Assessment Of Potassium Nutrition And Plant Spacing On Days To Emergence Of Inflorescence Of 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*. 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) and D_4 (1.5 m x 2.1 m), three sub- treatment of potassium levels, *viz*. K_1 (100 g K_2 O/plant), K_2 (200 g K_2O/plant), K_3 (300 g K_2O/plant) and thus comprising twelve treatment combinations.

From the results obtained in the present investigation, it can be revealed that the treatment D_3 (1.5 m x 1.8 m i. e.3703 plants/ha) required minimum days to emergence of inflorescence (246.83) which was at par with treatment $D_2$1.5 m x 1.5 m (4444 plants/ha) (247.33). The treatment D_4 (1.5 m x 2.1 m i. e. 3174 plants/ha) required maximum days to emergence of inflorescence (257.39) which was at par with treatment $D_1$1.5 m x 1.2 m (5555 plants/ha) (252.00). The minimum days to emergence of inflorescence required in treatment K_3 (300g K_2O/plant) (245.58). The treatment K_1 (100g K_2O/plant) required maximum days to emergence of inflorescence (257.13). The interaction effects of plant densities and potassium levels on days to emergence of inflorescence of banana 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:

During the present studies different treatments of plant density and potassium levels were taken for observation during two trial years. The actual number of days for emergence of inflorescence from planting was recorded and the mean was calculated.

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:

Days to emergence of inflorescence:

During 2011-12, 2012-13 and in pooled the plant densities and potassium levels (Table 01) significantly influenced days to emergence of inflorescence of banana depicted through Fig. 01

During 2011-12 the treatment D_3(1.5m x 1.8m spacing i.e. 3703 plants/ha) required minimum days to emergence of inflorescence (247.22) which was at par with treatment D_2(1.5m x 1.5m spacing i.e. 4444 plants/ha) (247.44) the treatment D_4(1.5m x 2.1m spacing i.e. 3174 plants/ha) required maximum days to emergence of inflorescence (258.00)

which was at par with treatment D_1(1.5m x 1.2m spacing i.e. 5555 plants/ha) (251.67). The minimum days to emergence of inflorescence required in treatment K_3 (300g K_2O/plant) (245.83). The treatment K_1 (100g K_2O/plant) required maximum days to emergence of inflorescence (257.25).The interaction effects of plant densities and potassium levels on days to emergence of inflorescence of banana found to be non significant.

During 2012-13 the treatment D_3(1.5m x 1.8m spacing i.e. 3703 plants/ha) required minimum days to emergence of inflorescence

Table 01. Effect of plant densities and different levels of potassium on days to emergence of inflorescence of banana cv. Ardhapuri

Treatments		Days to emergence of inflorescence		
Main treatments (Plant densities) (D)				
Spacings (m^2)	No. of plants/ha	2011-12	2012-13	Pooled Mean
D_1 (1.5 x 1.2)	5555	251.67	252.33	252.00
D_2(1.5 x 1.5)	4444	247.44	247.22	247.33
D_3(1.5 x 1.8)	3703	247.22	246.44	246.83
D_4 (1.5 x 2.1)	3174	258.00	256.78	257.39
S.E.(m) ±		1.343	2.056	1.74
C.D. at 5%		4.648	7.115	5.35
Sub treatments (Potassium levels) (K)				
K_1 (100g K_2O/plant)		257.25	257.00	257.13
K_2 (200g K_2O/plant)		250.17	249.75	249.96
K_3 (300g K_2O/plant)		245.83	245.33	245.58
S.E.(m) ±		1.042	1.326	1.193
C.D. at 5%		3.124	3.976	3.435
Interactions (D x K)				
D_1 K_1		256.33	257.67	257.00
D_1 K_2		252.33	254.33	253.33
D_1 K_3		246.33	245.00	245.67
D_2 K_1		255.00	254.00	254.50
D_2 K_2		245.00	245.33	245.17
D_2 K_3		242.33	242.33	242.33
D_3 K_1		253.33	252.00	252.67

D_3 K_2	245.67	245.00	245.33
D_3 K_3	242.67	242.33	242.50
D_4 K_1	264.33	264.33	264.33
D_4 K_2	257.67	254.33	256.00
D_4 K_3	252.00	251.67	251.83
S.E.(m) ±	2.084	2.652	2.385
C.D. at 5%	NS	NS	NS

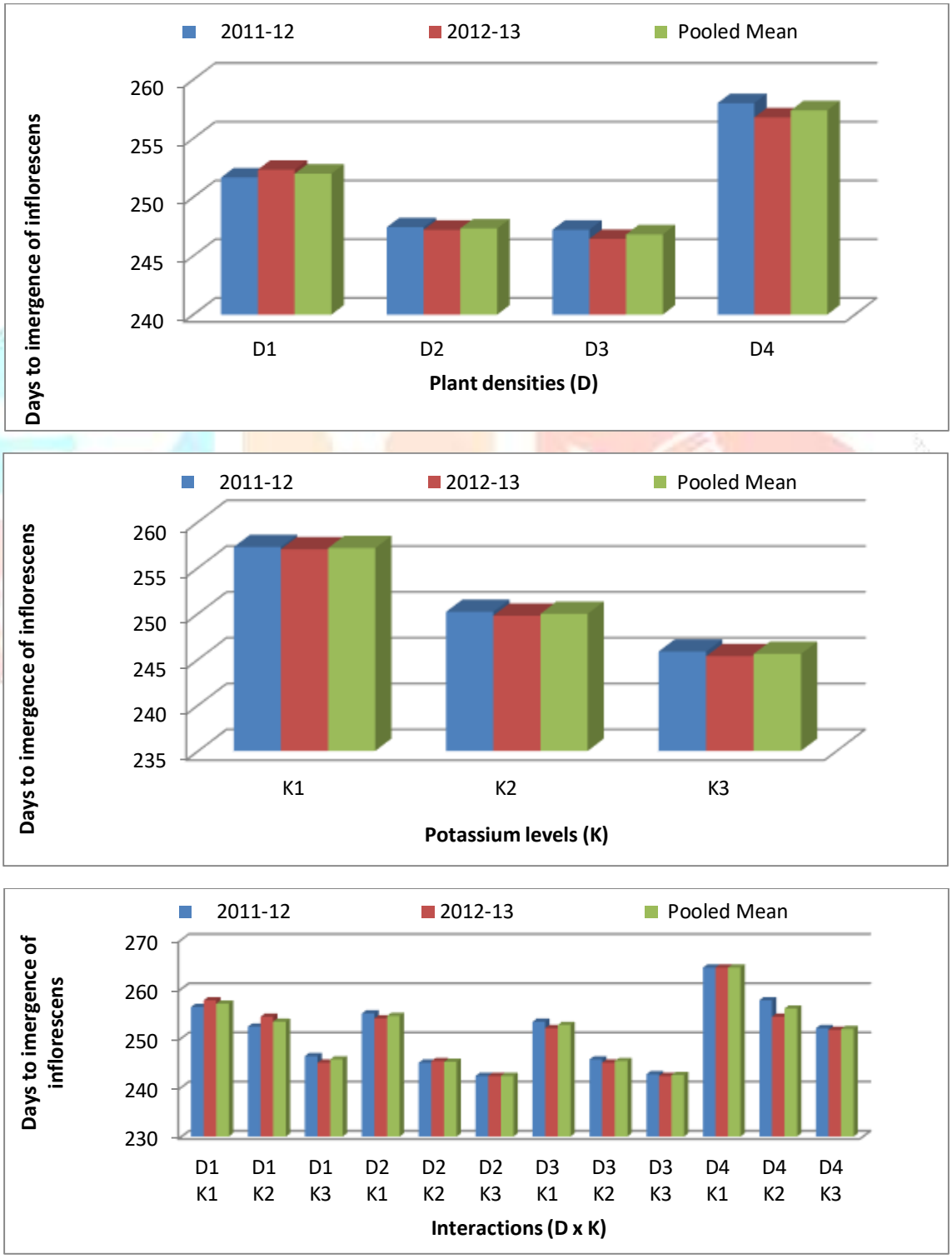

Fig. 01. Effect of plant densities and different levels of potassium on days to emergence of inflorescence of banana cv. Ardhapuri

(246.44) which was at par with treatment D_2(1.5m x 1.5m spacing i.e. 4444 plants/ha) (247.22).The treatment D_4(1.5m x 2.1m spacing i.e. 3174 plants/ha) required maximum days to emergence of inflorescence (256.78) which was at par with treatment D_1(1.5m x 1.2m spacing i.e. 5555 plants/ha) (252.33). The minimum days to emergence of inflorescence required in treatment K_3 (300g K_2O/plant) (245.33). The treatment K_1 (100g K_2O/plant) required maximum days to emergence of inflorescence (257.00).The interaction effects of plant densities and potassium levels on days to emergence of inflorescence of banana found to be non significant.

In pooled data the treatment D_3(1.5m x 1.8m spacing i.e. 3703 plants/ha) required minimum days to emergence of inflorescence (246.83) which was at par with treatment D_2(1.5m x 1.5m spacing i.e. 4444 plants/ha) (247.33). The treatment D_4(1.5m x 2.1m spacing i.e. 3174 plants/ha) required maximum days to emergence of inflorescence (257.39) which was at par with treatment D_1(1.5m x 1.2m spacing i.e. 5555 plants/ha) (252.00). The minimum days to emergence of inflorescence required in treatment K_3 (300g K_2O/plant) (245.58). The treatment K_1 (100g K_2O/plant) required maximum days to emergence of inflorescence (257.13).The interaction effects of plant densities and potassium levels on days to emergence of inflorescence of banana found to be non significant.

Discussion:

The data in Table 01 revealed that the treatment D_3 (1.5 m x 1.8 m with 3703 plants/ha) required minimum days to emergence of inflorescence (246.83) which was at par with treatment D_2(1.5 m x 1.5 m with 4444 plants/ha) (247.33). The treatment D_4(1.5 m x 2.1 m with 3174 plants/ha) required maximum days to emergence of inflorescence (257.39), however it was at par with treatment D_1(1.5 m x 1.2 m with 5555 plants/ha) (252.00). The minimum days to emergence of inflorescence required in treatment K_3 (300g K_2O/plant) (245.58). The treatment K_1 (100g K_2O/plant) required maximum days to emergence of inflorescence (257.13).The interaction effects of plant densities and potassium levels on days to emergence of inflorescence of banana found to be non significant.

Baruh and Sharma revealed that plant density had pronounced effect on crop production. In wider density, more area of leaf surface was exposed to light, causing increased metabolism of plants, which leads to early physiological maturity and flowering.

Delayed shooting in closer spacing was also reported by Ahmed Mannan (1970) and reddy (1991).

Palkar *et al* (2012) reported that inflorescence emergence and maturity were significantly affected by various treatments. The minimum days (391.85 and 297.75) for maturity and inflorescence were found in wider spacing (2.1 x 1.5 m) of Banana cv. Grand Naine.

Summery and Conclusion:

The treatment D_3 (1.5 m x 1.8 m i. e.3703 plants/ha) required minimum days to emergence of inflorescence (246.83) which was at par with treatment $D_2$1.5 m x 1.5 m (4444 plants/ha) (247.33). The treatment D_4(1.5 m x 2.1 m i. e. 3174 plants/ha) required maximum days to emergence of inflorescence (257.39) which was at par with treatment $D_1$1.5 m x 1.2 m (5555 plants/ha) (252.00). The minimum days to emergence of inflorescence required in treatment K_3 (300g K_2O/plant) (245.58). The treatment K_1 (100g K_2O/plant) required maximum days to emergence of inflorescence (257.13).The interaction effects of plant densities and potassium levels on days to emergence of inflorescence of banana found to be non significant.

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