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Germplasm evaluation in banana (*Musa* spp.) for bunch yield and quality attributes

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Abstract

India has been considered as one of the important centre of biodiversity for banana, having about eight species and 120 distinct clones. Banana is well adapted to diverse regions varying from humid tropics to humid sub tropics and semi arid sub tropics upto an elevation of 2000 m above mean sea level. Banana is one of the most important fruit crop in Karnataka. However, most of the cultivars grown under Ghataprabha command area (North Karnataka-Zone 3) are poor yielders even though the region is having congenial condition for commercial cultivation of banana. To find the suitable genotype for Ghataprabha command area, thirty cultivars of banana were evaluated for their yield and quality characters at All India Coordinated Research Project (AICRP) on Tropical fruits orchard, KRCCH, Arabhavi during 2011-2015. Among the thirty cultivars of banana evaluated, the variety Hanuman showed maximum bunch yield per plant (32.10 kg), bunch yield per plot (160.21 kg) and bunch yield per hectare (80.0 t). The varieties such as Udayam, Robusta, Poovan and Yangambi also recorded better performance for yield characters. The quality of Sakkare bale and Ney Poovan were found better by recording higher values for TSS, total sugars and reducing sugars. However the fruit quality traits in Hanuman and Udayam were equally good.

Keywords: Banana, germplasm, evaluation, bunch yield & quality

Introduction

Banana (*Musa* spp.) is one of the most important fruit crop of world as well as India. It is an economically profitable fruit crop with large domestic consumption with a considerable export potential. India has been considered as one of the important centre of biodiversity for banana, having about eight species and 120 distinct clones. Banana is well adapted to diverse regions varying from humid tropics to humid sub tropics and semi arid sub tropics upto an elevation of 2000 m above mean sea level. The wide range of adoption of banana is due to its appreciable genetic diversity and suitability to varying agro climatic conditions. The diverse agro climatic conditions have encouraged the development and sustenance of a large number of varieties catering to local needs (Rajamanickam *et al.*, 2006) [8].

A large number of local varieties are under cultivation in Karnataka along with commercial cultivars. However, information on the performance of these cultivars for growth, yield and quality characters in agro climatic condition of north Karnataka-(Zone 3) is lacking. Field evaluation of germplasm for yield with quality characters, disease and pest resistance and their suitability for fresh fruit or processing is a key factor for selection and further multiplication of promising cultivar and their by improve the crop productivity. Kulapati *et al.* (2000) [4] evaluated seven banana cultivars (Dwarf Cavendish, Karibale, Poovan, Elakkibale, Rasbale, Robusta and Vaatbale) in Karnataka for morphological and bunch characters and reported that Robusta was found to be the best cultivar as far as its yield performance is concerned ensuring the highest return to the farming community and was recommended for cultivation in the region-IV of Karnataka.

Materials and Methods

The experiment was laid out in Randomized Block Design with 30 treatments (Accessions/Genotypes) and 2 replications which include plants with a spacing of 2mx2m. To find the suitable genotype for Ghataprabha command area, thirty cultivars of banana were

evaluated for their yield and quality characters at All India Coordinated Research Project (AICRP) on Tropical fruits

orchard, KRCCH, Arabhavi during 2011-2015.

The details of treatments is mentioned below.

Treatment	Cultivar	Genomic composition	Treatment	Cultivar	Genomic composition
T ₁	Dwarf Cavendish	AAA	T ₁₆	Hoovu bale	AAB
T ₂	Hanuman	AAA	T ₁₇	Udayam	ABB
T ₃	Robusta	AAA	T ₁₈	Krishna Vazhai	AAB
T ₄	Sakkarebale	AAB	T ₁₉	Red banana green	AAA
T ₅	Ney Poovan	AB	T ₂₀	Cultivar Rose	AA
T ₆	Rajapuri	AAB	T ₂₁	Karpur bale	AAB
T ₇	Karibale	AAA	T ₂₂	Yangambi Selection	AAA
T ₈	Mitli	AB	T ₂₃	Bargi bale	AAB
T ₉	Palaykondan	AB	T ₂₄	Kothia	ABB
T ₁₀	Poovan	AAB	T ₂₅	H-1	AAB
T ₁₁	Saba	ABB	T ₂₆	Monthan	ABB
T ₁₂	Kadali	AA	T ₂₇	Gold finger	AAAB
T ₁₃	Mysore mitli	AA	T ₂₈	Bluggoe	ABB
T ₁₄	Sonakel	AAB	T ₂₉	Pisang liliin	AAB
T ₁₅	Pisang Awak	ABB	T ₃₀	Grand Naine	AAA

Observations were recorded on Bunch characters like Bunch length, Bunch width, Number of hands per bunch, Number of fingers in third hand and Total number of fingers per bunch. Yield parameters like Bunch weight (Kg/plant), Bunch weight (Kg/plot) and Bunch weight (t/ha). Quality parameters like Total Soluble Solids (TSS), Total sugars, Reducing sugars, Non-reducing sugars and Acidity.

Results and Discussion

In the present investigation, the variety Hanuman recorded maximum bunch length (90.0 cm), number of hands per bunch (16.0) and total fingers per bunch (178.0) besides recording moderate values for bunch width and number of fingers in third hand. While the maximum number of fingers in third hand (22.0) was recorded in the variety Udayam, which also had moderate values for the characters like bunch length, bunch width, number of hands per bunch and total number of fingers per bunch. The varieties Pisang Awak and Hoovubale recorded moderate values for bunch characters. The bunch width was found maximum in the variety Karibale. The maximum values for bunch characters recorded by the varieties Hanuman, Robusta, Pisang Awak, Hoovubale and Udayam may be attributed to vigorous growth of these varieties as noted by their maximum values for stem girth, number of leaves and leaf area. These vegetative characters might have helped in enhanced photosynthesis and accumulation of food in sink and their by improved values for bunch characters. This finding is supported by views of Sagar *et al.* (2014) ^[9]. Similar observations were reported by Deshmukh *et al.* (2004) ^[2, 3] who recorded maximum number of hands and number of fingers per bunch in variety Padalse (Hanuman). Where as Uma *et al.* (2005) ^[10] observed NRCB Sel. 001 (Udayam) had maximum values for bunch characters which matched with present results.

The higher values for bunch yield recorded by the varieties Hanuman (AAA), Udayam (ABB) and Yangambi Selection (AAA) may be attributed to varietal character and vigorous growth of these varieties as noted by maximum values for stem girth, number of leaves and highest leaf area. These vegetative characters helped in enhanced photosynthesis and accumulation of food and their by improved bunch yield. The enhanced yield attributes like maximum number of

hands per bunch, maximum total fingers per bunch, finger length, finger girth and fruit weight of these cultivars also contributed to maximizing the bunch yield. The results of present investigation corroborates with the findings of Sagar *et al.* (2014) ^[9] who observed maximum yield in Hanuman (43.07 t/ha). Kulapati *et al.* (2000) ^[4] recorded maximum yield in Robusta (AAA) followed by Dwarf Cavendish. Deshmukh *et al.* (2004) ^[2, 3] observed maximum bunch weight in Padalse (Hanuman) followed by Shrimanti (AAA). Barua *et al.* (2007) found heaviest bunches (15.88 Kg) in Barjahaji (AAA) and also observed highest yield in Barjahaji (49.0 t/ha). Uma *et al.* (2005) ^[10] recorded maximum bunch weight in NRCB Sel. 001 (Udayam). The present results are in conformity with these findings.

In the present study, the variety Sakkare bale recorded maximum TSS (29.50 °B) total sugars (27.52%) and reducing sugars (23.52%) which is on par with Ney Poovan. The cultivars Udayam and Hanuman recorded moderate values for TSS, total sugars and reducing sugars. The maximum Non-reducing sugar was found in Karibale (9.00%) which is on par with H-1, Kadali and cv. Rose. The Non-reducing sugar of Hanuman variety is 2.20%. There was non significant variation among the varieties for parameter of acidity and it ranged from 0.2 percent in Karibale to 0.53 percent in H-1.

The varietal genetic characters may be attributed to variation in quality parameters among the varieties. The location and environmental conditions may also have strong influence on fruit quality variation in banana varieties. The present results are in agreement with the findings of Rajamanickam and Rajmohan (2005) ^[7] who reported, the variety Njalipoovan (Syn. Ney Poovan) was the sweetest variety due to its improved TSS, Reducing sugars and total sugars. Uma *et al.* (2005) ^[10] reported that, NRCB Sel. 001 (Udayam) and Kanthali had the best blend of high TSS and medium acidity making them highly suitable for dessert purpose and preparation of value added products. The present results are in accordance with the findings of Uma *et al.* (2005) ^[10]. The variation in fruit quality parameters of different varieties was also observed by Kumar (1999) ^[5], Medhi (1994) ^[6], Rajamanickam *et al.* (2006) ^[8] and Devi *et al.* (2012) ^[11].

Table 1: Evaluation of performance of banana germplasm for bunch characters

Germplasm	Bunch length (cm)	Bunch width (cm)	No. of hands per bunch	Fingers in 3 rd hand	Total fingers per bunch
T ₁ : Dwarf Cavendish	50.66	34.33	8.66	14.66	126.15
T ₂ : Hanuman	90.00	46.00	16.00	21.50	178.00
T ₃ : Robusta	60.00	35.00	15.25	18.00	154.50
T ₄ : Sakkarebale	33.23	31.26	7.25	18.35	110.00
T ₅ : Ney Poovan	47.82	33.80	7.60	15.00	130.40
T ₆ : Rajapuri	45.52	32.00	9.00	16.50	102.00
T ₇ : Karibale	53.21	47.50	6.30	12.50	86.50
T ₈ : Mitli	40.21	36.20	6.20	12.00	80.00
T ₉ : Palaykondan	63.33	36.60	10.10	16.20	132.41
T ₁₀ : Poovan	45.00	28.00	10.50	15.50	125.50
T ₁₁ : Saba	33.50	28.75	6.00	12.50	80.00
T ₁₂ : Kadali	50.02	35.00	11.10	12.00	120.40
T ₁₃ : Mysore mitli	54.12	32.66	10.66	14.66	126.15
T ₁₄ : Sonakel	63.50	30.50	13.00	17.11	127.50
T ₁₅ : Pisang Awak	64.04	33.00	14.15	20.20	146.40
T ₁₆ : Hoovu bale	67.80	33.80	13.40	18.30	141.50
T ₁₇ : Udayam	65.50	30.66	15.20	22.00	148.00
T ₁₈ : Krishna Vazhai	37.50	29.00	6.50	12.00	71.00
T ₁₉ : Red banana green	47.50	36.26	7.50	14.40	109.15
T ₂₀ : Cultivar Rose	45.00	20.25	9.10	15.00	100.10
T ₂₁ : Karpur bale	35.50	28.00	6.51	11.50	85.20
T ₂₂ : Yangambi	63.60	33.00	7.60	13.00	96.33
T ₂₃ : Bargi bale	49.33	28.60	9.66	11.33	95.30
T ₂₄ : Kothia	58.00	28.00	10.40	10.40	95.25
T ₂₅ : H-1	42.00	30.00	9.20	16.80	98.40
T ₂₆ : Monthan	44.56	30.00	9.00	12.10	110.30
T ₂₇ : Gold finger	43.24	37.10	6.00	12.00	72.50
T ₂₈ : Bluggoe	40.75	28.75	5.75	12.45	61.50
T ₂₉ : Pisang lilin	29.66	24.50	4.00	11.33	52.66
T ₃₀ : Grand Naine	61.32	37.40	7.60	15.88	120.30
S.Em±	2.22	2.02	0.85	1.33	6.33
CD (P = 0.05)	6.41	5.85	2.46	3.85	18.32
CV(%)	16.16	14.88	12.94	12.69	17.96

Table 2: Evaluation of performance of banana germplasm for bunch yield characters

Germplasm	Bunch Yield (Kg/plant)	Bunch Yield (Kg/plot)	Bunch Yield (tons/ha.)
T ₁ : Dwarf Cavendish	16.15	80.10	40.10
T ₂ : Hanuman	32.10	160.21	80.00
T ₃ : Robusta	22.30	110.10	55.00
T ₄ : Sakkarebale	7.50	35.50	17.52
T ₅ : Ney Poovan	11.40	57.31	28.51
T ₆ : Rajapuri	11.00	55.00	27.53
T ₇ : Karibale	12.45	60.20	30.05
T ₈ : Mitli	10.45	50.80	25.56
T ₉ : Palaykondan	13.40	65.30	32.50
T ₁₀ : Poovan	24.30	120.21	60.05
T ₁₁ : Saba	6.00	30.31	15.05
T ₁₂ : Kadali	8.40	40.00	20.00
T ₁₃ : Mysore mitli	10.33	51.65	25.82
T ₁₄ : Sonakel	13.50	67.50	33.75
T ₁₅ : Pisang Awak	18.00	90.20	45.10
T ₁₆ : Hoovu bale	15.80	79.10	39.50
T ₁₇ : Udayam	30.60	150.10	75.05
T ₁₈ : Krishna Vazhai	4.50	22.50	11.25
T ₁₉ : Red banana green	8.00	40.20	20.10
T ₂₀ : Cultivar Rose	6.27	30.10	15.00
T ₂₁ : Karpur bale	6.25	31.25	15.62
T ₂₂ : Yangambi	28.33	141.65	70.15
T ₂₃ : Bargi bale	9.35	45.40	22.55
T ₂₄ : Kothia	9.00	45.40	22.55
T ₂₅ : H-1	8.30	40.00	20.05
T ₂₆ : Monthan	8.30	40.00	20.05
T ₂₇ : Gold finger	6.50	32.50	16.25
T ₂₈ : Bluggoe	5.62	28.10	14.05
T ₂₉ : Pisang lilin	2.16	10.80	5.40
T ₃₀ : Grand Naine	19.03	95.15	47.57
S.Em±	2.03	4.54	3.71
CD (P = 0.05)	5.88	13.14	10.72
CV(%)	22.37	10.11	16.52

Table 3: Evaluation of performance of banana germplasm for quality parameters

Germplasm	TSS (°B)	Total sugars (%)	Reducing sugars (%)	Non-reducing sugars (%)	Acidity (%)
T ₁ : Dwarf Cavendish	23.00	16.21	14.21	2.00	0.40
T ₂ : Hanuman	21.50	17.32	15.12	2.20	0.42
T ₃ : Robusta	20.00	16.51	13.21	3.30	0.43
T ₄ : Sakkarebale	29.50	27.52	23.52	4.31	0.34
T ₅ : Ney Poovan	27.00	25.00	22.50	2.50	0.45
T ₆ : Rajapuri	26.20	23.42	20.22	3.20	0.32
T ₇ : Karibale	22.50	19.81	10.81	9.00	0.29
T ₈ : Mitli	19.20	17.52	12.50	5.02	0.48
T ₉ : Palaykondan	20.50	18.51	12.50	6.01	0.51
T ₁₀ : Poovan	20.20	17.25	13.20	4.05	0.32
T ₁₁ : Saba	16.60	13.38	9.32	4.06	0.45
T ₁₂ : Kadali	16.20	13.24	5.20	8.04	0.50
T ₁₃ : Mysore mitli	18.20	14.57	12.52	2.05	0.41
T ₁₄ : Sonakel	19.20	14.51	10.51	4.00	0.50
T ₁₅ : Pisang Awak	26.20	24.20	22.20	2.00	0.30
T ₁₆ : Hoovu bale	18.20	16.81	12.61	4.20	0.45
T ₁₇ : Udayam	25.00	24.02	22.02	2.00	0.31
T ₁₈ : Krishna Vazhai	20.50	18.20	12.50	5.70	0.45
T ₁₉ : Red banana green	17.00	15.08	10.50	4.58	0.42
T ₂₀ : Cultivar Rose	16.20	13.21	6.21	7.00	0.40
T ₂₁ : Karpur bale	17.20	12.40	7.20	5.20	0.48
T ₂₂ : Yangambi	17.00	13.02	10.12	2.90	0.45
T ₂₃ : Bargi bale	18.00	14.01	10.20	3.81	0.45
T ₂₄ : Kothia	17.50	13.02	9.20	3.82	0.51
T ₂₅ : H-1	19.20	16.41	7.50	8.91	0.53
T ₂₆ : Monthan	16.30	12.40	6.20	6.20	0.48
T ₂₇ : Gold finger	18.20	14.20	8.50	5.70	0.39
T ₂₈ : Bluggoe	16.60	12.10	7.20	4.90	0.49
T ₂₉ : Pisang liliin	18.00	14.20	7.30	6.90	0.40
T ₃₀ : Grand Naine	22.00	18.30	12.20	6.10	0.32
S.Em±	0.90	0.92	0.96	0.81	0.09
CD (P = 0.05)	2.71	2.76	2.78	2.43	NS
CV(%)	10.88	9.12	9.91	12.30	10.21

Conclusion

The plants of variety Hanuman showed maximum bunch yield per plant (32.10 kg), bunch yield per plot (160.21 kg) and bunch yield per hectare (80.0 t) which was supported by better values for bunch length (90 cm), number of hands per bunch (16.0) and total fingers per bunch (178.0) respectively. The varieties such as Udayam, Robusta, Poovan and Yangambi also recorded better performance for yield characters. The quality of Sakkare bale and Ney Poovan were found better by recording higher values for TSS, total sugars and reducing sugars. However the fruit quality traits in Hanuman and Udayam were equally good.

References:

- Devi SP, Thangam M, Ladaniya MS, Korikanthimath VS. Evaluation of local banana cultivars under coconut shade in Goa. J Biol Chem Res. 2012;28(1-2):63-76.
- Deshmukh CD, Badgujar, Dusane SM. Comparative evaluation of banana varieties under Jalgaon conditions of Maharashtra. Agric Sci Dig. 2004a;24(2):118-120.
- Deshmukh CD, Badgujar, Dusane SM. Growth analysis of introduced banana varieties under Jalgaon conditions. Agric Sci Dig. 2004b;24(3):233-234.
- Kulapati H, Nagaraju HT, Gowda TH, Gowda CC. Evaluation of banana germplasm for morphological and bunch characters in Southern Transitional Zone of Karnataka. Mysore J Agric Sci. 2000;34(1):16-20.
- Kumar R. Field comparison of banana cultivars under low input conditions of Bihar plateau. Haryana J Horticult Sci. 1999;28(3-4):143-144.
- Medhi G. Performance of banana (*Musa paradisiaca* L.) cultivars in Assam. Haryana J Horticult Sci. 1994;23(3):181-185.
- Rajamanickam C, Rajmohan K. Studies on diploid banana (AA, AB and BB) varieties (*Musa* spp.). South Indian Horticult. 2005;53(1-6):1-7.
- Rajamanickam C, Rajmohan K, Parthiban S, Venkatesan K. Performance of triploid banana (*Musa* spp.) cultivars of Kerala. South Indian Horticult. 2006;55(1-6):119-132.
- Sagar BS, Raju B, Kulapati H, Patil SN, Sahithya BR. Evaluation of banana genotypes for growth and yield under northern dry zone of Karnataka. Bioscan. 2014;9(4):1773-1775.
- Uma S, Sathiamoorthy S, Saraswathi MS, Durai P, Sharma HO, Agrawal A. Evaluation and utilization of introduced *Musa* germplasm in India. Indian J Plant Genet Resour. 2005;18(1):1-5.
- Uma S, Sathiamoorthy S, Selvarajan R, Saraswathi MS, Durai P. Genetic improvement of *Musa* spp. through clonal selection: NRCB Sel 001 as a substitute for Pisang Awaks (ABB). Indian J Horticult. 2014;62(4):319-323.