COMPARATIVE EVALUATION OF TRADITIONAL METHODS AND RECOMMENDED PRACTICE OF PLANTING SWEET POTATO

Paz Saladaga-Eronico and Rodolfo G. Escalada

Research Assistant, Philippine Root Crop Research and Training Center; and Professor, Department of Agronomy and Soil Science, Visayas State College of Agriculture, Baybay, Leyte, Philippines.

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ABSTRACT

Generally, no significant differences in agronomic characters and yield components of sweet potato were observed using either the traditional methods or the recommended practice of planting. Varying the number of cuttings per hill significantly influenced only the fresh vine weight of Kaimay, BNAS-51 and Samar Big Yellow sweet potato varieties. Plants that developed from one cutting per hill produced heavier herbage than the other treatments. Root yield was likewise not markedly affected by the number of cuttings per hill although the varieties significantly differed in this parameter. Among the varieties, Kaimay obtained the highest value in yield and nearly all yield components.

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KEY WORDS: Sweet potato. Traditional methods of planting. Recommended practice. Varietal characteristics. Agronomic characters. Yield components.

The methods of planting sweet potato differ widely in the Philippines. Some farmers use one cutting per hill while others use two or more. The Philippine Root Crop Research and Training Center (PRCRTC) at ViSCA recommends the use of one cutting per hill planted at 100 cm between rows and 25 cm between hills. Knowing the differences in yield among these methods of planting is important since the performance of any individual plant is greatly affected by the size and proximity of adjacent plants due to possible competition;

whether interplant, intraplant or both. In corn, increasing the number of plants to three per hill increases yield because of more plants per unit area (Guillermo, 1966). This may not be true in sweet potato due to its different growth habit. Kay (1973) reported that regardless of whether sweet potato is planted singly or in pairs (one on each side of the ridge), or two or more cuttings are planted per hill, overall yield per hectare differs slightly over a population ranging from 20,000 to 100,000 plants/ha. However, when the population density drops to 12,500 plants/ha, yield is significantly reduced.

This study was thus conducted to evaluate and compare the farmers' traditional way of planting sweet potato with the PRCRTC's recommended practice, and to determine the number of cuttings per hill that will give optimum growth and root yield at a given distance of planting.

PRCRTC's recommended practice of planting sweet potato using one cutting per hill spaced at 100 cm between rows and 25 cm between hills was evaluated and compared with different traditional methods of planting adopted by farmers in some parts of the country, i.e. using 2, 3, and 4 cuttings per hill spaced at 50, 75, and 100 cm between hills, respectively.

The experiment was laid out in split-plot arranged in randomized complete block design with three replications. The three sweet potato varieties (Kaimay, BNAS-51, and Samar Big Yellow) were designated as the mainplots and the number of cuttings per hill with corresponding distance of planting as the subplots (one cutting/hill spaced at 25 cm between hills, two cuttings/hill at 50 cm, three cuttings/hill at 75 cm, and four cuttings/hill at 100 cm. Each subplot had an area of 4 x 5 m. The distance between rows in all the treatment plots was 100 cm. A plant population of 40,000 plants/ha was maintained in all treatments.

All plots were applied with the same amount of fertilizer at the rate of 60-10-30 kg/ha based on the result of soil analysis. The whole amount of fertilizers (complete, urea, and muriate of potash) was applied at planting. Benlate and Thiodan were sprayed to the plants following the manufacturer's recommended rate when symptoms of disease infection and insect pest attack, respectively, were observed. Handweeding and cultivation were also done whenever necessary.

Varying the number of cuttings per hill significantly affected the fresh weight of vines. Plants that developed from one cutting per hill spaced at 25 cm between hills generally had higher herbage yield than those in the other treatments (Table 1). This could probably be partly due to the development of more lateral vines per plant in the former treatment. Although no marked differences were noted among varieties, Samar Big Yellow produced the heaviest fresh vine

Table 1. Agronomic characters of three sweet potato varieties as affected by varying number of cuttings per hill.[1]

Variety/ No. of Cuttings per Hill	Fresh Weight of Vines (tons/ha)	Length of Main Vines (m)	No. of Lateral Vines/ Plant	Leaf Area Index (LAI) 8 wks after plting	10 wks after plting	12 wks after plting	14 wks after plting
Kaimay							
1	44.37a	6.06	6.40	2.72	2.88	3.64	3.40
2	34.70b	6.23	6.26	2.73	2.84	3.68	3.53
3	30.93b	6.33	5.33	2.68	2.79	3.81	3.63
4	30.80b	6.54	5.23	2.62	2.71	3.87	3.70
Mean	35.20	6.29	5.80	2.69	2.80	3.75b	3.56b
BNAS-51							
1	43.20a	5.06	6.00	2.82	2.96	3.92	3.83
2	36.97a	5.33	5.53	2.81	2.89	4.04	3.96
3	33.47b	5.52	4.83	2.65	2.83	4.07	3.97
4	33.43b	5.85	4.63	2.54	2.73	4.13	4.00
Mean	36.77	5.44	5.25	2.71	2.85	4.04a	3.94a
Samar Big Yellow							
1	46.43a	4.85	6.60	2.85	2.98	3.95	3.83
2	41.80a	5.12	6.57	2.76	2.82	4.03	3.89
3	39.70a	5.25	5.93	2.61	2.69	4.06	3.98
4	33.13b	5.41	5.83	2.56	2.66	4.10	4.01
Mean	40.26	5.15	6.23	2.69	2.79	4.03a	3.93a
Grand Mean	37.41	5.63	5.76	2.70	2.81	3.94	3.81
C.V. % (a)	17.75	53.39	14.10	13.30	7.00	2.90	3.34
C.V. % (b)	15.35	33.04	16.75	7.79	8.18	3.54	4.07

[1] Treatment means within a column followed by the same letter are not significantly different at 5% level, DMRT.

weight with an average of 40.26 tons/ha, while Kaimay produced the lowest herbage yield of 35.20 tons/ha.

On the other hand, main vine length of the three sweet potato varieties studied was not significantly influenced by variation in the number of cuttings per hill although the vines tended to be longer as the number of cuttings per hill was increased. The number of lateral vines that developed per plant was likewise not significantly affected. However, slightly more lateral vines developed in plots with one cutting per hill while the least number was observed in plots with four cuttings per hill (Table 1).

LAIs taken at 8, 10, 12 and 14 weeks after planting were also not significantly influenced by the different treatments. Plants grown using three and four cuttings/hill developed more but smaller leaves while those grown using one and two cuttings per hill developed fewer but larger leaves, hence their LAIs were comparable. At the early stages of growth (8 and 10 weeks after planting), LAI in all treatments was small and this could probably be due to the very low rainfall during these periods which could have hampered plant growth. At later stages, more leaves developed, increasing the LAI. The maximum LAI for all treatments in all varieties was reached at 12 weeks after planting. At this stage and 2 weeks later, LAIs significantly differed among varieties. BNAS-51 and Samar Big Yellow showed higher LAIs than Kaimay. This may be explained by the differences in growth habit and characteristic leaf size of each variety. The first two varieties are highly spreading with large, entire cordate leaves while the latter is moderately spreading with small leaves.

The number of cuttings per hill did not markedly affect the marketable root yield of the three varieties (Table 2). However, highly significant differences in number and weight of marketable roots were noted among varieties. BNAS-51 produced the highest marketable root weight and Samar Big Yellow obtained the lowest value. On the other hand, the number of marketable roots produced by Kaimay was significantly higher than the other two varieties. This result could be traced to the inherent characteristics of the varieties rather than to the effects of the treatments.

The number and weight of non-marketable roots/ha was not significantly influenced by the number of cuttings per hill. However, the number of storage roots affected root size. As the number of storage roots increased, size generally decreased due to greater competition for photosynthates among roots resulting in the reduced amount of carbohydrates translocated to each root. This condition could have restricted storage root development and consequently led to the production of more non-marketable roots.

Highly significant differences in total root yield were noted among varieties. Kaimay produced the highest mean yield of 11.53 tons/ha followed by BNAS-51 with 10.92 tons/ha, and Samar Big Yellow obtained the lowest yield of 7.43

Table 2. Yield and yield components, and harvest indices of three sweet potato varieties as affected by varying number of cuttings per hill.[1]

Variety/ No. of Cuttings per Hill	Marketable Roots		Non-Marketable Roots		Total Root Yield (t/ha)	Harvest Index (HI)
	Number (x 10^4)	Weight (t/ha)	Number (x 10^4)	Weight (t/ha)		
Kaimay						
1	3.43	9.84	2.74	1.31	11.45	0.20
2	5.09	11.32	4.28	1.51	12.83	0.27
3	4.74	10.48	4.38	2.07	12.55	0.29
4	3.92	8.51	3.22	1.09	9.59	0.24
Mean	4.30a	10.04a	3.65	1.49a	11.53a	0.25a
BNAS-51						
1	3.38	12.26	2.64	0.79	13.05	0.23
2	2.97	9.96	2.72	0.96	10.92	0.23
3	2.79	9.52	2.90	0.98	10.50	0.24
4	2.59	8.51	2.59	0.72	9.22	0.22
Mean	2.93b	10.06a	2.71	0.86a	10.92a	0.24a
Samar Big Yellow						
1	2.31	7.37	1.86	0.33	7.70	0.15
2	2.31	7.17	1.93	0.36	7.53	0.15
3	2.07	6.85	2.25	0.52	7.37	0.16
4	2.04	6.82	2.11	0.32	7.19	0.15
Mean	2.18b	7.05b	2.04	0.38b	7.43b	0.15b
Grand Mean	3.14	9.05	2.08	0.91	9.96	0.21
C.V. % (a)	21.77	15.16	32.48	56.58	16.49	22.34
C.V. % (b)	22.00	16.85	29.27	37.80	16.60	17.69

[1] Treatment means within a column followed by the same letter are not significantly different at 5% level, DMRT.

tons/ha. Varying the number of cuttings per hill with corresponding adjustment in the distances of planting between hills, however, did not significantly affect the total root yield of the three sweet potato

varieties. This indicates that using one or two cuttings per hill with closer spacing will give total root yield which is comparable with that using more cuttings per hill but spaced farther apart. This is desirable because farmers can plant sweet potato in different ways without adversely affecting root yield. Adjusting the distance between hills farther apart and planting more than one cutting per hill will enable the farmers to utilize the interspaces for other crops. This would allow maximum crop production per unit area and time hence, also provide additional income to the farmers. Furthermore, planting four cuttings per hill and spacing them farther apart would reduce the time of planting compared to planting one cutting per hill at closer spacing.

Using different number of cuttings per hill did not significantly influence the harvest index of sweet potato. However, significant differences among varieties were observed. Kaimay had the highest harvest index (0.25), followed by BNAS-51 (0.24), and Samar Big Yellow having the lowest HI of 0.15. The low HI value of Samar Big Yellow indicates that this variety had more vegetative growth at the expense of root formation and development.

In general, the harvest indices obtained for all varieties in this study were low considering that HI values of 0.35 to 0.50 are normally obtained for sweet potato. This could be due to the presence of excessive soil moisture during the conduct of the study, which enhanced the production of more vegetative parts and less tuberous roots leading to low HI values.

In cases where intercropping is possible and manpower is available and cheap, it is advisable to plant sweet potato using four cuttings per hill and to utilize the interspaces for other crops. If bigger tubers are desired, planting one cutting per hill spaced 25 cm apart is recommended. Varieties with moderate-spreading growth habit and smaller leaves should be planted using more cuttings per hill.

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