

Study on yield contributing characters and yield of twenty sweet potato genotypes

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Abstract: An experiment was conducted with twenty sweet potato genotypes namely SP1, SP2, SP3, SP4, SP5, SP7, SP8, SP10, SP11, SP12, SP15, SP16, SP17, SP18, SP19, SP20, SP21, SP23, SP24 and SP25 at the Horticulture Farm, Bangladesh agricultural University, Mymensingh during the period from November, 1995 to October, 1996 to study the yield contributing characters and yield for identifying the best genotypes for farmers use. Genotype SP7 produced maximum vine length (379.00cm). SP1 produced maximum average tuber weight (307.69g), average length of tuber (15.69cm) and average diameter of tuber (6.87cm). SP10 and SP20 gave the highest number of tuber per plant (6.83) and dry matter (36.45%), respectively. On the other hand, SP15 gave the maximum weight of tuber per plant (1200.00g) and yield (66.67 t/ha). So, the genotype SP15 was found to be the best for cultivation at farmer level.

Key words: Length of vine, weight of tuber, dry matter (%), yield and sweet potato genotypes.

Introduction

Sweet potato (*Ipomoea batatas* Poir.) belonging to the family convolvulaceae is an important root crop in Bangladesh and commonly known as “Misti Alu”. The crop is believed to be originated in central America. It occupies an area of 61,000 acres of land with an annual production of 253,000 metric tons (BBS, 2012). Sweet potato is a high calorie producing crop. Roots of sweet potato are rich in starch. Leaves and stem tips of its vine are used as a green vegetable, salad and cattle feed (AVRDC, 1976). Diversified products can be prepared from sweet potato (Soenarzo, 1989). There are a lot of sweet potato genotypes in Bangladesh. Some of them representing broader genetic base, better characteristics and suitable for specific agro ecological condition. Information on yield contributing characters i. e. length of vine (cm), weight of vine (g), main stem/ plant, weight of tuber (g), diameter of tuber (cm), number of tuber/ plant, dry matter (%) and yield potential of different sweet potato genotypes growing under different regions of Bangladesh is scanty. Therefore, the study was undertaken to identify the most suitable sweet potato genotype(s) as well as to record detailed information on yield component characters and yield of some sweet potato genotypes grown at Mymensingh.

Materials and Methods

The experiment was carried out at the Horticulture Farm, Bangladesh Agricultural University, Mymensingh during the period from November, 1995 to October, 1996. Twenty sweet potato genotypes namely SP1, SP2, SP3, SP4, SP5, SP7, SP8, SP10, SP11, SP12, SP15, SP16, SP17, SP18, SP19, SP20, SP21, SP23, SP24 and SP25 were collected from various regions of Bangladesh and used in the study. These twenty sweet potato genotypes were considered as the experimental treatments. The unit plot size was 3.0m x 2.4m. Spacing was 60cm x 30cm. The soil was sandy loam in texture belonging to the Brahmaputra Alluvial Tract Series (Edris *et al.*, 1979) having pH 6.6. The crop was manured and fertilized as per schedule described by Hossain and Siddique (1985). Vine cutting (30cm in length with at least 6-7 nodes) were used as the planting materials and were planted on 16 December, 1995. All other intercultural operations were done as and when necessary. Harvesting was done by cutting off the basal portion of vine with the help of sickle and digging out the tuberous

roots with spade and stored in thatched house condition at Horticulture Farm, BAU, Mymensingh on 25 May, 1996. For collection of data 10 plants were selected at random from each line and data on maximum length of vine, average number of main stem per plant, weight of vine per plant, number of tuber per plant, average weight of tuber, average length of tuber, average diameter of tuber, dry matter percentage, weight of tuber per plant and yield of tuber per /hectare were recorded. Measurement was made with the help of measuring scale and balance. Only Standard deviation and coefficient of variation were done.

Results and Discussion

Maximum length of vine: The genotypes exhibited significant variation in respect of maximum length of vine (Table 1). The genotype SP7 produced maximum length of vine (379.00 cm) followed by SP15(298.40 cm), SP20(295.80 cm), SP21 (287.88 cm), SP3(270.67cm), SP12(253.00cm), SP1(226.20cm) and SP19 (208.50 cm). The minimum length of vine was recorded in the genotype SP25 (81.18 cm). Rest of the genotypes produced vine length between 94.17 cm and 199.75 cm.

Average number of main stem per plant: The average number of main stem per plant varied from 2.29 to 4.67 (Table 1). The highest number of main stem per plant was produced by the genotype SP3(4.67) followed by SP15 (4.40), SP18 (4.33), SP1 (4.30), SP23(4.28), SP5(4.22), SP4(4.11), SP7(4.10) and SP19 (4.00). The genotype SP16 produced the lowest number of main stem per plant (2.29). Rest of the genotypes was between 2.80 and 3.83.

Weight of vine per plant: The results on weight of vines per plant have been shown in Table 1. Genotype SP11 produced highest weight of vines per plant (1143.50 g). Genotype SP17 produced the lowest weight of vines per plant (275.00 g). Remaining genotypes were intermediate position.

Number of tuber plant: The genotypes exhibited wide variation in respect of number of tubers per plant (Table 1). The maximum number of tubers per plant was observed in the genotype SP10 (6.83) followed by SP18 (5.11). The lowest number of tubers per plant (2.29) was produced by SP16. Rest of the genotypes was between 2.50 and 4.80.

Per cent dry matter content of tuber: There was little variation among the genotypes in per cent dry matter content of tuberous roots (Table 1). The highest dry matter

percentage (36.45%) was found in the genotype SP20 followed by SP5 (35.74%), SP18 (34.59%) and SP2 (34.36%). Genotype SP12 gave lowest dry matter percentage (15.09 %).

Weight of tuber—The variation in weight of tuber from 52.17 (g) to 307.69 (g). The highest tuber weight was found SP1 (307.69 g) while the lowest was SP19 (52.17g) (Table 1).

Table 1. Yield contributing characters and yield of twenty sweet potato genotypes at harvest

Genotype	Max. length of vine (cm)	Av. no. of main stem/ plant	Wt. of vine /plant (g)	No. of tuber /plant	Dry matter (%)
SP 1	226.20	4.30	680.00	2.60	27.20
SP 2	111.50	3.60	410.00	2.50	34.36
SP 3	270.67	4.67	678.16	4.00	23.93
SP 4	166.44	4.11	711.51	3.89	15.68
SP 5	158.67	4.22	689.28	4.44	35.74
SP 7	379.00	4.10	630.00	3.70	31.27
SP 8	94.17	3.00	766.67	3.17	30.01
SP10	136.50	4.33	666.67	6.83	26.20
SP11	158.71	3.71	1143.50	3.71	22.82
SP12	253.00	3.83	600.00	2.67	15.09
SP15	298.40	4.40	430.00	4.80	26.82
SP16	96.86	2.29	814.75	2.29	34.13
SP17	199.75	3.75	275.00	4.50	25.77
SP18	182.00	4.33	777.78	5.11	34.59
SP19	208.50	4.00	566.99	3.83	33.23
SP20	295.80	3.11	655.56	3.89	36.45
SP21	287.88	3.20	775.00	3.63	33.13
SP23	109.29	4.28	857.14	2.29	30.59
SP24	106.50	3.83	650.36	5.33	33.06
SP25	81.18	2.80	344.44	3.78	32.72
Mean	191.05	3.79	656.14	3.85	29.14
Range	81.18-379.00	2.29-4.67	275.00-1143.50	2.29-6.83	15.09-36.45
SD.	82.23	0.61	189.14	1.11	6.00
CV (%)	43.04	16.09	28.83	28.83	20.59

Contd.

Genotype	Average wt. of tuber (g)	Av. length of tuber (cm)	Av. diameter of tuber (cm)	Wt. of tuber /plant (g)	Yield of tuber /ha. (tons)
SP 1	307.69	15.69	6.87	800.00	44.44
SP 2	152.00	14.02	3.81	380.00	21.11
SP 3	227.78	13.56	6.63	991.11	50.61
SP 4	171.43	12.34	5.58	666.67	37.03
SP 5	225.00	11.82	6.62	1000.00	55.56
SP 7	202.70	10.88	5.77	750.00	41.67
SP 8	236.84	13.88	5.89	750.00	41.67
SP 10	97.60	10.20	5.21	666.67	37.03
SP 11	188.46	11.47	5.49	700.00	38.88
SP 12	250.00	13.66	5.07	666.67	37.00
SP 15	250.00	15.38	6.20	1200.00	66.67
SP 16	212.50	13.76	5.74	485.71	26.98
SP 17	180.56	11.28	5.23	812.50	45.11
SP 18	108.70	11.28	4.34	555.56	30.83
SP 19	52.17	10.71	3.22	200.00	11.11
SP 20	91.43	11.64	3.99	355.56	19.75
SP 21	120.69	12.59	4.54	437.50	24.28
SP 23	281.25	12.96	6.85	642.86	35.67
SP 24	171.88	12.35	5.14	916.67	50.89
SP 25	161.76	11.57	5.13	500.00	27.78
Mean	184.52	12.55	5.37	673.87	37.20
Range	52.17-307.69	10.20-15.69	3.22-6.85	200.00-1200.00	11.11-66.67
SD.	65.56	1.49	0.99	238.64	12.99
CV (%)	35.53	11.87	18.44	35.41	34.91

Length of tuber: A little variation was observed among 20 sweet potato genotypes in average length of tuber. The length of tuber ranged from 10.20 to 15.69 cm and SP1 produced maximum length of tuber (15.69cm) followed by SP15 (15.38cm) and SP10 produced minimum length of

tuber (10.20 cm). Rest of the genotypes had the length of tuber in between 10.71 cm and 14.02 cm.

Diameter of tuber: The diameter of tuber varied significantly from one genotype to another (Table 1). The maximum diameter of tuber (6.87 cm) was recorded in

SP1 (6.87cm) followed by SP23 (6.85cm), SP3 (6.63 cm), SP5 (6.62 cm) and SP15 (6.20 cm). The minimum diameter of tuber was found in SP19 (3.22cm).

Weight of tuber per plant: The variation in weight of tuber per plant among 20 sweet potato genotypes was found to be highly significant (Table 1). The weight of tubers per plant produced by SP15 was significantly higher (1200.00 g) than those of SP5 (1000.00 g) and SP3 (991.11 g). The lowest weight of tubers per plant (200.00 g) was recorded in the genotype SP19.

Yield of tuber: Yield of tuber was ranged from 11.11 to 66.67 t/ha. The maximum yield (66.67 ton) was recorded in SP15 followed by SP5 (55.56 ton). The lowest yield was recorded in SP19 (11.11 ton/ha). SP1 and SP3 and SP24 gave the moderate yield (Table 1). The results of the present study are in conformity with the report of Anonymous (1982), Rahman and Haque (1983) and Siddique (1985). The differences in the yield contributing characters and yield might be due to genetic variation of the genotypes.

It may be concluded that among the genotypes SP15 was found to be the best for cultivation at farmer level in respect of number of tuber per plant, weight of tuber per plant (g) and yield of tuber/ha. This cultivar may be used for hybridization work for development of a new sweet potato variety

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