Available online at www.ijpab.com

DOI: http://dx.doi.org/10.18782/2320-7051.2893

ISSN: 2320 – 7051

Int. J. Pure App. Biosci. **6 (1):** 744-747 (2018)

International Journal of Pure & Applied Bioscience

Research Article

OPEN ACCESS

Evaluation of Vegetative Characters of Different Sapota Genotypes under the Coastal Zones of Odisha

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Received: 24.04.2017 | Revised: 30.05.2017 | Accepted: 7.06.2017

ABSTRACT

An experiment was carried out during 2015-16 in Department of Fruit science and Horticulture Technology, College of Agriculture, OUAT, Bhubaneswar to find out the effect of evaluation of vegetative characters of different sapota genotypes under the coastal agro climate of Odisha. Variation due to divergence in genotypes was found significant. so far as the morphometric is concerned different genotypes have maximum plant height (174.68cm), stem girth (11.91cm), number of primary branches (4.66), secondary branches (14.33) and tertiary branches (36) which was recorded highest in CO-1. Whereas, maximum number of leaves per shoot (20.16) was noted in DHS-1. However, highest canopy area (2.67m²) was in PKM-4 and canopy volume (1.35 m^3) recorded in PKM-1. Likewise, leaf area (26.56cm²) and leaf petiole length (2.66cm) were observed in Panic collection was highest in Mohan gootee. Lowest plant height (111.9 cm), stem girth (8.31 cm), number of primary branches (2.00), secondary branches (5.66), tertiary branches (17.66), canopy area (0.95 m^2) and volume (0.48 m^3) were noted in PKM-5. However, minimum petiole length (1.74 cm) and leaf area (14.90 cm^2) were observed in Kirti Bharathi, Whereas, Pala recorded minimum number of leaves (11.83).

Key words: *Morphometrics, Genotype, Agro climate, Canopy volume.*

INTRODUCTION

Sapota or sapodilla (*Manilkara Zapota* L.P. Royen) also known as Chiku, belong to family Sapotaceae is one of the most delicious and flavoured tropical fruits. It is native to south Mexico as well as North East Guatemala. In colonial periods it was taken from tropical American countries to the Philippines and Malaysia and other countries of the tropic. India is the largest producer of sapota in the world. Maharashtra is the pioneer state in sapota production in India. The area under this crop has increased steadily in the recent years. In India, It is grown nearly in 160,000 ha with a production of 1363,000 MT and productivity of 12.5 MT/ha with area under sapota. In Odisha is 3.35Mha and 15.64 MT/ha. (NHB, 2014-15).

Cite this article: Patel, M.K.; Sahoo, A.K.; Das, K.K.; Das, A.K.; and Dash, D.K., Evaluation of Vegetative Characters of Different Sapota Genotypes under the Coastal Zones of Odisha, *Int. J. Pure App. Biosci.* **6(1):** 744-747 (2018). doi: http://dx.doi.org/10.18782/2320-7051.2893

The agro climactic conditions prevailing in Odisha is very congenial for sapota cultivation and provides splendid scope for Sapota cultivation. Through the area under cultivating sapota is increasing day by day but this increasing trend failed to meet up the expected level of production in this country due to absence of number of good choice varieties, so evaluation and characterization is an important aspect for documentation of the performance of the studied genotypes, which subsequently will help to introduce, select, and improve existing sapota variety that's why this research was undertaken to study of Sapota genotypes under different parameter.

MATERIAL AND METHODS

The present investigation was carried out at the Department of Fruit science and Horticultural Technology, Bhubaneswar during 2015-16 with an aim to study the extent of variability among sapota genotypes and to identify the better performing genotypes. The experiment was laid out in Randomized Block Design (RBD) with 16 treatments (cultivars) and 3 replications. For evaluation 3 years old plant of all genotypes were taken with recommended intercultural operation. The observations regarding on Vegetative growth parameter with respect to Plant height (cm), Girth of the plant (cm), Number of primary branches, secondary branches, tertiary branches, Canopy area (m^2), Canopy Volume (m^3), Number of leaves per shoot, Leaf area (cm^2), Leaf petiole length (cm).

RESULT AND DISCUSSION

The Sapota plant under study showed significant variations among themselves with regards to the plant height. Maximum plant height was recorded under variety CO-1 (167.11cm, 176.46cm, 182.19cm on 12th Nov 2015, 12th March 2016,12thMay 2016 respectively) which was followed by DHS-1 (163.66cm, 171.23cm, 177.22cm on 12thNov 2015, 12th March 2016,12th May 2016 respectively).The shortest plant height was recorded in PKM-5 (106.36cm, 112.35cm, and 117.26cm on 12th Nov 2015, 12th March 2016, and 12th May 2016 respectively).The increased plant height was possibly due to its genetic constitution which might have encouraged more vegetative growth and development. Such differences in cultivars was also reported by Shirol *et al*[6]., Raghuvanshi and Sharma[3]., Shirol *et al*[5]., Rahman *et al*[2]., Saraswathi *et a*l[4]., The plant girth was statistically significant differences among all the genotypes studied. Maximum plant (stem) girth was recorded under the CO-1 (11.38cm, 12.13cm, 12.24cm on 12th Nov 2015, 12th March 2016, and 12thMay 2016 respectively). It was followed by DHS-1 (10.93cm, 11.15cm, and 11.35cm on 12th Nov 2015, 12th March 2016, and 12thMay 2016 respectively).The shortest plant (stem) girth was recorded in PKM-5 (8.15cm, 8.35cm, 8.45cm on 12thNov 2015, 12th March 2016, 12th May 2016 respectively).The variation might be due to the fact of genetical differences in CO-1 and PKM-5 which encouraged more vegetative growth leading to the maximum girth. Similar finding have also been reported by Shirol *et al*[5]., Rahman *et al*[2]., and Suhasini *et al*[7].,

Maximum number of primary branches was recorded under the CO-1 (4.66 on 12th Nov 2015). It was followed by DHS-1 (4.0 on 12th Nov 2015).The highest number of primary branches per plant was found in the CO-1 genotypes and the lowest number of primary branches per plant was observed in the PKM-5.The variation might be due to the fact of genetically differences in between genotypes. Similar finding have also been reported by Bhoyar *et al.* (2015).Maximum number of secondary branches was recorded under the CO-1 (14.33, on 12th Nov 2015). It was followed by DHS-1 (14.0 on 12th Nov 2015). CO-1 varied significantly from DHS-1 and rest of the genotypes. The lowest number of secondary branches was recorded in PKM-5 (5.66on 12th Nov 2015).Maximum number of tertiary branches was recorded under the CO-1 (36.00on 12th Nov 2015). It was followed by DHS-1 (32.00 on 12th Nov 2015). CO-1 varied

significantly from DHS-1 and rest of the genotypes. The lowest number of tertiary branches was recorded in PKM-5 (17.66 on 12th Nov 2015).

Number of leaves per shoot under study the sapota genotypes showed significant variations among themselves. Highest number of leaves per shoot was recorded under the DHS-1 (19.66, 20.66 on 12th March 2016 and 12th May 2016). It was followed by DHS-2 (18.33, 18.66 on12th March 2016 and 12th May 2016). DHS-1 varied significantly from DHS-2 and rest of the genotypes. The lowest number of leaves per shoot was recorded in Pala (11.66, 12.00on 12th March 2016 and 12th May 2016).Highest number of leaves per shoot was recorded in the DHS-1 genotypes and the lowest number of leaves per shoot was recorded in Pala genotypes respectively due to genotypically differences with the environmental effect amongst cultivars and similar results were also cited by Shirol *et al*[6]., Raghuvanshi and Sharma[3]., Shirol *et al*[5].,

Maximum plant canopy area was record under the PKM-4 (2.67.m² on 12th May 2016 respectively). It was followed by PKM-1(2.40m² on 12th May 2016 respectively).PKM-1 varied significantly from PKM-4 and rest of the genotypes. The minimum plant canopy area was recorded in Pala (0.95m² 12th May 2016 respectively).Maximum plant canopy area was duly recorded under the PKM-4 genotypes. It was subsequently followed by PKM-1. PKM-4 varied significantly from Pala and rest of the genotypes. The shortest plant canopy area was recorded in Pala. This result was also concluded by Shirol *et al*[6]., Raghuvanshi and Sharma[3]., Shirol *et al*[5]., Rahman *et al*[2]., Saraswathi *et a*l[4]., respectively.

Among themselves with regards to the plant Canopy volume (m³). Maximum plant canopy volume was recorded under the PKM-1 (1.35 m³on 12th May 2016 respectively). It was followed by CO-1(1.30 m³ on 12th May 2016 respectively). PKM-1 varied significantly from CO-1 and rest of the genotypes. The minimum plant canopy volume was recorded in PKM-5 (0.48 m³ 12th May 2016 respectively).This difference was significant due to genetical characters of the genotypes which was also reported by Shirol *et al*[6]., Raghuvanshi and Sharma[3]., Shirol *et al*[5]., Rahman *et al*[2]., Saraswathi *et a*l[4].

The leaf area showed significant variations among themselves in the sapota genotypes. Maximum leaf area was recorded under the Panic collection (26.33cm², 26.63cm², and 26.73cm ² on 12th Nov 2015, 12th March 2016 and 12th May 2016 respectively). It was followed by Pala (26.20cm², 26.50cm², and 26.60cm ² on 12th Nov 2015, 12th March 2016 and12th May 2016 respectively). Panic collection varied significantly from Pala and rest of the genotypes. The minimum leaf area was recorded in Kirti Bharthi (14.66cm², 14.96cm², and 15.10cm ² on 12th Nov 2015, 12th March 2016 and 12th May 2016 respectively).This might be due to the cumulative effect of environmental conditions and genotypical difference prevailing among respective genotypes and influenced to generate the variation in average leaf area. Similar findings were also reported by Raghuvanshi and Sharma[3].

Maximum length of leaf petiole was recorded under the Panic collection (2.43cm, 2.73cmand 2.83cm on 12th Nov 2015, 12th March 2016, and 12th May 2016 respectively). It was followed by Pala (2.33cm, 2.63cm and 2.73cm on 12th Nov 2015, 12th March 2016, and 12th May 2016 respectively). Panic collection varied significantly from Pala and rest of the genotypes. The shortest leaf petiole length was recorded in Kirti Bharathi (1.66cm, 1.76cm, 1.80cm on 12th Nov 2015, 12th March 2016 and 12th May 2016 respectively). The leafpetiole lengthwas found to increase periodically. These might be due to the plant genotypic varietal characters. Similar findings were also reported by Rafiul Islam *et al*[2].,

Table 1: Evaluation of vegetative characters of different sapota genotypes

Treatment	Height (cm)	Girth (cm)	No of primary branch	No of secondary branch	No of tertiary branch	No of leaves per shoot	Canopy Area (m^2)	Canopy volume (m^3)	Leaf area (cm)	Leaf petiole length (cm)
CO-1	182.19	12.24	4.66	14.33	36.00	13.33	1.62	1.30	21.20	2.56
Cricket Ball	171.52	8.67	3.66	11.00	31.333	12.00	1.22	1.01	16.33	2.40
DHS-1	177.22	11.35	4.00	14.00	32.00	20.66	1.13	1.02	21.86	2.33
DHS-2	175.18	8.56	3.66	11.33	31.66	18.66	1.34	1.08	20.16	2.46
Kalipatti	138.24	11.04	2.00	6.000	23.33	15.66	1.48	0.71	19.60	2.20
Kirti Bharthi	145.16	10.86	3.00	9.66	23.00	12.33	1.27	0.74	15.0	1.80
Murraba	164.13	9.63	3.00	9.00	24.666	13.00	1.72	1.13	17.73	2.43
Mohan Gotee	158.13	10.30	3.00	10.66	25.33	13.66	2.25	1.23	20.06	2.66
Pala	137.22	8.55	2.000	6.666	19.000	12.0000	0.95	00.54	26.60	2.73
Pili Patti	167.12	9.31	3.33	100.000	26.66	14.66	2.22	1.29	19.56	2.10
Panic collection	165.23	9.17	3.33	10.666	29.33	14.00	1.81	1.15	26.73	2.83
PKM-1	170.15	8.94	3.66	10.66	30.00	14.66	2.40	1.35	20.80	2.36
PKM-2	160.06	10.02	3.00	8.00	24.66	16.33	1.84	1.08	23.03	2.13
PKM-3	144.19	11.21	2.00	6.00	18.66	12.43	1.17	0.69	21.80	2.06
PKM-4	158.20	10.93	3.33	9.33	22.33	12.66	2.67	1.23	16.93	1.96
PKM-5	117.26	8.45	2.00	5.66	17.66	14.33	1.59	0.48	20.76	2.20
Total	140.51	8.849	2.75	8.50	23.09	12.70	1.48	0.893	18.20	2.07
SE(m)	0.11	0.031	0.373	00.777	1.161	0.314	0.522	0.142	0.436	0.042
CD (5%)	0.32	0.089	1.071	2.231	3.333	0.903	1.498	0.407	1.252	0.121

CONCLUSION

Based on the present investigation on, "Evaluation of vegetative characters of different sapota genotypes under the coastal zones of Odisha", it can be concluded that genotype CO-1 excelled all others with regards to vegetative characters like plant height, stem girth, number of primary, secondary and tertiary branches. Whereas, DHS-1 performed well on number of leaves per shoot. Highest canopy area was in PKM-4 and canopy volume recorded PKM-1. Likewise, leaf area and leaf petiole length were observed in Panic collection.

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