J. Sher-e-Bangla Agric. Univ., 4(1): 24-30, January 2010 ISSN 1997-6038

COMPARATIVE STUDY ON DRY MATTER PARTITIONING IN FIVE EXOTIC GENOTYPES AND FIVE LOCAL VARIETIES OF SWEET POTATO

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ABSTRACT

In a comparative study dry matter partitioning, dry matter content, dry weight and dry matter yield of tuberous roots of five exotic genotypes and five local varieties of sweet potato were evaluated. Total fresh weight and total dry matter weight increased with plant age. Local varieties produced comparatively higher fresh weight than dry weight, whereas exotic genotypes produced lower fresh weight but higher dry weight. The highest fresh weight (1950.90 g) was found in Kamalasundari and dry weight (525.91 g) in JB. Deposition of dry matter in leaves, vines and storage roots increased with plant ages except in absorbing fibrous roots. Dry matter content and dry matter yield of storage roots also increased with days gone. The highest amount (64.80%) of dry matter deposited to storage roots of J9 followed by JB (62.90%) and Kamalasundari (60.31%), whereas the lowest amount (43.93%) was recorded in Daulatpuri. The highest dry matter content (37.46%) in storage root was recorded in J8 followed by J7 (34.32%) and JB (33.20%) and the lowest (18.46%) in Kamalasundari. The maximum dry weight as well as dry matter yield was obtained in JB followed by J9 and J8. The minimum dry weight and dry matter yield were found in Daulatpuri. The exotic genotypes showed better performance than the local varieties tested in respect of yield attributes and JB showed the best performance in producing dry matter yield (18.38 t/ha).

Keywords: Dry matter, exotic genotypes, local varieties, sweet potato.

INTRODUCTION

Sweet potato [*Ipomoea batatas* L. (Lam.)], commonly known as Misti alu in Bangladesh, belongs to the family Convolvulaceae, bears adventitious roots, which become enlarged near the stem and form starchy tuberous roots. It has high conversion ability of solar energy to carbohydrates as well as the potential to produce more foods per unit of land area, capacity to withstand adverse biotic and abiotic stresses and are well adapted to drought (Villareal, 1977). It requires low amount of fertilizers and other agricultural chemicals and less management practices. Thus, sweet potato is an important crop to exploit in a world of increasing population and limited land resources for food production.

At present in Bangladesh the food security gap is about 1.5-1.7 million metric tons (Anonymous, 2007). Sweet potato may constitute the important link to fit the food security gap. It is harvested during March to May when supply of cereal like rice is minimum. Thus, it can play an important role to fulfill the demand of cereals of the needy people.

Peoples now look for new varieties that have uniformly large roots, attractive shape and colour, good storage qualities, and high dry matter content. Most varieties now cultivated have a low dry matter content, partitioning of dry matter to storage roots and the yield of existing cultivated varieties is low. Depeng Zhang (1996) stated that to increase fresh yields normally have to increase the use of water and fertilizer but high dry matter is highly heritable and breeding new varieties with 5% more dry matter, it's like increasing the fresh yield by 15-20% without using more inputs. Thus, dry matter might be a selection criterion for sweet potato improvement. Local varieties of sweet potato are adapted to our soil and climate, whereas the exotic genotypes need to be acclimatized. Moreover, some vegetative mutants that occur frequently in sweet potato may be suitable for our country. In this situation, selection is the best procedure to improve the sweet potato. Keeping this idea in mind, five genotypes

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of sweet potato were procured from Japan and a study was undertaken to compare their performance with five local varieties in respect of dry matter content, partitioning of dry matter and tuber yield.

MATERIALS AND METHODS

The study was conducted at Bangladesh Institute of Nuclear Agriculture (BINA) Farm, Mymensingh during the period from December 2001 to May 2002. Five local varieties and five exotic genotypes of sweet potato were used as treatments. Local varieties were Daulatpuri, Kamalasundari, Tripti, BARI Misti Alu 4 and BARI Misti Alu 5, while the exotic genotypes were JB, J1, J7, J8 and J9. The experiment was set in a Randomized Complete Block Design with 3 replications. An area of 144.18 square meters was divided into 3 equal blocks. Each block contained 10 plots. One plot contained one ridge. Totals of 30 plots were made, each plot size was 2.70 m × 0.75 m and height was 30 cm. The soil of the land was silty loam in texture and medium high in land type. Ten vine cuttings were planted in each ridge. A planting distance of 60 cm between the ridges, 30 cm between plants and 100 cm between blocks were maintained for even growth of plants and for the case of intercultural operations. Vine cuttings were 30 cm in length, having 3-5 nodes and 2-3 nodes were put under the soil.
Manures and fertilizers were given as per recommendation by Razzaque *et al.*, 2000. 145 kg of cow dung (CD), 2.16 kg of urea, 1.80 kg of triple supper phosphate (TSP) and 2.52 kg of muriate of potash (MP) per plot were applied. The total amount of CD was applied during initial land preparation. The entire amount of TSP and ¼ th of urea and ¼ th of MP were applied at the time of final land preparation. The rest amount of urea and MP were side dressed after 60 days of planting.
Gap filling was done within 20 days of planting from reserved border plants whereas earthing-up was done after 30 days of planting. Weeding was done 3 times following 30, 60 and 90 days of planting. Lifting up of vines and placing it again in previous position were carried out after irrigation following 50 days intervals. It was done 3 times following at the day of planting and after 30, 60 days of planting. Harvesting was done after 115, 140 and 165 days of planting. Leaves, absorbing roots, storage roots and vines were separated and collected in the paper bags and were taken freshly in the laboratory to take weight. At the time of each harvesting two plants were selected randomly from each plot. After taking fresh weight and plant characters, further sampling was done for dry weight of leaves, vines, absorbing roots and storage roots.
The dry matter content of storage root, total dry matter (TDM) and their distribution were calculated using the formulae (Radford, 1967) mentioned below.

$$\text{Dry matter content of storage root} = \frac{\text{Constant dry weight of sliced piece (g)}}{\text{Fresh weight of sliced piece (g)}} \times 100$$

TDM = Shoot dry weight (g) + dry weight of absorbing root (g) + dry weight of storage root (g).
Dry matter partitioning of different parts of plant were also calculated using the following formula:

$$\%\ \text{dry matter of leaf} = \frac{\text{Dry weight of leaves (g)}}{\text{TDM (g)}} \times 100$$

$$\%\ \text{dry matter of vine} = \frac{\text{Dry weight of vines (g)}}{\text{TDM (g)}} \times 100$$

$$\%\ \text{dry matter of absorbing root} = \frac{\text{Dry weight of absoring roots (g)}}{\text{TDM (g)}} \times 100$$

$$\%\ \text{dry matter of storage root} = \frac{\text{Dry weight of storage roots (g)}}{\text{TDM (g)}} \times 100$$

The means of all the treatments were calculated and analysis of variances of all the characters studied were performed by F test. The significance of differences between the pair of means was evaluated by Duncan's Multiple Range Test (DMRT) (Gomez and Gomez, 1984).

RESULTS AND DISCUSSION

Total fresh weight

After 115 days of planting, the highest fresh weight (1210.85g) of root was found in Kamalasundari, followed by JB (1167.37g), Tripti (1115.60g), J1 (1079.50g) and J8 (985.80g) (Table 1). No significant variations were found among the genotypes J8, J9, BARI Misti Alu -5 and J7 in fresh weight production. The lowest fresh weight (750.00g) was found in Daulatpuri. After 140 days of planting, the highest fresh weight (1748.65g) was found in Kamaladundari followed by JB (1592.94g), Tripti (1484.27g), BARI Misti Alu -4 (1330.14g) and J9 (1311.82g). No significant variations were found among the genotypes J9, BARI Misti Alu -4 and J1. Genotypes J1, J8, BARI Misti Alu -5 and J7 were also more or less similar in fresh weight production. The lowest fresh weight (1050.35g) was found in Daulatpuri. After 165 days of planting, the highest fresh weight (1950.90g) was also observed in Kamalsundari and the lowest (1120.55g) in Daulatpuri. Significant variations were observed in between Kamalasundari and Tripti, Tripti and J9, J9 and BARI Misti Alu -4, but not in between Tripti and JB, JB and J9, BARI Misti Alu -4 and J1. Fresh weight of BARI Misti Alu -5, J1 and J8 were more or less similar, where J8 was followed by J7.

It is apparent that the highest fresh weight was observed in Kamalsundari and the lowest in Daulatpuri. It agreed with the findings of Haque (2002), where the total plant fresh weight in eight sweet potato genotypes varied from 420.10g (Daulatpuri) to 1301.5g (Kamalasundari). It was also apparent that total fresh weight increased with the advancement of plant age.

Total dry matter (TDM)

After 115 days of planting, the highest TDM was observed in JB followed by J8 and J7 (Table 1).

Table 1. Effect of genotypes on total fresh weight and total dry matter.

Genotypes	Total fresh weight (g/ plant)			Total dry matter (g/ plant)		
	115 (DAP)	140 (DAP)	165 (DAP)	115 (DAP)	140 (DAP)	165 (DAP)
JB	1167.37 ab	1592.94 b	1720.38 bc	263.76 a	428.50 a	525.91 a
J1	1079.50 c	1250.30 de	1450.80 de	227.55 c	314.58 d	370.29 e
J7	938.85 de	1190.35 e	1268.85 f	239.69 b	297.19 e	374.98 de
J8	985.80 d	1205.60 e	1349.85 ef	244.01 b	357.93 b	439.41 c
J9	943.06 de	1311.82 d	1664.65 c	154.39 e	356.35 b	450.31 c
Daulatpuri	750.00 f	1050.35 f	1120.55 g	174.37 d	192.26 g	213.10 f
Kamalasundari	1210.85 a	1748.65 a	1950.90 a	180.29 d	298.35 de	379.37 de
Tripti	1115.60 bc	1484.27 c	1805.20 b	174.52 d	338.12 c	470.43 b
BARI Misti Alu 4	894.15 e	1330.14 d	1535.55 d	124.64 f	233.77 f	362.11 e
BARI Misti Alu 5	940.24 de	1193.65 e	1450.45 de	185.42 d	240.14 f	393.51 d
CV (%)	3.96	3.53	4.79	3.27	3.13	2.84

DAP = Days after planting

The figures in column bearing same letter(s) do not differ significantly at 5% level of significance by DMRT

J1 also followed J8 and J7. There were no significant differences among the genotypes BARI Misti Alu -5, Kamalasundari, Tripti and Daulatpuri. The lowest TDM was reported in BARI Misti Alu -4, which followed by J9. After 140 days of planting, JB was highest in TDM production, which was followed by J8 and J9, Tripti and J1. There were no significant variations between J1 and Kamalasundari, Kamalasundari and J7, BARI Misti Alu -4 and BARI Misti Alu -5. The lowest TDM (192.26g) was found in Daulatpuri.

After 165 days of planting, the maximum TDM (525.91g) was found in JB followed by Tripti, J9 (450.31g), J8, BARI Misti Alu -5, J1 and BARI Misti Alu -4 in descending order. Kamalasundari, J7, J1 and BARI Misti Alu -4 were statistically similar in TDM production. The lowest TDM (213.10g) was found in Daulatpuri.

The above result agreed with the findings of Haque (2002) who found a noticeable variation among the eight sweet potato genotypes in respect of TDM production, varied from 98.8g (Daulatpuri) to 281.82g

(J9). It revealed that TDM of exotic genotypes ranged from 154.39 to 525.91 g, while it ranged from 124.64 to 470.43 g in local varieties. It also appealed that TDM increased keeping pace with time in all of the genotypes.

Partitioning of dry matter

Leaf

After 115 days of planting, the highest dry matter partitioning (21.53%) occurred in J7, which was near/about similar to JB (21.23%), BARI Misti Alu -5 (20.97%) and BARI Misti Alu -4 (20.87%) but varied from J8 (19.87%) (Table 2) by the lowest dry matter (10.09%) was partitioned in leaves of J9.

After 140 days of planting, more or less near percent of dry matter was partitioned to J7, JB, BARI Misti Alu -5, Kamalasundari and BARI Misti Alu -4 (22.53%, 22.00%, 21.64%, 21.48% and 21.48%, respectively). The lowest percent of dry matter partitioned to J9 (11.25%). After 165 days of planting, there was no significant variation among the genotypes J7, BARI Misti Alu -5, Kamalasundari, BARI Misti Alu -4, JB and J8 (23.06%, 22.92%, 22.57%, 22.50% and 21.50%, respectively).

Dry mater of leaves increased up to the final harvest, which was close to the findings of Mannan *et al.* (1992), where dry matter of leaf of Kamalasundari and Daulatpuri increased rapidly from 90 DAP to the final harvest (150 DAP).

Vine

After 115 days of planting, the maximum dry matter (29.55%) was deposited in the vines of Daulatpuri, which was followed by Tripti (24.74%), J9 (20.90%) and J1 (20.43%) (Table 2). BARI Misti Alu -4, BARI Misti Alu -5 and J7 were statistically similar to dry matter partitioning in vines. After 140 days of planting, dry matter partitioning to the vines of Daulatpuri, Tripti, J1, J9, BARI Misti Alu -4, BARI Misti Alu -5, J7, Kamalasundari, JB and J8 were ranked in descending order. After 165 days of planting, the highest percent of dry matter was partitioned to Daulatpuri (32.50%), which was followed by Tripti (27.38%), J1 (23.09%), J9 (22.40%) and BARI Misti Alu -5 (19.59%). There were no significant differences in between BARI Misti Alu -4 and BARI Misti Alu -5, BARI Misti Alu -4 and J7, JB and J8. The lowest dry matter partitioning occurred in Kamalasundari (16.02%).

It was apparent that more dry matter partitioned to vines of Daulatpuri and Tripti made stronger and heavy vines but produced weak and small sized storage roots. The dry matter partitioning in vines of Kamalasundari was higher than JB. It was also observed that partitioning of dry matter into stem tissue was higher than leaf tissue, which agreed with the findings of Lewthwaite and Triggs (2000). A replicated field trial was established at the Pukekohe Research Centre, New Zealand (1995) for evaluation of three-selected sweet potato cultivars (Owairaka, Beniazuma and Beauregard) on the basis of dry matter partitioning. Lewthwaite and Triggs (2000) reported that the dry matter partitioning into stem material in Owiraka Red was higher than in the other cultivars and partitioning of dry matter into stem tissue was higher than leaf tissue.

Absorbing fibrous roots

After 115 days of planting, the maximum dry matter partitioning (7.80%) occurred in absorbing fibrous roots of Daulatpuri followed by Tripti (6.41%), Kamalasundari (6.36%) and BARI Misti Alu -4 (5.97%), and the lowest amount (3.18%) deposited in JB (Table 2). Genotypes BARI Misti Alu -5, J8, J9 and J7 were statistically similar in dry matter partitioning (5.61%, 5.54%, 5.08% and 5.01%, respectively). After 140 days of planting, the highest dry matter partitioning (5.72%) occurred in Daulatpuri, followed by J1 (4.22%) and Tripti (4.12%), and the lowest amount (1.83%) was found in JB. The pair of genotypes viz. BARI Misti Alu -4 and BARI Misti Alu -5, Kamalasundari and J8, J7 and J9 was statistically similar in dry matter partitioning. After 165 days of planting, the highest dry matter partitioning (1.95%) occurred in Daulatpuri, followed by Tripti (1.05%) and the lowest amount (0.08%) was found in JB. The genotypes J9, J8, Kamalasundari, BARI Misti Alu -4, J1 and BARI Misti Alu -5 were ranked in descending order in dry matter partitioning (0.90%, 0.80%, 0.78%, 0.64%, 0.49% and 0.44%, respectively).

Dry matter partitioning into absorbing fibrous roots reduced after 115 days of planting and was continuing up to the final harvest. This was possibly due to translocation of assimilates from absorbing fibrous roots to tuberous roots. Similar findings were also obtained by Pardales and Belmont (1989), who reported reduced fibrous root dry matter in the genotype VSP 2 at final harvest.

Table 2. Effect of genotypes on dry matter partitioning into different plant parts of sweet potato

Genotypes	Dry matter partitioning (%)											
	Leaf			Vine			Absorbing fibrous root			Storage root		
	115 DAP	140 DAP	165 DAP	115 DAP	140 DAP	165 DAP	115 DAP	140 DAP	165 DAP	115 DAP	140 DAP	165 DAP
JB	21.23 ab	22.00 a	22.50 a	14.02 f	14.14 g	14.52 g	3.18 g	1.83 f	0.08 h	61.57 ab	62.03 a-c	62.90 ab
J1	16.68 d	17.20 d	18.52 c	20.43 c	22.52 c	23.09 c	4.44 f	4.22 b	0.49 f	54.45 c	57.06 cd	57.90 bc
J7	21.53 a	22.53 a	23.06 a	17.22 d	17.58 e	18.28 e	5.01 e	2.25 e	0.35 g	56.24 c	57.64 b-d	58.11 bc
J8	19.87 bc	20.09 c	21.50 ab	12.01 g	13.10 h	13.50 g	5.54 c-e	3.25 d	0.80 d	62.58 ab	63.56 ab	64.20 a
J9	10.09 f	11.25 f	11.90 e	20.90 c	21.90 c	22.40 c	5.08 de	2.25 e	0.90 c	63.93 a	64.60 a	64.80 a
Daulatpuri	18.56 c	20.37 bc	20.50 b	29.55 a	31.70 a	32.50 a	7.80 a	5.72 a	1.95 a	43.93 d	44.21 e	45.05 d
Kamalasu-ndari	19.39 c	21.48 ab	22.89 a	15.29 e	15.34 f	16.02 f	6.36 b	3.35 d	0.78 d	58.96 bc	59.23 a-d	60.31a-c
Tripti	13.87 e	14.79 e	15.77 d	24.74 b	26.05 b	27.38 b	6.41 b	4.12 b	1.05 b	54.98 c	55.04 d	55.80 c
BARI Misti Alu-4	20.87 ab	21.48 ab	22.57 a	18.12 d	18.71 d	18.99 de	5.97 bc	3.73 c	0.64 e	55.04 c	56.08 cd	57.80 bc
BARI Misti Alu-5	20.97 ab	21.64 a	22.92 a	17.71 d	18.48 de	19.59 d	5.61 cd	3.62 c	0.44 f	55.71 c	56.26 cd	57.05 c
CV (%)	4.06	3.23	4.78	3.16	3.03	3.19	5.63	3.19	3.24	4.62	5.54	4.86

DAP = Days after planting
The figures in column bearing same letter(s) do not differ significantly at 5% level of significance by DMRT.

Storage roots

After 115 days of planting, it appeared that dry matter partitioning into storage roots of J9 was maximum (63.93%), which was followed by J8 (62.58%), JB (61.57%) and Kamalasundari (58.96%), and Daulatpuri was minimum (43.93%) (Table 2). There was no significant difference among the genotyes J7, BARI Misti Alu -5, BARI Misti Alu -4, Tripti and J1 (56.24%, 55.71%, 55.04%, 54.98% and 54.45%, respectively). After 140 days of planting, the highest dry matter (64.60%) was partitioned to storage roots of J9, which was similar to J8, JB and Kamalasundari (63.56%, 62.03% and 59.23%, respectively). Dry matter partitioning into storage roots of the genotypes J7, J1, BARI Misti Alu -5 and BARI Misti Alu -4 were not statistically different. The lowest amount of dry matter (44.21%) was partitioned to storage roots of Daulatpuri. In respect of dry matter partitioning, Tripti was very close to Kamasundari but diffred with JB. After 165 days of planting, the maximum dry matter partitioning (64.80%) occurred in J9, which was similar to J8, JB and Kamalasundari (64.20%, 62.90% and 60.31%, respectively). Dry matter partitioning to storage roots of the genotypes J7, J1 and BARI Misti Alu -4 were statistically similar (58.11%, 57.90% and 57.80%, respectively) and were more close to JB and Kamalasundari than to Tripti (55.80%) and BARI Misti Alu -5 (57.05%). The lowest amount of dry matter partitioning was observed in Daulatpuri.

Distribution of assimilates into vines and absorbing fibrous roots of Daulatpuri was the highest, and of Tripiti and Kamalasundari was higher than that of JB. Dry matter deposition in storage roots increased up to the final harvest. This was perhaps due to production of more assimilates by photosynthesis for a long time.

Dry matter content

After 115 days of planting, percent dry matter content of storage roots of the genotype J8 was maximum (35.04%) followed by J7 (32.19%) and JB (30.50%) and it was minimum (18.46%) in Kamalasundari (Table 3). Dry matter content of storage roots of J9 was higher than J1 and other local varieties. There were no significant differences among the local varieties in resect of per cent dry matter content. After 140 days of planting, storage roots of the genotype J8 content the highest per cent of dry matter (36.85%), which was followed by J7, J9, JB, J1, Daulatpuri, Tripti, BARI Misti Alu -5 and BARI Misti Alu -4 in descending order. Per cent dry matter content of Kamalasundari (19.19%) was the lowest one. After 165 days of planting, the highest per cent of dry matter was recorded in J8 and J7, followed by JB and J9. Genotypes J1, BARI Misti Alu -5, Daulatpuri and Tripti were not different in per cent dry matter content. The lowest dry matter content space (22.50%) was found in Kamalasundari.

It was apparent from Table 3 that dry matter content of storage roots of exotic genotypes was relatively higher than that of local varieties. Dry matter content of storage roots of exotic genotypes ranged from 24.91% to 37.46%, whereas local varieties ranged from 18.46% to 30.54%. The results were close to the findings of Hussain *et al.* (1984, 1987), Anonymous (1988), Gardner *et al.* (1995) and Jahan (2001).

Dry weight of storage roots

After 115 days of planting, genotype JB produced the highest dry weight (183.3g/plant) of storage roots, followed by J8, J7 and J1 (152.7, 134.8 and 123.9 g/plant, respectively) (Table 3). The lowest weight (76.6 g/plant) was found in Daulatpuri, which was similar to BARI Misti Alu -4 (68.6 g/plant).

Table 3. Effect of genotypes on per cent dry matter content, dry weight and dry matter yield of storage roots

Genotypes	Dry matter content of storage roots (%)			Dry weight of storage roots (g/plant)			Dry matter yield of storage roots (t/ha)
	115 DAP	140 DAP	165 DAP	115 DAP	140 DAP	165 DAP	165 DAP
JB	30.50 b	31.03 cd	33.20 bc	183.3 a	265.8 a	330.8 a	18.38 a
J1	24.91 d	29.50 d	29.80 cd	123.9 d	179.5 cd	214.4 de	11.91 de
J7	32.19 b	33.55 b	34.32 ab	134.8 c	171.3 e	217.9 de	12.11 de
J8	35.04 a	36.85 a	37.46 a	152.7 b	227.5 b	282.1 b	15.67 b
J9	28.06 c	31.89 c	32.50 bc	98.7 e	230.2 b	291.8 b	16.21 b
Daulatpuri	24.50 d	26.75 e	27.53 de	76.6 g	85.0 g	96.0 f	5.33 f
Kamalasundari	18.46 f	19.19 g	22.50 f	106.3 e	178.5 d	228.8 d	12.71 d
Tripti	19.59 ef	26.02 e	27.90 de	95.95 f	186.1 c	262.5 c	14.58 c
BARI Misti Alu-4	19.78 ef	20.92 f	26.00 e	68.6 g	131.1 f	209.3 e	11.63 e
BARI Misti Alu-5	21.52 e	25.17 e	30.54 cd	103.3 ef	135.1 f	224.5 de	12.47 de
CV (%)	4.48	3.35	6.31	4.78	2.23	3.65	4.32

DAP = Days after planting

The figures in a column bearing same letter(s) do not differ significantly at 5% level of significance by DMRT.

Dry weight of Kamalasundari (106.3 g/plant) was higher than other local varieties. At the second harvest, dry weight of storage roots of JB was maximum (265.8), which was followed by J9, J8, Tripti, J1, Kamalasundari, J7, BARI Misti Alu 5 and BARI Misti Alu 4 (230.2, 227.5, 186.1, 179.5, 178.5, 171.3, 135.1 and 131.1 g/plant, respectively). The lowest weight (85.0 g/plant) was found in Daulatpuri. After 165 days of planting, JB produced the highest dry weight of storage roots followed by J9, J8, Tripti and Kamalasundari (291.8, 282.1, 262.5 and 228.8 g/plant, respectively). Dry weight of storage roots of the genotypes BARI Misti Alu -5, J7, J1 and BARI Misti Alu -4 were statistically similar (224.5, 217.9, 214.4 and 209.3 g/plant, respectively). The lowest dry weight of storage roots (96. g/plant) was found in Daulatpuri.

Dry weight of storage roots increased up to the final harvest in all genotypes. It was perhaps due to getting enough assimilates from leaves to storage roots. The dry weight of storage roots of the exotic genotypes was higher than local varieties.

Dry matter yield

The highest (18.38 t/ha) dry matter yield of storage roots was produced by the genotype JB was followed by J9 and J8 (16.21 and 15.67 t/ha, respectively) and the lowest yield (5.33 t/ha) was found in Daulatpuri (Table 3). Dry matter yield of the exotic genotypes was higher than that of local varieties. Dry matter yield of the exotic genotypes ranged from11.91 to 18.38 t/ha, whereas the local varieties ranged from 5.33 to 14.58 t/ha. JB produced more dry matter yield than the other nine genotypes because of its higher dry matter content, higher dry matter partitioning to storage roots.

From the above study, it was found that local varieties produced more fresh weight but lower dry weight, whereas exotic genotypes produced more dry weight but lower fresh weight. In local varieties, distribution of dry matter into vines and absorbing roots was higher than storage roots. Whereas, in the exotic genotypes, distribution of dry matter into storage roots was higher than vines and absorbing roots. Consequently, exotic genotypes produced comparatively more dry matter yield of storage roots. Genotype JB showed the best performance among the studied genotypes.

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