

## “Studies of Banana cv. Grand Naine in the Respect of Correlation with Growth and Yield Parameters”

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**ABSTRACT:** The studies consisted of 150 randomly plants of banana cv. Grand Naine were selected for various parameters and their correlation with yield. The experiment was laid out in a non replicated trial for metric and non variables. A wide range of variation was observed for vegetative growth parameters of banana at various growth periods viz., leaf length (39.42 - 157.52 cm), leaf width (19.17 - 41.09 cm), variation in functional leaf area (0.43 - 6.06 m<sup>2</sup>), petiole length (10.28 - 34.61 cm), variation in functional leaf (6.99 - 13.27), height of pseudo stem (19.08 - 198.37 cm), girth of pseudo stem (16.77 - 59.01 cm), PCA (23.41 - 277.55 cm<sup>2</sup>), peduncle length (43.67 cm), peduncle width (14.49 cm), male bud size (31.18 cm length and 30.70 cm girth) showed continuously increased during crop cycle of banana and bunch position was slightly angled. The average value of total crop duration (374.05 days) was recorded during crop cycle of banana plant. The yield attributing characters viz. weight of bunch (21.88 kg), hands per bunch (11.43), fruits on 2<sup>nd</sup> hand (17.80), hand weight per bunch (1827.45 g), fruits per bunch (202.88), length and girth of fruit (17.61 cm and 10.81 cm, respectively), fruit pedicel length (2.25 cm), fruit pedicel width (1.62 cm), fruit weight (102.58 g) and non metric characters like fruit shape was observed curved (sharp curved) and fruit apex was observed blunt tipped. \*\*Where PCA and MAP is used sequentially Pseudostem Cross Sectional Area and Months After Planting.

Coefficient of correlation were estimated for 23 characters which included leaf length, leaf width, petiole length, leaf area, number of functional leaf, pseudo stem height, pseudo stem girth, PCA, days taken from planting to shooting, days taken from flowering to harvest, plant crop cycle, finger length, finger girth, peduncle length, peduncle width, number of hands, fruits per bunch, hand weight, finger weight, fingers per hand, finger weight and fingers per bunch etc. Among these fruit yield exhibited strong positive correlation with leaf area at harvesting time (0.459) and shooting time (0.418), pseudo stem girth at shooting time (0.523) followed by 8<sup>th</sup> and half MAP (0.476) and harvesting time (0.401), PCA at shooting time (0.521) followed by 8<sup>th</sup> and half MAP (0.469) and harvesting time (0.398), number of functional leaves at harvesting time (0.402) and shooting time (0.382) and yield attributing characters such as fruits per 2<sup>nd</sup> hand (0.362), hands per bunch (0.611), fruits per bunch (0.693), fruit weight (0.792), hand weight (0.691), plant crop cycle (0.340) and days taken from flowering to harvesting (0.381).

**Key words:** Banana, phenological characters, PCA, correlation of different characters with Yield.

### INTRODUCTION

India is the largest banana growing country in the world. Among the fruits, banana holds first position in production and productivity in India. Banana is grown all over India and is available round the year. In India, it is cultivated on an estimated area of 770 thousand ha, with an annual production of 26,470 thousand MT and productivity of 34.4 MT/ha (Anonymous, 2010a). In Gujarat, it is cultivated on an estimated area of 61.9 thousand ha, with production of about 3779.6 thousand MT and productivity of 61 MT/ha (Anonymous, 2010b). It is

one of the most important fruit crops of Middle and South Gujarat regions. The farmers prefer its cultivation because of its high demand as a fresh fruit in the market. It is interwoven in the national heritage with multifaceted uses having great socio-economic significance. Banana plant produces the parthenocarpic fruit of commercial importance is propagated vegetatively from underground storage organ rhizome and surface level is the meristematic region which gives rise to the leaves, and finally to the inflorescence which produces the fruit. The pseudostem produces flowers only once and is cut

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off after fruiting. The fruits are called fingers, which are borne in hands.

The Grand Naine Bananas (also spelled Grande Naine) literally translates from French meaning "Large Dwarf." It is a cultivar of the well known Cavendish bananas. This group of bananas is distinguished from other groups by its AAA genotype. The AAA genotype refers to the fact that this group is a triploid variant of the species *M. acuminata*. There are 33 chromosomes present in the AAA cultivar and all produce seedless fruits through parthenocarpy. (Ploetz, 2007). Its characteristic medium height and large fruit yields make it ideal for commercial agriculture. The moderate height allows easy harvesting and some resistance to wind throw (plants breaking due to strong winds). Plantations growing Grand Naine range from the tropical regions of Central America, Africa, India, and Southeast Asia. In many tropical communities, entire local economies are based upon banana production and export. Because of its importance as a staple crop as well as a cash crop, much botanical research has focused around the Grand Naine. (Anonymous, 2007).

There is no authentic information available on morphological, phenological and yield attributing variations required for an ideal production by a banana plant under South Gujarat Agro Climatic conditions, so the investigation was undertaken on banana cv. Grand Naine to describe various phenological characters and to work out correlation of different characters with yield.

## MATERIALS AND METHODS

An experiment was conducted at Block "C" of N. M. College of Agriculture, Navsari Agricultural University, Navsari entitled "Studies of banana cv. Grand Naine in the respect of correlation with growth and yield parameters" during the year 2011. The studies consisted of 150 randomly selected plants of banana cv. Grand Naine. The experiment was laid out in a non-replicated trial with a 1.8 x 1.8 m spacing for metric variables. Observations were taken from the second month after planting at 15 days interval. The observation periods were mentioned below. P<sub>1</sub>- 2<sup>nd</sup> MAP of banana, P<sub>2</sub>- 2<sup>nd</sup> and half MAP of banana, P<sub>3</sub>- 3<sup>rd</sup> MAP of banana, P<sub>4</sub>- 3<sup>rd</sup> and half MAP of banana, P<sub>5</sub>- 4<sup>th</sup> MAP of banana, P<sub>6</sub>- 4<sup>th</sup> and half MAP of banana, P<sub>7</sub>- 5<sup>th</sup> MAP of banana, P<sub>8</sub>- 5<sup>th</sup> and half MAP of banana, P<sub>9</sub>- 6<sup>th</sup> MAP of banana, P<sub>10</sub>- 6<sup>th</sup> and half MAP of banana, P<sub>11</sub>- 7<sup>th</sup> MAP of banana, P<sub>12</sub>- 7<sup>th</sup> and half MAP of banana, P<sub>13</sub>- 8<sup>th</sup> MAP of banana, P<sub>14</sub>- 8<sup>th</sup> and half MAP of banana, P<sub>15</sub>- At the shooting time of banana, and P<sub>16</sub>- At the harvesting time of banana.

The data on vegetative growth parameters like leaf length, leaf width, variation in functional leaf area, petiole length, variation in functional leaf height of pseudostem, girth of pseudostem, PCA (Pseudostem Cross Sectional Area), peduncle length, peduncle width, crop duration and finally yield and yield attributing characters like bunch weight, number of hands, hand weight, number of fruits per bunch were recorded and whereas leaf area (m<sup>2</sup>) were measured with the help of leaf area factor (0.8) suggested by Obiefena and Ndubizy, 1979 and PCA (Pseudostem Cross-sectional Area) were measured by following formula  $PCA = \text{Girth}^2 / 4 \pi$  (Kumar and Panday, 2010) and statistically analyzed (Snedecor and Cochran, 1980).

## RESULTS AND DISCUSSION

### Growth Characters and their Correlation with Yield

It is evident from the data presented in **tables 1** that these are the average values which are taken from randomly selected banana cv. Grand Naine plants. That is presented in the range of leaf length (39.42-157.52 cm), leaf width (19.17-41.09 cm), variation in functional leaf area (0.43-6.06 m<sup>2</sup>), petiole length (10.28-34.61 cm), variation in functional leaf height (6.99-13.27), height of pseudostem (19.08-198.37 cm), girth of pseudostem (16.77-59.01 cm), PCA (23.41-277.55 cm<sup>2</sup>), peduncle length (43.67 cm), peduncle width (14.49 cm), male bud size (31.18 cm length and 30.70 cm girth) was continuously increased during the crop cycle of banana plant. Such differential response may probably be due to continuous increasing age of the banana plant; however, less functional leaf area was observed at shooting and harvesting time. This might be due to a less number of functional leaves during the growth period. Similar findings have also been reported by Rajmanickam and Rajmohan (2010), Singh, M. (2010), Kumar *et al.* (2008), Rajamanickam *et al.* (2007), Tenkovano, A. and Baiyeri, K. (2007), Panday *et al.* (2005), Rajamanickam and Rajmohan (2005), Mandal and Sharma (2001) and Uma *et al.* (2000).

It is also evident from the data presented in **tables 2 and fig. 1 a.** that among different plants of banana cv. Grand Naine, banana fruit yield showed a significantly positive correlation with growth characters viz., leaf length at harvesting time (0.192) and shooting time (0.173), leaf width at harvesting time (0.248) and shooting time (0.202), leaf area at harvesting time (0.459) and shooting time (0.418), pseudostem height at shooting time (0.219) and harvesting time (0.208), pseudostem girth at shooting time (0.523) followed by 8<sup>th</sup> and half MAP (0.476) and

**Table 1**  
**Leaf Characters and Pseudo Stem Characters during Crop Cycle of Banana cv. Grand Naine**

Time	Leaf characters					Pseudo stem characters		PCA (cm <sup>2</sup> )
	Leaf length (cm)	Leaf width (cm)	Leaf area per plant(m <sup>2</sup> )	Petiole length (cm)	No. of functional leaves	Pseudo stem height (cm)	Pseudo stem girth (cm)	
P1	39.42	19.17	0.43	10.28	6.99	19.08	16.77	23.41
P2	53.64	21.74	0.82	12.34	8.61	29.22	18.50	27.78
P3	62.18	24.31	1.26	14.56	10.23	38.57	19.13	29.97
P4	76.40	25.96	1.71	16.60	10.74	53.94	22.33	40.87
P5	84.93	27.59	2.27	18.43	11.95	62.74	25.85	54.09
P6	96.31	29.46	2.86	19.90	12.42	83.31	34.52	96.75
P7	105.04	31.10	3.29	20.90	12.47	91.45	35.09	99.02
P8	113.42	32.07	3.67	22.77	12.53	98.91	35.66	102.70
P9	122.50	33.72	4.41	24.60	13.27	109.06	41.21	137.02
P10	127.61	34.71	4.53	26.36	12.64	121.44	42.96	149.75
P11	131.25	35.96	5.03	28.14	13.24	130.08	46.32	173.36
P12	138.06	37.26	5.23	29.77	12.66	141.37	50.90	208.87
P13	142.00	38.07	5.46	31.38	12.59	169.78	51.50	211.90
P14	152.52	39.99	6.06	33.56	12.42	187.83	54.28	234.99
P15	155.79	40.65	5.93	34.06	11.70	191.83	55.40	244.89
P16	157.52	41.09	4.81	34.61	9.27	198.37	59.01	277.55

**Table 2**  
**Correlation Coefficient (r) of Leaf Characters and Pseudo Stem Characters during Crop Cycle of Banana cv. Grand Naine**

Time	Leaf characters					Pseudo stem characters		PCA (cm <sup>2</sup> )
	Leaf length (cm)	Leaf width (cm)	Leaf area per plant(m <sup>2</sup> )	Petiole length (cm)	No. of functional leaves	Pseudostem height (cm)	Pseudostem girth (cm)	
P1	0.040	0.122	0.084	-0.053	0.037	0.058	0.057	0.062
P2	0.019	0.134	0.112	-0.054	0.111	0.095	0.151	0.152
P3	0.020	0.067	0.140	-0.057	0.182	0.084	0.139	0.151
P4	0.045	0.150	0.069	-0.054	-0.034	0.031	0.027	0.035
P5	0.038	0.006	0.044	-0.054	0.035	0.086	0.131	0.123
P6	0.051	0.034	0.151	-0.055	0.208	0.104	0.033	0.032
P7	0.004	0.066	0.084	-0.054	0.105	0.147	0.069	0.061
P8	0.048	0.148	0.051	-0.052	-0.058	0.140	0.151	0.144
P9	0.104	0.129	0.156	-0.048	0.072	0.155	0.008	0.027
P10	0.169	0.152	0.154	-0.043	0.065	0.174	0.174	0.175
P11	0.136	0.168	0.144	-0.032	0.028	0.155	0.175	0.178
P12	0.137	0.166	0.184	-0.008	0.085	0.193	0.216	0.220
P13	0.132	0.165	0.142	0.044	0.044	0.165	0.055	0.061
P14	0.073	0.084	0.144	0.076	0.108	0.190	0.476	0.469
P15	0.173	0.202	0.418	0.066	0.382	0.219	0.523	0.522
P16	0.192	0.249	0.459	0.061	0.402	0.209	0.401	0.398

Note: Correlation coefficient (r) At 2 Tail, (0.05%) r = +/- 0.160

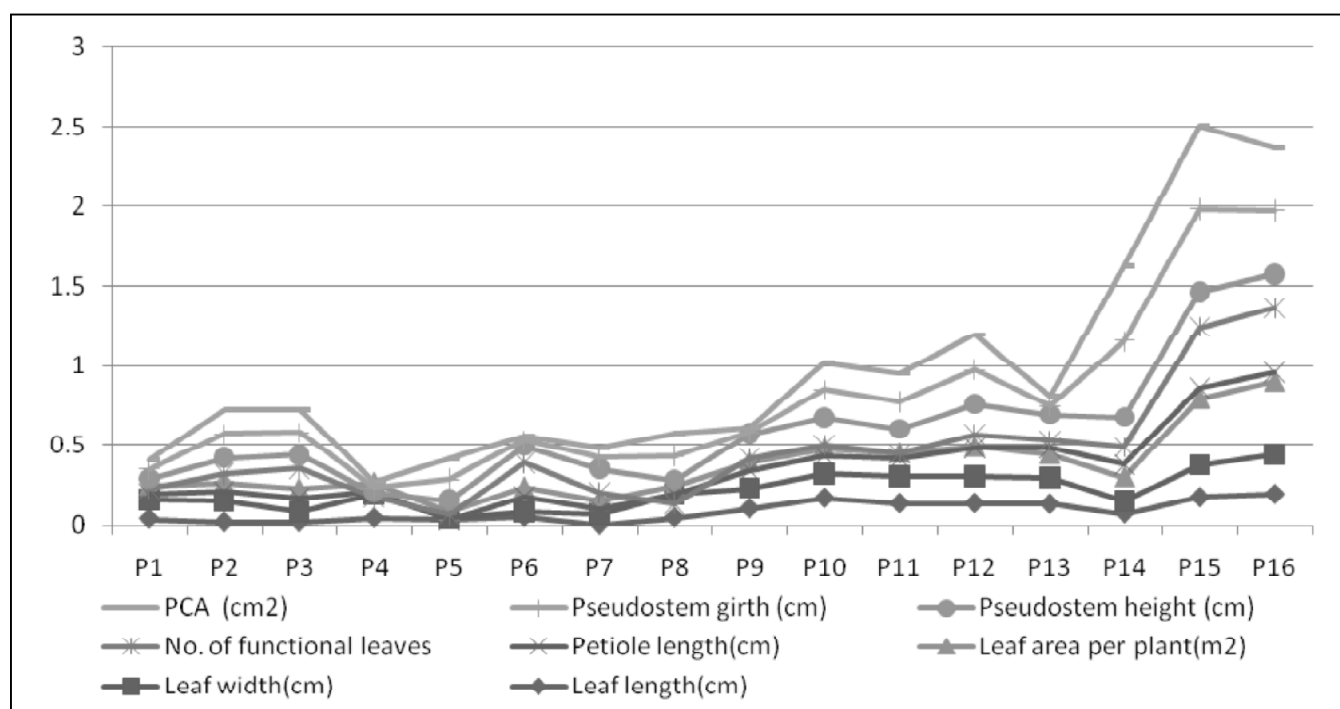


Figure 1 a: Correlation coefficient (r) of leaf and pseudostem character of banana cv. Grand Naine during crop cycle

harvesting time (0.401), PCA at shooting time (0.521) followed by 8<sup>th</sup> and half MAP (0.469) and harvesting time (0.398), number of functional leaves at harvesting time (0.402) and shooting time (0.382), peduncle length (0.221) whereas it was non significant with petiole length (0.076) and male bud girth (0.029) but negatively correlated with peduncle width (-0.143) and male bud length (-0.058) as presented in **table 3**. The increase in yield might be due to more area of functional leaf, which synthesized and accumulate more photosynthetic matters. Several variations have been observed in the plant when a single cultivar is planted on a commercial scale which is mainly due to differences in root characters leading to nutrient uptake. The results are in accordance with the finding of Patil *et al.* (2010) and Kumar and Panday (2010).

**Crop Duration and their Correlation with Yield**

It is evident from the data presented in tables 4, the mean value of number of days from planting to inflorescence emergence (272.4), days taken from inflorescence emergence to harvesting (101.65) and total crop duration (374.05 days) were recorded during crop cycle of banana plant. The present results confirmed the report of Patel *et al.* (2011), Rajmanickam and Rajmohan (2010), Hazarika and Ansari (2010), Kavitha *et al.* (2009), Uazire *et al.* (2008), Rajamanickam *et al.* (2007), Panday *et al.* (2005), Rajamanickam and Rajmohan (2005), Badgujar *et al.*

(2004), Raskar, B. S. (2003), Orellana, P. *et al.* (2002), Sirisena and Senanayake (2000). In this table 4.4, banana fruit yield showed significantly positive correlation with days taken from inflorescence emergence to harvesting (0.381) and plant crop cycle (0.340) while it was non significant with days taken to shooting (0.120). This might be due to more time available for accumulation of reserved in the bunch. Similar findings are reported earlier by Rajamanickam and Rajmohan (2008).

**Table 3**  
**Inflorescence or Male Bud of Banana cv. Grand Naine**

Inflorescence or male bud	Unit (cm)	Correlation coefficient (r) At 2 Tail, (0.05%) <i>r</i> = +/- 0.160
Peduncle length (cm)	43.68	0.221
Peduncle width (cm)	14.50	-0.143
Male bud length (cm)	31.18	-0.058
Male bud girth (cm)	30.70	0.029

**Table 4**  
**Crop duration (Days) and Correlation Coefficient (r) of Plant Crop Cycle with Yield of Banana cv. Grand Naine**

Parameters	Crop duration (days)	Correlation coefficient (r) At 2 Tail, (0.05%) <i>r</i> = +/- 0.160
Days to shooting (days)	272.40	0.120
Flower emergence to harvesting (days)	101.66	0.382
Plant crop cycle (days)	374.06	0.341

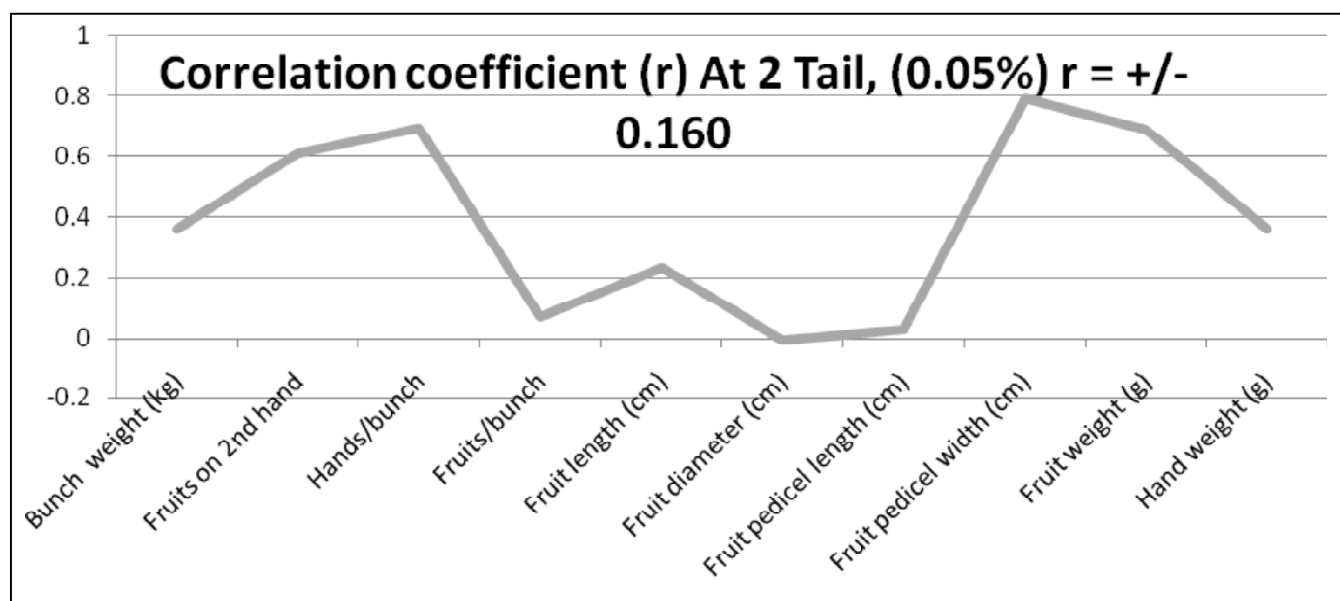
**Yield and Yield Attributing Characters and their Correlation with Yield**

It is evident from the data presented in respective **tables 5 and fig. 1 b.**, The mean value of yield attributing characters viz., weight of bunch (21.88 kg), number of hands per bunch (11.43), number of fruit on 2nd hand (17.80), hand weight per bunch (1827.45 g), number of fruits per bunch (202.88), length and girth of fruit (17.61 cm and 10.81 cm, respectively), fruit pedicel length (2.25 cm), fruit pedicel width (1.62 cm) and fruit weight (102.58 g) of banana cv. Grand Naine. The results are coincided with the finding of Patel *et al.* (2011), Baiyeri *et al.* (2010), Rajmanickam and Rajmohan (2010), Kavitha *et al.* (2009), Nath *et al.* (2009), Khalequzzaman *et al.* (2009), Ebeed *et al.* (2008), Rajamanickam and Rajmohan (2008), Rajamanickam *et al.* (2007), Nainwad *et al.* (2005), Weerasinghe and Ruwanpathirana (2004), Dens *et al.* (2002), Sheela, V. L. and Nair, S. R. (2001), Sirisena and Senanayake

**Table 5**  
**Yield Attributing Characters and Correlation Coefficient (r) with Yield of Banana cv. Grand Naine**

Parameters	Yield	Correlation coefficient (r) At 2 Tail, (0.05%) <i>r = +/- 0.160</i>
Bunch weight (kg)	21.88	0.362
Fruits on 2 <sup>nd</sup> hand	17.81	0.612
Hands/bunch	11.43	0.694
Fruits/bunch	202.89	0.068
Fruit length (cm)	17.62	0.232
Fruit diameter (cm)	10.81	-0.007
Fruit pedicel length (cm)	2.25	0.029
Fruit pedicel width (cm)	1.62	0.792
Fruit weight (g)	102.59	0.691
Hand weight (g)	1827.46	0.362

(2000). The banana fruit yield showed significantly positive correlation with number of hands per bunch (0.611), number of fruits on 2nd hand (0.362), hand weight per bunch (0.691), number of fruits per bunch



**Figure 1 b: Correlation coefficient (r) with yield attributing parameters of banana cv. Grand Naine**

(0.693), fruit diameter (0.232), fruit weight (0.792) while it was non significant with fruit length (0.06821) and fruit pedicel width (0.0292) however fruit yield showed negatively correlated with fruit pedicel length (-0.0070) of banana cv. Grand Naine therefore, for high fruit yield in banana improvement, selection can be based on number of hands per bunch, number of fruits on 2<sup>nd</sup> hand, hand weight per bunch, number of fruits per bunch, fruit diameter and fruit weight. The results are coincided with that of Patil *et al.* (2010), Rajamanickam and Rajmohan (2008) and George (2005).

**CONCLUSION**

On the basis of present investigation, it can be concluded that all the vegetative parameters were significantly increased with crop cycle of banana plant except functional leaf area and number of functional leaf and also studies on correlation coefficient analysis were conducted on the “Grand Naine” variety of banana to identify the major factors contributing to yield. Fruit yield exhibited strong positive correlation with leaf area, pseudostem girth, PCA, number of functional leaves and yield attributing characters such as fruits per 2<sup>nd</sup> hand, hands per bunch, fruits per



**Plate 1: Brief view of experimental plot**



**Plate 2: Banana crop at the time of shooting stage cv. Grand Naine**

bunch, fruit weight, hand weight, plant crop cycle and days taken from flowering to harvesting apart from this yield attributes recorded at harvest can also be used for predicting fruit yield though it is late. However, the yield attributes recorded at harvesting are going to remain to same even 3 to 4 month prior to harvesting (complete emergence of bunch). Banana fruit can be predicted precisely well in advance using leaf area, pseudostem girth, PCA, number of functional leaves and yield attributing characters such as fruits per 2<sup>nd</sup> hand, hands per bunch, fruits per bunch, fruit weight, hand weight, plant crop cycle and days taken from flowering to harvesting. This will help the farmers in planning the sound marketing strategy.

## REFERENCES

- Anonymous (2007), *Banana and plantain overview with emphasis on pacific island cultivars*, pp. 10.
- Anonymous (2010a), All India area, production and productivity of banana. Indian Horticulture Database 2010. *National Horticulture Board.*, pp. 4.
- Anonymous (2010b), State wise area, production and productivity of banana. Indian Horticulture Database 2010. *National Horticulture Board.*, pp. 38.
- Badgular, C.; Dusane, S. M. and Desmukh, S. (2004), Influence of plant spacing on growth, maturity and yield of Grand Naine (AAA) banana. *South Indian Hort.*, **52**(1-6): 13-17.
- Baiyeri, K. P.; Aba, S. C. and Tenkovano, A. (2010), Region of bunch pruning influences, the bunch and fruit physical traits of “PITA24” plantain hybrid. *J. Appl. Biosci.*, **33**: 2119-2127.
- Dens, K.; Vargas, M.; Malton, G.; Coensens, S.; Van, I. and Sweenen, R. (2002), Introduction and multiplication of improved banana and plantains in Nicaragua and distribution to farmers. *INFOMUSA*, **11**(1): 44-47.
- Ebeed, S.; Mostafa, E. and Salem, M. (2008), Effect of gibberellic acid and male bud removal on yield and fruit quality of banana. *Res. J. Agric. and Biol. Sci.*, **4**(4): 289-292.
- George, S. (2005), Path coefficient analysis of yield parameters in Nendran banana in Kerala soil. *South Indian Hort.*, **53**(1-6): 209-211.
- Hazarika, B. and Ansari, S. (2010), Effect of integrated nutrient management on growth and yield of banana cv. Jahaji. *Indian J. Hort.*, **67**(2): 270-273.
- Kavitha, P.; Balamohan, T.; Veeraragavathatham, D. and Poornima, K. (2009), Genetic variability and correlation in ecotypes of Nendran banana. *Banana New Innovation*, Westville Publishing House, New Delhi, pp. 91 – 98.
- Khalequzzaman, K. M.; Rahim, M. A.; Mollah, M. and Kaiser, M. (2009), High density planting effect on banana yield. *J. Agric. Res.*, **47**(4): 359-364.
- Kumar, D. and Panday, V. (2010), Relationship of pseudostem cross sectional area with bunch weight, fruit quality and nutrient status in banana cv. Rasthali (Pathkapoor-AAB). *Indian J. Hort.*, **67**(1): 26-29.
- Kumar, D.; Panday, V. and Anjaneyulu, K. (2008), Effect of planting density and nutrient management on growth, yield and quality of micropropagated banana cv. Rasthali. *Indian J. Hort.*, **65**(3): 272-276.
- Mandal, B. and Sharma, S. (2001), Effect of leaf pruning on the growth and yield of banana cv. Alpan. *The Hort. J.*, **14**(1): 7-11.
- Nainwad, R.; Kullkarni, N. and Kalalbundi, B. (2005), Extent of variation in growth and yield attributes of some tissue culture vs conventional sucker planted banana varieties. *Karnataka J. Agric. Sci.*, **18**(1): 221-222.
- Nath, V.; Kumar, D. and Panday, V. (2009), Improved technologies for vegetable banana production. *Banana New Innovation*, Westville Publishing House, New Delhi, pp. 182 - 186.
- Obiefuana J. C. and Ndubizy, T. O. C. (1979), Estimating leaf area of plantain. *Scientia Hort.* **11**(1): 31-36
- Orellana, P.; Bermudez, I.; Rodriguez, G. and Rodriguez, N. (2002), Evaluation of the agronomic characteristics of plantain hybrids (*Musa* spp.). *INFOMUSA*, **11**(1): 34-35.
- Panday, V.; Kumar, D. and George, S. (2005), Response of micropropagated “Robusta” banana to varying combinations of N, P, K nutrition in lateritic soils of coastal Orissa. *Indian J. Hort.*, **62**(2): 122-126.
- Patel, C. M.; Patel, N. L.; Gaikwad, S. S. and Patil, S. J. (2011), Effect of post shooting treatments on yield and its attributes of banana cv. Grand Naine. *Green Farming*, **2**(2): 210-212.
- Patil, S.; Solia, B. and Patil, B. (2010), Prediction of fruit yield of banana using stem girth and yield attributes. *Green Farming*, **1**(2): 219.
- Ploetz, R. C. (2007), Banana and plantain – an overview with emphasis on Pacific island cultivars. *Species Profiles for Pacific Island Agroforestry* ver. 1.
- Rajamanickam, C. and Rajmohan, K. (2005), Intra clonal variation in *Musa* (AAB) “Nendran”. *South Indian Hort.*, **53**(1-6): 195-204.
- Rajamanickam, C. and Rajmohan, K. (2008), Genetic variability and correlation studies in banana (*Musa* spp.). *Madras Agric. J.*, **95**(7-12): 258-265.
- Rajamanickam, C. and Rajmohan, K. (2010), Variability studies in Palayankodan ecotypes AAB genomic group of banana (*Musa* spp.). *J. Hortl. Sci.*, **5**(2): 109-113.
- Rajamanickam, C.; Rajmohan, K.; Parthiban, S. and Venkatesan, K. (2007), Performance of triploid banana (*Musa* spp.) cultivars of Kerala. *South Indian Hort.*, **55**(1-6): 119-132.

- Raskar, B. S. (2003), Effect of planting technique and fertigation on growth, yield and quality of banana. *Indian J. of Agronomy*, **48**(3): 235-237.
- Sheela, V. L. and Nair, S. R. (2001), Growth, flowering and yield potential of tissue culture banana cv. Nendran., *Journal of Tropical Agriculture*, **39**: 1-4.
- Singh, M. (2010), Evaluation and economics of different intercrops in banana. *Indian J. Hort.*, **67**(2): 267-269.
- Sirisena, J. and Senanayake, S. G. (2000), Estimation of variability parameters within "Mysore" banana clones and their implication for crop improvement. *Scientia Horti*, **84**: 49-66.
- Snedecor, G.W. and Cochran, W.G. (1980), Sixth edition. *Statistical Methods*. The Iowa State University Press. Ames, Iowa, U.S.A.
- Tenkovano, A. and Baiyeri, K. (2007), Adaptation pattern and yield stability of banana and plantain genotypes grown in contrasting agroecologies in Nigeria. *African Crop Science Conference Proceedings*, **8**: 377-384.
- Uazire, A.; Ribeiro, C.; Mussane, R.; Pillay, M.; Blomme, G.; Fraser, C.; Staver, C. and Karamura, E. (2008), Preliminary evaluation of improved varieties in Mozambique. *African Crop Science Journal*, **16**(1): 17-25.
- Uma, S.; Dayarani, M.; Singh, H. P.; Shyam, B. and Sathiamoorthy, S. (2000), Studies on genetic variability in banana *Silk* sub group (AAB). *Indian J. Hort.*, **57**(2): 106-109.
- Weerasinghe, S. and Ruwanpathirana, K. (2004), Effect of dehanding on bunch characteristics of banana. *Annals of the Srilanka. Depart. of Agriculture*, **6**: 227-235.



