

**Original Research Article**

**EFFECT OF DIFFERENT PLANT SPACINGS ON GROWTH, YIELD AND DISEASE  
INCIDENCE IN BANANA CV. PHULE PRIDE**

**ABSTRACT**

An investigation was carried out in planted banana crop cv. Phule Pride (AAA) to evaluate the effect of different planting distances on growth, durational, bunch, and yield parameters and disease incidence for three successive years (2021-22 to 2023). The experiment was carried out in Randomized Block Design with four replications. The treatments comprised of T<sub>1</sub> (1.20 m x 1.20m (6944 Plants per hectare)), T<sub>2</sub> (1.35 m x 1.35m (5487 Plants per hectare)), T<sub>3</sub> (1.35 m x 1.75m (4233 Plants per hectare)), T<sub>4</sub> (1.50 m x 1.35m (4938 Plants per hectare)) and T<sub>5</sub> (1.50 m x 1.50m (4444 Plants per hectare)). In general, there was decrease in pseudo stem height, number of functional leaves and leaf area with the decrease in plant spacing, where increase in pseudo stem girth was observed with the decrease in plant spacing. Delay in all the durational parameters namely days to shooting, days to maturity and days harvesting was recorded with the decrease in plant spacing. Number of hands per bunch, number of fingers per bunch, finger length and bunch weight also decreased with the decrease in plant spacing, whereas increase in finger girth was observed with the decrease in plant spacing. The conventional treatment 1.50 m x 1.50m (4444 Plants per hectare)) recorded highest bunch weight (19.40 t/ha) as against the 12.18 t/ha in the treatment T<sub>1</sub> (1.20 m x 1.20m (6944 Plants per hectare)). As regards the yield (t/ha), all the treatments were on par with each other except T<sub>2</sub> (1.35 m x 1.35m (5487 Plants per hectare)). Considering all the parameters, it observed that the plant spacing of 1.5 m x 1.5 m accommodating 4444 plants per hectare is found optimum for the banana cv. Phule Pride.

Keywords: Phule Pride, spacing, functional leaves, bunch weight, yield

**INTRODUCTION**

Banana is the important commercial fruit crop of the country and Tamil Nadu Ranks first in area and production whereas Maharashtra ranks second in area and production. During the last ten years, there is a significant increase in the area and production of bananas in Maharashtra. In 2021-2022, area under banana was 90.9 thousand hectare with 4887.9

thousand metric tons indicating its significant contribution state's economy. In Maharashtra, varieties mainly from Dwarf Cavendish group such as Basrai, Shrimanti, Harisal, Ardhapuri, Grand Naine are grown. Among these varieties, Grand Naine is the dominant commercial variety. Although, Grand Nain produces heavier bunches with high yield and best quality fingers than other varieties, it suffers from important abiotic stresses such as the breaking of the pseudo stem in the middle and uprooting of the entire plant in the summer at the stage when the bunches are about to harvest causing severe economic losses. The banana cultivar Phule Pride is supposed to be the ideal variety to avoid such problems as it is highly dwarf which grows up to the height of just 153 cm. Therefore, it is highly resistant to the breaking of the pseudo stem in the middle and uprooting of the plant. Phule Pride being dwarf, there is a possibility to further enhance its yield by adopting the high-density planting. Generally, higher yields per area unit are the result of efficient use of sunlight, nutrient, and water. However, with high densities, the agronomic performance of the Plantain banana crop can decrease due to sun light competition, excessive water loss through transpiration, and plant pests and disease (Cayón *et al.*, 2004).

Research work on plant densities generally with reduced spacing has been attempted in banana with varying degree of success. In Maharashtra, the recommended plant spacing for dwarf varieties for cultivars such as Basrai, Shrimanti, Phule Pride is 1.5 m x 1.5 m. The significance of high density planting in augmenting yield per hectare in banana has already been elucidated by Chaudhari and Baruah (2002); Husameldin (2013); Swain *et al.* (2020); Debnath *et al.* (2021). Since the availability of solar radiation in close plant spacing is the most important factor that governs photosynthesis and ultimately accumulation of carbohydrates, its efficient utilization determines the final yield to a great extent (Kumar *et al.*, 2008). Therefore, maintenance of suitable plant spacing for proper utilization of the available solar radiation is essential for optimum production. Therefore the present investigation was carried with the objective to explore possibility of reducing plant spacing to further enhance the yield without compromising with quality.

## **MATERIALS AND METHODS**

The field experiment entitled was carried out on plant crop for three at the Research Farm of AICRP (Fruits), Banana Research Station, Jalgaon (Maharashtra). The experiment was laid out in a Randomized block design which comprised of five (05) treatments which were replicated four times. Each treatment had 12 units of the plant. The treatment details are as follows

**Chart 1: Treatment details**

<b>Tr. No.</b>	<b>Spacing Details</b>
T <sub>1</sub>	1.20 m x 1.20m (6944 Plants per hectare)
T <sub>2</sub>	1.35 m x 1.35m (5487 Plants per hectare)
T <sub>3</sub>	1.35 m x 1.75m (4233 Plants per hectare)
T <sub>4</sub>	1.50 m x 1.35m (4938 Plants per hectare)
T <sub>5</sub>	1.50 m x 1.50m (4444 Plants per hectare)

Observations were recorded on the different growth, durational, bunch, and yield parameters, and incidence of important diseases. Fresh planting was done in the month of July every year. Sword suckers of three months old weighing 450 g were selected for planting and the suckers were treated with solution prepared by dissolving 100 g Carbendizim + 150 g Acephate in 100 liters of waters. All the agronomic practices were carried out as per University (MPKV, Rahuri) schedule. Observations were recorded on the different growth, durational, bunch and yield parameters, and incidence of important diseases.

Pseudo stem height and girth (cm) were measured at the time of harvest with the help of measuring tape and expressed in centimeter. Number of functional leaves was recorded simply by counting the leaves at the time of harvest simply and expressed in number. Days to shooting and harvesting was computed from the date of planting and expressed in days. Days to maturity was computed from the date of shooting to harvesting and was expressed in days. Weight of bunch was recorded by weighing on the weighing balance and expressed in kilograms. The bunch characters namely number of hands per bunch and number of fingers per hand were counted and expressed as number. The finger length and girth were measured with the help of measuring tape and expressed in cm. Yield per hectare was worked out from number of plants per hectare of that particular treatment and was expressed in metric tons. Spacing also has significant impact on diseases also. Therefore, observations were also recorded on four important diseases namely Cucumber Mosaic Virus (CMV), Sigatoka leaf spot, Cigar End Rot and *Erwinia* Rot and their incidence were expressed in percentage.

## **RESULTS AND DISCUSSION**

### **I. Growth parameters**

The data recorded on plant growth parameters is depicted in Table1. It is revealed from the data, that all the growth parameters were influenced by various spacing treatments. It was

noticed that the plant height increased with the reduction in plant spacing, whereas pseudo stem girth, number of functional leaves, and leaf area decreased with the reduction in plant spacing. Significantly the highest plant height was observed in the treatment T<sub>1</sub> (1.2 x 1.2 m, 6944 plants /ha) which recorded 163.6 cm pseudo stem height. Whereas the Significantly lowest plant height of 156.4 cm in the treatment T<sub>5</sub> (1.5 x1.5 m, 4444 plants /ha). The results corroborate with the findings of Mandal and Sharma (1999), Chaudhari and Baruah (2010), Patel *et al* (2018) and Sindhupriya *et al.*, (2018). Kumar *et al.* (2008) also reported increase in pseudostem height due to increase in spacing. The treatments namely T<sub>1</sub> (1.2 x 1.2 m) and T<sub>5</sub> (1.5 x1.5 m) recorded maximum and minimum pseudo stem girth of 67.5 cm and 63.2 cm, respectively. Similar results were also noticed in banana cv. Jahaji by Chaudhari and Baruah (2010) and in Grand Naine by Naik (2016) and Gaonkar (2019), and by Sindhupriya *et al.* (2018) in Quintal Nendran. Kesavan *et al.* (2002) also reported that banana plants at close spacing were taller with thinner pseudo stems than under wide spacing.

The data pertaining to number of leaves showed decreasing trend with the decrease in plant spacing. The treatments T<sub>5</sub> (1.5 x1.5 m) and T<sub>1</sub> (1.2 x 1.2 m) recorded maximum and minimum number of functional leaves per plant and produced 12.5 and 11.3 average numbers of functional leaves per plant with 6.28 m<sup>2</sup> and 5.77 m<sup>2</sup> leaf area. These findings conform with the findings of Choudhari and Baruha (2002); Gogoi *et al.*, (2015) and Patel *et al* (2018) in banana cv. Grand Naine. Similar results were also noticed in Ney Poovan (Panjavarnam *et al.*, 2018), Martaman (Naidu *et al.*, 2015), Bantala (Behera *et al.*, 2016), and Quintal Nendran (Sindhupriya *et al.*, 2018). Murugan (2003) reported number of leaves in high density planting was lower than the number of leaves in normal planting density. Sufficient reserve assimilation is a pre-requisite for higher leaf production and the highest number of leaves registered in wider spacing i.e. in the treatment T<sub>5</sub> (1.5 x1.5 m) might be due to ample space, higher amount of nutrients, availability of water (Kumar *et al.*, 2020)

Increased pseudo stem height, decreased pseudo stem girth, number of functional leaves and leaf area in the reduced plant spacing might be due to natural shading of plants resulting in competition for space, light and soil moisture. The higher leaf area at shooting stage in wider spacing is due to a larger number of leaves accompanied with bigger size of leaves. Rapid production of leaves in lower plant population might have increased the leaf area (Singh, 1988).

## **II. Durational parameters:**

As revealed from the Table 1, durational parameters were also significantly influenced by different plant spacings and reduction in plant spacing delayed shooting, maturity and

harvesting also. Lowest days to shooting, maturity and harvesting was observed in the treatment T<sub>5</sub> (1.5 x1.5 m, 4444 plants /ha) which required 204, 92.5 296.5 days, respectively. Maximum days to shooting, maturity and harvesting were observed in the treatment T<sub>1</sub> (1.2 x 1.2 m, 6944 plants /ha) and recorded 225.5, 329.4 and 103.9 days respectively for shooting, maturity and harvesting.

Similar findings were reported by Mandal and Sharma (1999) in banana cultivar Robusta. Kesavan *et al.* (2002) noticed longer crop cycle in Cavendish banana cv. Williams with increased plant densities. He reported that at close spacing, the time to harvest was extended by 3 to 6 months in the plant crop. According to Santiago *et al.* (2017) lengthening of crop cycle is main limitation of increased plant density. Competition of banana plants for light and nutrient would have resulted extended durational parameters (Chundawat *et al.*, 1982 and Chundawat *et al.*, 1983).

### III. Yield parameters

The bunch and yield parameters (Table 2) were markedly influenced by different plant spacing treatments. Conspicuous reduction in the number of hands, number of fingers, finger length, bunch weight, and yield was observed with the decrease in plant spacing, whereas increase finger girth was observed with the decrease in plant spacing. Maximum number of hands per bunch (8.3 kg) was recorded by the treatment T<sub>5</sub> (1.5 x1.5 m, 4444 plants /ha) and it was on par with treatment T<sub>4</sub> (1.50 x1.35 m, 4938 plants/ha) which was recorded 8.1 hands per bunch. The lowest number of hands was recorded in the treatment T<sub>1</sub> (1.20 m x 1.20m (6944 plants /hectare). The maximum number of fingers per bunch (134.2) was recorded by treatment T<sub>5</sub> (1.5 x1.5 m), whereas the treatment T<sub>1</sub> (1.20 m x 1.20m (6944 plants/ hectare) recorded the lowest number of fingers per bunch (109.1). Maximum finger length of 20.2 was recorded in the treatments T<sub>5</sub> (1.5 x1.5 m) and T<sub>4</sub> (1.5 x1.35 m) and had 20.2 cm finger length. But in the case of finger girth increased finger girth was noticed in the closer spacing treatment T<sub>1</sub> (1.2 x 1.2 m, 6944 plants /ha) and it was 12.9 cm whereas the lowest finger girth was observed in the treatment T<sub>5</sub> (1.5 x1.5 m, 4444 plants /ha). Similar results were reported by Chaudhari and Baruah (2002) in banana.

The treatment T<sub>5</sub> (1.5 x1.5 m, 4444 plants /ha) registered significantly the highest bunch weight of 19.4 kg with 86.22 mt/ha yield. Lowest bunch weight (12.18 kg) and yield (84.58 mt/ha) was registered in the treatment T<sub>1</sub> (1.2 x 1.2 m, 6944 plants /ha). Reduction in bunch weight in closure spacing than normal spacing is also reported by Nalina (2000) and Mahalaxmi (2000) and Sarrwy *et al.* (2012). Healthier bunches were obtained by Badway *et al.* under wider spacing of 3 x 2 m in banana cultivar Grand Niane. Reduction in the weight of hands is reported

by Santiago *et al.* (2017). Reduction in bunch weight with the reduction in plant spacing might be due to excessive interception of light by enhanced canopy under high density planting would have helped to increase vegetative characters but probably not the bunch character. In contrast under normal spacing where the plant population is optimum, more leaf surface area would have exposed to sunlight and indirectly greater amount of assimilates in the various organs of the plant leading to increase bunch weight (Chaudhari and Baruah, 2002; Sarrwy *et al.*, 2012).

Highest yield was recorded in the conventional treatment T<sub>5</sub> (1.5 x1.5 m, 4444 plants /ha) and this treatment recorded yield of 86.22 mt/ha. However, it was at par with the treatments T<sub>4</sub>, T<sub>1</sub> and T<sub>3</sub>. Husameldin (2013) recorded heavier bunch weight and higher yield at normal spacing of 1.75 m x 1.75 m banana cultivar Grand Naine (AAA) than the reduced spacing. Reduced number of functional leaves, number of hands per bunch and finger, bunch weight and finger length cumulatively resulted in reduction in the yield in the closer spacing.

### **C) Incidence of diseases:**

Different plant spacing treatments significantly influenced the intensities of various diseases and the data presented in Table 3, clearly indicated that the disease incidence increased with the decrease in plant spacing i.e. increase in plant density. Increase in the incidence of various diseases with the reduction in spacing was observed from data depicted in Table 3. Lowest incidence of Cucumber Mosaic Virus (0.27 %), sigatoka leaf spot disease (10.13 %), cigar end rot (0.43 %) and Erwinia rot (0.20 %) was reported in the treatment T<sub>5</sub> (1.5 x1.5 m, 4444 plants /ha). The treatment T<sub>1</sub> (1.2 x1.2 m, 6944 plants /ha) recorded the highest incidence of CMV (2.13 %), sigatoka leaf spot disease (24.99 %), cigar end rot (1.73 %) and Erwinia rot (2.40 %). Vishwakarma *et al.* (2019) reported high incidence of sigatoka leaf spot disease in banana.

## **CONCLUSION AND RECOMMENDATIONS**

Maintenance of suitable plant spacing for proper utilization of the available solar radiation is essential for optimum productio. Results of the present investigation demonstrated that the planting distance of 1.5 m x 1.5 m accommodating 4444 plants per hectare is found to be optimum for banana cv. Phule Pride. Based on the results of present investigation, plant spacing of 1.5 m x 1.5 m is recommended for the dwarf banana cv. Phule Pride.

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## References

Behera, S., Das, A. K., Mishra, N. and Mishra, P. P., 2016, Effect of Spacing on Growth and yield of banana cv. Grand Naine and Bantala. *Int. J. Tropical Agri.*, 34 (1): 39-43.

Badway, M. AbdAllah; K.A. Roshdy and M.R.EL-Shenawi. 2020. Effect of Plant Density on Growth, Flowering, Fruiting and Yield of Grand Naine Banana in Sandy Soil. *Alexandria Science Exchange J.*, 31 (4): 380-385.

Cayón, G., Valencia, L., Morales, H., & Domínguez, A. (2004). Desarrollo y producción del plátano Dominico-Hartón (*Musa* AAB Simmonds) en diferentes densidades y arreglos de siembra. *Agronom, Colomb*, 22(1), 18-22.

Chaudhuri, P. and K. Baruah. 2010. Studies on Planting Density in Banana cv. 'Jahaji' (AAA). *Indian J. of Hill Farming*. 23(2):31-38.

Debnath Sanjit, Bauri F.K., Swain S., Patel A.N. , Patel A.R. , Shaikh N.B., Bhalerao V.P., Baruah K., Manju P.R., Suma A., Menon R., Gutam S. and Patil P. 2021. Studies on high density planting and nutrient requirement of banana in different states of India. *J. Hortl. Sci.* 16(2) : 152-163.

Gaonkar, Y. A., 2019, Studies on plant density and nutrient requirement in banana cv. Grand Naine. *Ph. D.(Hort.) thesis* submitted to Vasantrya Naik Marathwada Krishi Vidyapeeth Parbhani. India

Gogoi, B., Khangia, B., Brauh, K. and Khousal, A., 2015, Effect of high density planting and nutrient on growth and yield of Banana cv. Jahaji (*Musa* AAA). *Intl. J. Agril. Inno. and Res.*, 315: 1465-1469.

- Husameldin M. H. 2013. Effect of different levels of planting distances, irrigation and fertigation on yield characters of main banana crop cv. Grand Naine. *Global J. of Plant Ecophysiology*, 3(2): 115-121.
- Kesavan, V., Hil, T., & Morris, G. (2002). The effect of plant spacing on growth, cycling time and yield of bananas in subtropical Western Australia. *Acta Horticulturae*, 575: 851-857.
- Kumar Dinesh, V. Pandey and K. Anjaneyulu. 2008. Effect of planting density and nutrient management on growth, yield and quality of micro-propagated banana Rasthali Pathkapoor (AAB). *Indian J. Hort.* 65(3):272-276.
- Kumar Yallesh, H. S., Kulapati Hippargi, B. S. Shivakumar, I. B. Biradar, M. P. Basavarajappa and Mallikarjuna G. Awati. 2020. Effect of Planting Density and Fertilizers on Growth and Development of Tissue Culture Banana cv. Ney Poovan (AB) under Hill Zone of Karnataka. *Int. J. Curr. Microbiol. App. Sci.* 9(8): 3846-3856.
- Mahalakshmi, M., 2000. Water and fertigation management studies in banana cv. Robusta (AAA) under normal planting and high density planting systems. Ph. D. Thesis, Horticulture College and Research Institute, Coimbatore.
- Mandal, B.K. and S.B. Sharma, 1999. Growth and yield responses of Robusta banana (*Musa AAA*) at high densities. *Prog. Hort.*, 31(3-4): 138-143.
- Murugan, V., 2003, Influence of fertigation on growth and productivity of banana cv. Ney Poovan under different planting densities. *M.Sc. Thesis*. Tamil Nadu Agricultural University, Coimbatore.
- Naidu, M. M., Mamata, K., Lakshmi, N. R and Rajashekaram, T., 2015, Effect of plant density and fertigation on growth and productivity of banana cv. Martaman (AAB). *J. Agril. Engineering and Food Tech.*, 2 (3): 178-180.
- Naik, M. H. 2016. Studies on high density planting, fertigation and postharvest chemical treatments in banana (*Musa acuminata*.) cv. Grand Naine. *Ph.D (Fruit Science) Thesis*, submitted to Dr. Y.S.R. Horticultural University, Rajendranagar.
- Nalina, L., N. Kumar, S. Sathiamoorthy and P. Muthuvel. 2000. Effect of nutrient levels on bunch characters and vegetative characters of banana cv. Robusta under high density planting system. *South Indian Hort.*,48(1-6): 18-22.
- Panjavarnam, G., Parthiban, A., Subbiah. P. AND Jeyakuma, N., 2018, effect of planting density and nutrient management on yield, fruit quality and post harvest characters in banana cv. Ney Poovan under coconut. *Int.J.Curr.Microbiol.App.Sci.*, (2018) 7 (2): 515-525.
- Patel, M. J., Sitapara, H. H., Shah, N. I. and Pat, H. R., 2018, Effect of different levels of planting distance and fertilizers on growth, yield and quality of banana cv. Grand Naine. *J. Pharmacognosy and Phytochemi.*, 7(2): 649-653.
- Santiago Miguel Ulloa Cortazar, Erick Daniel Wolf and Ignacio Armendáriz González. 2017. Effect of plant density on growth and yield in Barraganete plantain (*Musa paradisiaca* (L.) AAB cv. Curare enano) for a single harvest cutting in Provincia de Los Ríos, Ecuador. *Acta Agron.* 66 (3) : 367-372.
- Sarawy, S.M.A, E.M. A. Mostafa and H.S.A. Hassan, 2012. Growth, yield and fruit quality of Williams banana as affected by different planting distances. *International Journal of Agricultural Research*. 7: 266-275.

Saudamini Swain, Bipin Pradhan and Prakash Patil. 2020. Evaluating Efficacy of High Density Planting in Banana under Coastal Plain Zone of Odisha. *Int.J.Curr.Microbiol.App.Sci.* 9(11): 152-160.

Sindhupriya, V., Auxcilia, J. and Soorianathasundaram, K., 2018, Effect of planting density and nutrient requirement on growth and development of banana cv. Quintal Nendran (AAB). *Int. J. Curr. Microbiol. App. Sci.*, 7(11): 3060-3068.

Singh R.K.D (1988). Studies on growth and development of some cultivars. M.Sc. (Agri) Thesis, AAU, Jorhat.

Vishwakarma Govind, Shweta Soni and Etalesh Gouta.2019. Techniques and Constraints of High Density Planting For Fruit Crops. In: Innovative Approaches in Agriculture and Environmental Development. (Eds.) Chhatarpal Singh, Md. Nadeem Akhtar and Vishal M. Balaramnavar, JPS Scientific Publications, Tamil Nadu. Pp. 210-214.

**Table: 1 Influence of different plant spacing treatments on growth and durational parameters of banana cv. Phule Pride (Pooled over three year i.e. 2021-22, 2022-23 and 2023- 24)**

Treatments	Pseudo-stem (cm)		No. of functional leaves at harvesting	Leaf area / plant (m <sup>2</sup> )	Days to		
	Height	Girth			Shooting	Harvesting	Maturity
T <sub>1</sub> :1.20 x1.20 m	163.6	63.2	11.3	5.77	225.5	329.4	103.9
T <sub>2</sub> :1.35 x 1.35 m	158.9	64.9	11.6	5.95	210.2	311.7	101.5
T <sub>3</sub> :1.35 x1.75 m	158.6	67.4	11.6	6.08	207.6	308.8	101.2
T <sub>4</sub> :1.50 x1.35 m	159.9	66.3	12.1	6.26	210.4	307.5	97.1
T <sub>5</sub> :1.50 x1.50 m	156.4	67.5	12.5	6.28	204.0	296.5	92.5
SE±	1.9	0.7	0.13	0.07	2.04	2.76	1.76
C.D.at 5 %	6.4	2.4	0.41	0.24	6.65	8.99	5.73

**Table 2: Influence of different plant spacing treatments on bunch and yield attributes of Banana cv. Phule pride Pooled over three year i.e. 2021-22, 2022-23 and 2023- 24)**

Treatments	Numbers/bunch		Finger Size (cm)		Bunch Weight (kg)	Yield / ha (mt)
	Hand	Finger	Length	Girth		
T <sub>1</sub> :1.20 x 1.20 m (6944)	7.3	109.1	18.7	12.9	12.18	84.58
T <sub>2</sub> :1.35x1.35 m (5487)	7.5	121.3	19.3	12.3	14.83	81.38
T <sub>3</sub> :1.35x1.75 m (4232)	7.8	124.9	19.2	12.1	17.61	84.51
T <sub>4</sub> :1.50 x 1.35 m (4938)	8.1	128.2	20.2	12.4	17.33	85.35
T <sub>5</sub> :1.50 x 1.50 m (4444)	8.3	134.2	20.2	12.5	19.40	86.22
SE ±	0.12	4.42	0.2	0.03	0.95	0.66
C.D.at 5 %	0.39	14.42	0.5	0.10	3.09	1.99

**Table 3: Influence of different plant spacing treatments on incidence of diseases on banana cv. Phule Pride Pooled over three year i.e. 2021-22, 2022-23 and 2023-24)**

	Incidence of diseases (%)			
	CMV	Sigatoka leaf Spot	Cigar end rot	<i>Ervinia rot</i>
T <sub>1</sub> :1.20x1.20 m (6944)	2.13	24.99 (29.93)	1.73 (2.49)	2.40
T <sub>2</sub> :1.35x1.35 m(5488)	1.70	22.21 (28.11)	1.4 (6.80)	1.20
T <sub>3</sub> :1.35x1.75 m (4232)	1.27	20.99 (27.20)	1.33 (6.55)	1.67
T <sub>4</sub> :1.50x1.35 m (4938)	0.27	13.97 (21.89)	0.86 (5.32)	0.53
T <sub>5</sub> :1.50x1.50 m (4444)	0.27	10.13 (18.33)	0.43 (3.76)	0.20
SE ±	--	1.05	0.80	--
C.D.at 5 %	--	3.23	2.46	--

(Figures in parenthesis indicate arcsine values)