of various levels of N and P on growth and yield of banana cv. Grand Naine in first ratoon crop at Punjab Agricultural University, Ludhiana. The treatments consisted of six levels of nitrogen at 150, 200 (in 4 and 5 splits), 250 (in 4 and 5 splits) and 300 g (in 5 splits) per plant as urea, phosphorus at 60 and 90 g per plant as single super phosphate. Application of N and P at the rate of 200 g N in 5 splits + 60 g P_2O_5 per plant to ratoon crop of banana cv. Grand Naine proved to be the best among all treatment combinations. This also resulted in maximum plant growth, early shooting and fruit maturity. In addition, the fruit yield per plant (18.9 kg) was maximum with the above mentioned treatment. Finger length increased with increase in dose of N from 150 g to 200 g per plant.

Key words: Banana, ratoon crop, nutrition, nitrogen, phosphorus, fertilization, punjab

In banana, higher yields are related to faster production of bigger leaves. Banana is a gross feeder of nutrients and has restricted root zone thus requires heavy fertilizer application in this limited root area. As most of soils are deficient in nitrogen and phosphorus, application of these two plant nutrients together with organic manure play an important role to get good crop returns (Datt and Sundharam 2005). Although, a lot of work has been done on nutrient requirement of banana with respect to production under different set of edaphic conditions, such information is lacking under Punjab conditions, where banana has been recently introduced and gaining importance. Therefore, a need was felt to study the response of various levels of nitrogen and phosphorus and their application on growth, yield and quality of banana and thereby formulate a fertilizer schedule under prevailing agro climatic conditions of Punjab.

The present investigation was undertaken during 2007-08 at the Punjab Agricultural University, Ludhiana on the first ratoon crop of banana cv. Grand Naine. The treatments consisted of six levels of nitrogen (N) at 150, 200 (in 4 and 5 splits), 250 (in 4 and 5 splits) and 300 g (in 5 splits) per plant as urea; phosphorus (P_2O_5) at 60 and 90 g per plant as single super phosphate. Thus, there were 12 treatment combinations. A common dose of 200 g potash (K_2O) was applied in 5 split doses as muriate of potash. Full dose of single super phosphate was applied in May while, urea and muriate of potash were applied from May to September, 2007. All plants were under uniform cultural practices, except the fertilizer treatments. Observations on plant height, girth, number of leaves (recorded at shooting stage), crop duration (time recorded after the complete harvest of the main crop in April) and yield attributing characters like number of fingers per hand, number of hands per bunch, finger length and bunch weight were recorded. The data recorded were statistically analyzed as per split plot design method (Chao and Lincoln, 1969).

Data presented in Table 1 indicate that nitrogen and phosphorus application significantly influenced pseudo stem height, girth, and number of leaves at all levels tried. Though application of 200 g N in 5 splits and 60 g P_2O_5 produced the tallest plants (216 cm) with larger pseudo stem girth (57.4 cm), it was at par with 200 g N in 4 splits and 60g P_2O_5.

Within nitrogen treatments the highest average height attained by plants treated with 200 g N in 5 splits was 210.5 cm. However, it was only 3.5 cm more than that at the maximum level of N applied (300 g N), showing thereby that increase in height of plants by application of N beyond 200g per plant was less rapid. These results are in agreement with other workers (Das and Khatna, 1974 and

Table 1. Response of growth attributing characters, flowering and crop duration in banana cv. Grand Naine to various levels of N and P

Treatment	Growth character						Crop duration(time taken for)				Yield attributing character							
	Pseudostem height (cm)		Pseudostem girth (cm)		Leaf No.		Shooting (no. of days)		Shooting to harvesting (no. of days)		Bunch weight(kg)		No. of hands per bunch		No. of fingers per hand		Finger length(cm)	
N (g/tree)	P_1	P_2	P_1	P_2	P_1	P_2	P_1	P_2	P_1	P_2	P_1	P_2	P_1	P_2	P_1	P_2	P_1	P_2
N1 - 150 g N in 5 split doses	205	201	52.5	50.8	12.7	11.3	93	98.0	110	110	17.6	15.3	7.5	7.0	16.0	14.0	18.0	17.5
N2 - 200 g N in 4 split doses	215	205	57.4	55.7	14.5	13.8	79	93.0	90	108	18.0	17.2	9.3	8.6	20.2	16.6	19.3	18.2
N3 - 200 g N in 5 split doses	216	205	57.8	55.8	14.6	13.4	79	93.0	90	108	18.9	17.7	9.7	8.8	20.6	16.7	19.7	18.5
N4 - 250 g N in 4 split doses	212	204	54.7	53.2	13.4	12.5	85	108	107	119	17.4	16.8	8.0	7.6	18.4	14.1	18.8	17.6
N5 - 250 g N in 5 split doses	208	202.7	54.4	53.0	12.6	12.1	85	108	107	119	16.3	15.8	8.9	7.6	17.5	13.9	18.2	18.0
N6 - 300 g N in 5 split doses	212	203.2	54.3	53.7	12.8	12.7	98	115	110	117	17.5	16.0	8.3	7.3	17.6	14.4	18.3	17.9
CD (*P=0.05)*	N=1.32 P=2.21 Nx P=3.02		N=2.30 P=1.43 Nx P= NS		N=1.42 P=NS Nx P= NS		N=3.05 P=1.71 Nx P=4.22		N=1.53 P=0.92 Nx P=2.14		N=1.42 P=0.81 Nx P=NS		N=1.23 P=0.72 Nx P= NS		N=1.33 P=0.82 Nx P= NS		N=0.72 P=0.42 Nx P= NS	

P_1 = 60g P_2O_5
P_2 = 90g P_2O_5

Parida *et al*, 1994). The result of the experiment also did not record much difference in height of banana plants due to application of P at the rate of 60 g and 90 g P_2O_5 per plant, but lower dose of 60 g P_2O_5 was significantly better than 90 g P_2O_5. This is in agreement with findings of Kohli *et al* (1976), who reported that due to low requirement of P in banana, lower doses of P is generally recommended. Nitrogen was found to be most effective in increasing the pseudostem girth at 200 g N. P did not record any significant difference in pseudostem girth (Mahakal and Gupta 1973). Significant increase in leaf number was observed with application of N. The highest average leaf number was recorded in 200 g N in 5 splits which was at par with 200 g N in 4 splits. No marked variation was noted with respect to leaf production due to interaction between N and P. Among P, both the treatments failed to show any effect on leaf number.

Plants supplied with 200 g N in 4 or 5 splits and 60 g P_2O_5 took a shorter time for shooting and subsequently the time taken for harvest also reduced significantly (79 and 99 days, respectively), when compared to lower level of 150 g N and 60 g P_2O_5 (93 and 111 days, respectively) as well as other treatment combinations. Owing to earlier production of leaves with larger leaf area per plant and better disposition of photosynthetic area, the required net assimilation was reached early in plants receiving higher dose of nitrogen, hastening the process of initiation and emergence of inflorescence (Parida *et al*, 1994). Earlier studies by Israeli and Lahav (1986) and Singh *et al* (1990) suggested that an optimum supply of nutrients stimulated early shooting and shortened the duration. Effect of nitrogen was more pronounced than phosphorus in decreasing the shooting as well as harvest duration. Plants receiving 200 g N took significantly less number of days to shooting and harvesting as compared to 300 g N. Decrease in duration to shoot and harvest between 60 g P_2O_5 and 90 g P_2O_5 was 16 and 11 days, respectively and corresponding figure to nitrogen was 20 and 14 days, respectively. These results are in agreement with observations of Kohli *et al* (1981).

In case of yield attributing characters, bunch weight, number of hands per bunch, number of fingers per hand and finger length, increased significantly due to treatment with nitrogen and phosphorus when applied singly. Application of 200 g N (5 splits) and 60 g P_2O_5 gave the highest bunch weight (18.9 kg). The increase in bunch weight was associated with corresponding increase in number of hands per bunch, number of fingers per hand and finger length, which were found to be highest in 200 g N (5 splits) and 60 g P_2O_5 (9.7, 20.6 and 19.7 cm, respectively). The increased dry matter at harvest due to application of nutrients might have contributed to higher bunch characters, which may be attributed to timely availability of required amounts of nutrients at flower bud initiation (Basagarahally, 1996 and Armugam and Manivannan, 2001).

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