Influence Of Plant Spacing And Potassium Supply On Weight Of Finger In Banana (*Musa Acuminata* L.) Cv. Ardhapuri"

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ABSTRACT

The present investigation was carried out at Banana Research Station, Nanded. "Studies on plant geometry and levels of potassium on growth, yield and quality of banana (Musa acuminata L.)", for two trial years. In the present experiment, there were four main treatments of plant density, viz. D1 (1.5 m x 1.2 m), D2 (1.5 m x 1.5 m), D3 (1.5 m x 1.8 m) and D4 (1.5 m x 2.1 m), three sub- treatment of potassium levels, viz. K1 (100 g K2 O/plant), K2 (200 g K2O/plant), K3 (300 g K2O/plant) and thus comprising twelve treatment combinations.

The maximum finger weight (131.73g) was obtained in D_4 (1.5m x 2.1 m), while the lowest finger weight (131.73g) was noted in D_1 (1.5m x1.2m) the highest finger weight (116.95 g) was noted by potassium level K_3 (300 g K_2O/plant) and the least finger weight (104.88g) was recorded in K_1 (100 g K_2O/plant). The interaction effect of plant densities and potassium levels on finger weight (g) during 2011-12, 2012-13 and in pooled were found to be non significant.

INTRODUCTION

Banana belongs (Musa spp.) to family Musaceae and it is the most important fruit crops of the world as well as India. It is pleasing flavoured, nutritious, cheap and known as "poor man's apple". The banana crop determines the socio-economic status of the farmer's and called as Kalpataru (Plant of heaven) due to its socio-economic and multiple uses. The number of banana cultivars are variable, there are about 250-300 cultivated cultivars in India. Ardhapuri (Musa sp.)

Advantages of high density planting(plant geometry) includes precocity in bearing, high yield, high average yield, high returns per unit area, early returns, easy management, reduction in labour cost, low reduction cost, mechanization of fruit crop, production and facilitates more efficient use of radiation, fertilizers, fungicides, herbicides, pesticides, insecticides etc.

To ensure high yield of superior quality bananas, adequate application of nutrients is of paramount importance, Potassium regulates many vital functions like carbon assimilation, translocation of proteins and sugars, water balance in plants, maintain turgor pressure in the cell, root development, improving the quality of fruits by maintaining desirable sugar: acid ratio, ripening of fruits and many other processes. The banana requires more potassium for its growth, production and quality compared to nitrogen and phosphorus Croucher and Mitchell (1940). Considering these facts the research topic entitled "Studies on plant geometry and levels of potassium on growth, yield and quality of banana (*Musa acuminata* L.)" is related to the present studies.

Materials and Methods:

Fingers were weighted by using electronic balance and mean weight of fingers was recorded and expressed in grams.

Details of Experiment:

a) Name of crop : Banana
b) Botanical Name : *Musa* spp.
c) Family : Musaceae
d) Number of main treatments : 04
e) Number of sub treatments : 03
f) Number of treatment combinations: 12
g) Number of replications : 03
h) Experimental design : Split plot design
i) Variety : Ardhapuri
j) Season : 2011-12 and 2012-13
k) Fertilizers : As per mentioned later

Treat. Symbol.		Treatment details
Plant density (D)		
D_1	:	1.5 m x 1.2 m
D_2	:	1.5 m x 1.5 m
D_3	:	1.5 m x 1.8 m
D_4	:	1.5 m x 2.1 m
Potassium levels (K)		
K_1	:	100 g K_2O/plant (1/2 dose of RDF)
K_2	:	200 g K_2O /plant (RDF)
K_3	:	300 g K_2O /plant (1.5 dose of RDF)

Treatment		Treatment Details
T1	:	D1K1 (1.5m x 1.2m with 100g K2O/plant)
T2	:	D1K2(1.5m x 1.2m with 200g K2O/plant)
T3	:	D1K3(1.5m x 1.2m with 300g K2O/plant)
T4	:	D2K1(1.5m x 1.5m with 100g K2O/plant)
T5	:	D2K2(1.5m x 1.5m with 200g K2O/plant)
T6	:	D2K3(1.5m x 1.5m with 300g K2O/plant)
T7	:	D3K1(1.5m x 1.8m with 100g K2O/plant)
T8	:	D3K2(1.5m x 1.8m with 200g K2O/plant)
T9	:	D3K3(1.5m x 1.8m with 300g K2O/plant)
T10	:	D4K1(1.5m x 2.1m with 100g K2O/plant)
T11	:	D4K2(1.5m x 2.1m with 200g K2O/plant)
T12	:	D4K3(1.5m x 2.1m with 300g K2O/plant)

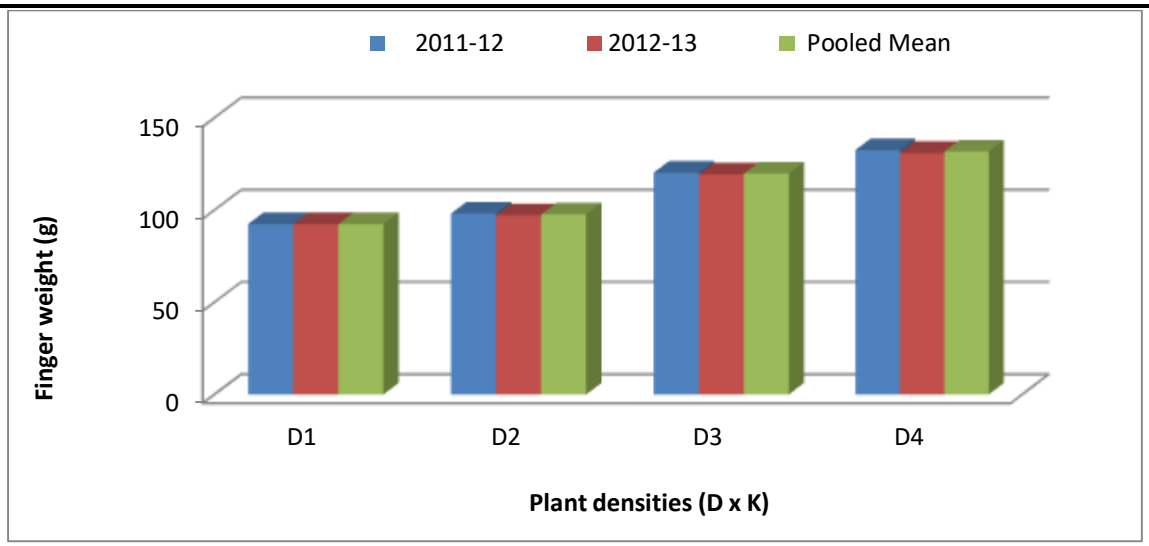
RESUITS:

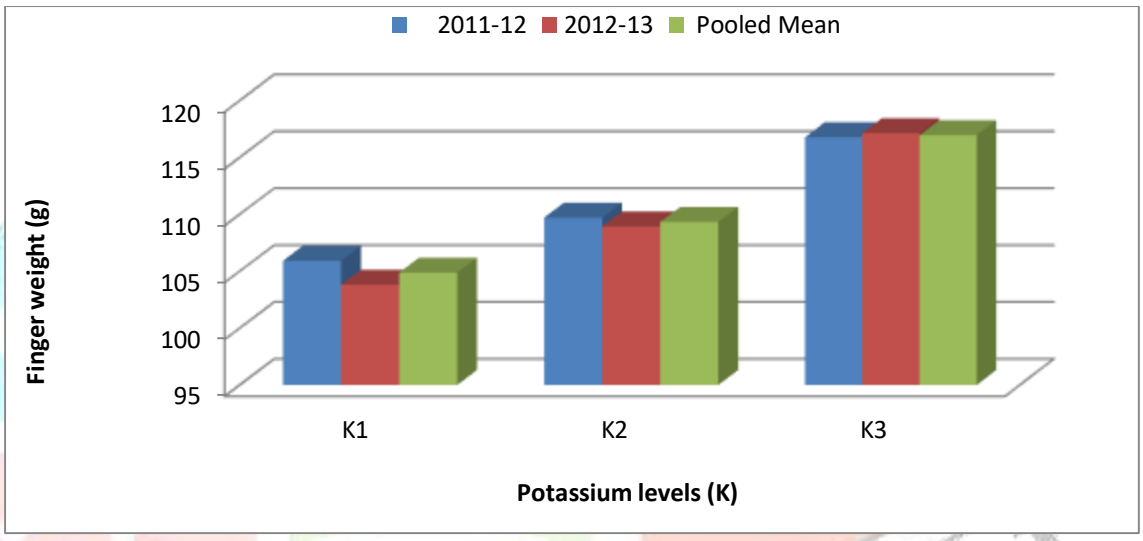
Weight of Fingers of Banana:

The data during 2011-12, showed that the plant density D_4 (1.5m x 2.1m spacing *i.e.* 3,174 plants/ha) gave the significantly maximum finger weight (132.47 g), while the minimum finger weight (92.38g) was noted in D_1 (1.5m x 1.2m spacing *i.e.* 5,555 plants/ha) which was followed (98.10) by D_2 (1.5m x 1.5m spacing *i.e.* 4,444 plants/ha) the potassium level K_3 (300 g K_2O/plant) had gave significantly maximum finger weight (116.77g), and the minimum finger weight was noted in K_1 (100 g K_2O/plant) which as at par (109.71 g) with K_2 (100 g K_2O/plant).

Table 01. Effect of plant densities and different levels of potassium on finger weight (g) of banana cv. Ardhapuri

Treatments		Finger weight (g)		
Main treatments (Plant densities) (D)		2011-12	2012-13	Pooled Mean
Spacings (m^2)	No. of plants/ha			
D_1 (1.5 x 1.2)	5,555	92.38	92.38	92.38
D_2(1.5 x 1.5)	4,444	98.10	97.16	97.63
D_3(1.5 x 1.8)	3,703	120.27	119.31	119.79
D_4 (1.5 x 2.1)	3,174	132.47	131.00	131.73
S.E.(m) ±		1.640	2.012	1.84
C.D. at 5%		5.676	6.961	5.66
Sub-treatment (Potassium levels) (K)				
K_1 (100 g K_2O/plant)		105.93	103.82	104.88
K_2 (200 g K_2O/plant)		109.71	108.94	109.33
K_3 (300 g K_2O/plant)		116.77	117.13	116.95
S.E.(m) ±		1.365	1.042	1.214
C.D. at 5%		4.091	3.123	3.497
Interaction (D x K)				
D_1 K_1		90.87	90.73	90.80
D_1 K_2		91.37	91.50	91.43
D_1 K_3		94.90	94.90	94.90
D_2 K_1		93.20	89.63	91.42
D_2 K_2		94.03	94.77	94.40
D_2 K_3		1`07.07	107.07	107.07
D_3 K_1		113.67	113.30	113.48
D_3 K_2		121.93	118.00	119.97
D_3 K_3		125.20	126.63	125.92
D_4 K_1		126.00	121.60	123.80
D_4 K_2		131.50	131.50	131.50
D_4 K_3		139.90	139.90	139.90
S.E.(m) ±		2.729	2.083	2.428
C.D. at 5%		NS	NS	NS





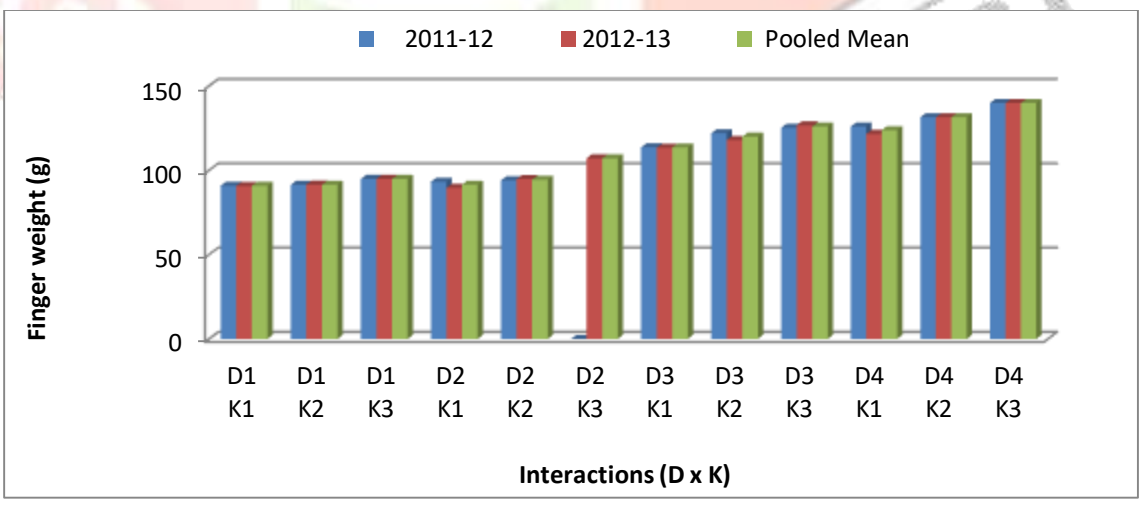


Fig. 01.Effect of plant densities and different levels of potassium on finger weight (g) of banana cv. Ardhapuri

During 2012-13, the density D_4 (1.5m x 2.1m spacing *i.e.* 3,174 plants/ha) gave the significantly maximum finger weight (131.00g) and the minimum finger weight was recorded in (92.38g) (1.5m x 1.2 m) which was at par (97.16 g) with D_2 (1.5m x1.5m). The potassium level, K_3 (300 g K_2O/plant) gave the significantly maximum finger weight (117.13g), and the minimum finger weight (103.82g) was noted in K. (100 g K_2O/plant).

In pooled data, the significantly highest finger weight (131.73g) was obtained in D_4 (1.5m x 2.1 m), while the lowest weight (131.73g) of finger was noted in D_1 (1.5m x1.2m). The significantly highest finger weight (116.95 g) was noted by potassium level K_3 (300 g K_2O/plant) and the least finger weight (104.88g) was recorded in K_1 (100 g K_2O/plant).

The interaction effect of plant densities and potassium levels on finger weight (g) during 2011-12, 2012-13 and in pooled were found to be non significant. and the minimum finger weight (103.82g) was noted in K. (100 g K_2O/plant).

In pooled data, the significantly highest finger weight (131.73g) was obtained in D_4 (1.5m x 2.1 m), while the lowest weight (by potassium level K_3 (300 g K_2O/plant) and the least finger weight (104.88g) was recorded in K_1 (100 g K_2O/plant131.73g) of finger was noted in D_1 (1.5m x1.2m). The significantly highest finger weight (116.95 g) was noted).

The interaction effect of plant densities and potassium levels on finger weight (g) during 2011-12, 2012-13 and in pooled were found to be non significant.

DISCUSSION

The data in Table 42 revealed that the maximum finger weight (131.73g) was obtained in D_4 (1.5m x 2.1 m), while the lowest weight (131.73g) of finger was noted in D_1 (1.5m x1.2m) the highest finger weight (116.95 g) was noted by potassium level K_3 (300 g K_2O/plant) and the least finger weight (104.88g) was recorded in K_1 (100 g K_2O/plant).

The interaction effect of plant densities and potassium levels on finger weight (g) during 2011-12, 2012-13 and in pooled was found to be non significant.

In above study when the plant density was high more leaf surface was exposed to sunlight and indirectly greater amount of assimilates accumulated in various organs of the plant leading to increased finger attributes *viz*., number of fingers, finger lengths, girth of finger, diameter of finger and finger weight were highest and also contributed by application potassium.

Natesh *et al.* (1993) observed significantly more finger weight (196.60g), length (25.32 cm) and girth of fingers (12.26 cm), maximum pulp weight (143.30 g) and maximum pulp to peel ratio (3.58) in Nendran banana by application of recommended dose of fertilizer (190: 115: 300 g/ plant/ year).

Similar findings were reported by Nalina *et al*. (2003), and Syed Ziauddin (2009).

SUMMERY AND CONCLUSION

The maximum finger weight (131.73g) was obtained in D_4 (1.5m x 2.1 m), while the lowest finger weight (131.73g) was noted in D_1 (1.5m x1.2m) the highest finger weight (116.95 g) was noted by potassium level K_3 (300 g K_2O/plant) and the least finger weight (104.88g) was recorded in K_1 (100 g K_2O/plant). The interaction effect of plant densities and potassium levels on finger weight (g) during 2011-12, 2012-13 and in pooled were found to be non significant.

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