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VARIETAL PERFORMANCE AND FOLIAGE YIELD IN VEGETABLE AMARANTH

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The present investigation was carried out to evaluate the foliage yield and its component characters of different level of cuttings in vegetable amaranth. The 10 cultivars were grown in RBD with three replications and foliage cutting was started after 3rd week of sowing and subsequent cuttings were done at the interval of 10 days. Data on plant height, branches/plant, leaves/plant and leave size were taken of each cutting. The cultivar 'AV-190' (285.24 q/ha) was found the most promising cultivar for foliage yield followed by 'AV-45' (270.66 q/ha) and 1AV-35/1' (218.75 q/ha). It was observed that foliage yield enhanced in subsequent cuttings. The component characters noticed were mainly responsible for the enhancement of foliage yield.

Key words : Amaranth, selection, foliage, regeneration

Amaranths are hardy, fast growing pseudo-cereals and cheap source of protein rich seed and carotene rich leafy vegetables. The leaves as pot herbs of many amaranth species are widely consumed as food in the developing countries. Its fliage is particularly rich in vitamin 'A' as well as in protein, iron and calcium (Devadas and Saroja, 1980; Prakash and Pal, 1991). It also has a considerable amount of vitamin C which is an important water soluble antioxidant and plays a significant role in maintaining the preferred oxidation-reduction potential in human tissues (Kutsky, 1973). For nutritional quality, the selection of genotypes for high foliage yield in different cuttings and stages is necessary. The information on this aspect in vegetable type amaranth is meagre. Therefore, keeping importance of green leafy vegetables, present investigation was undertaken to evaluate the promising strains for foliage yield and its component characters in different cuttings in summer season.

MATERIAL AND METHODS

The seeds of 10 cultivars namely 'AV-35', 'AV-45', 'AV-35/1', 'AV-63', 'AV-64', 'AV-77', 'AV-151', 'AV-N-3', 'AV-190' 'AV-76' selected from large germplasm maintained at the NBRI, Lucknow, were sown in randomized block design with three replications in the year 1997-98 at NBRI, Lucknow on sandy loam soil under uniform cultural and climatic conditions. The distance between plant to plant and row to row were kept 45×10 cm^2 respectively. The net plot size was 5.76 M^2. The first cutting was done after 3rd week of sowing and subsequent cuttings were done at the interval of 10 days. The data on foliage yield (kg/plot) and its components traits i.e. plant height (cm), leaves/plant, leaves size (cm^2) and branches/plant were recorded for each cutting.

Statistical analysis was done in factorial design according to Panse and Sukhatme (1978).

RESULTS AND DISCUSSION

Analysis of variance for individual cutting showed significant differences among treatments for all the characters (Table 1). Pooled analysis of variance due to cuttings and cultivars also showed significant differences for different characters except branches/plant due to cultivars. The variances due to cutting × cultivars were significant for all the traits.

respectively. The branching pattern was found very irregular. On the overall mean basis the cultivar 'AV-64' (11.80 ± 1.89) followed by 'AV-190' (10.60 ± 0.96) and 'AV-151' (10.41 ± 0.57) showed maximum number of branches per plant.

The leaves per plant generally enhanced in subsequent cutting and maximum in IVth cutting

Table 1. Pooled ANOVA for different characters over different cuttings in vegetable amaranth

Source	df	Plant height (cm)	Leaves/plant	Leaves size (cm^2)	branches/plant	Foliage yield (kg/plot)
Cuttings	4	426.63**	981.18**	193.87*	22.72**	22.11**
Cultivars	9	75.63**	143.32*	547.22**	7.47	2.31*
Cutting × cultivar	36	10.48**	56.90**	66.78**	5.83**	0.72**
Pooled Error	100	3.68	15.11	16.71	2.38	0.18

* **Significant at 5% and 1% respectively.

Considering the total foliage yield/ha, the cultivar 'AV-190' (285.24 q/ha) was most promising followed by 'AV-45' (270.66 q/ha) and 'AV-35/1' (218.75 q/ha) (Table 3). The 'AV-190' and 'AV-45' were significantly higher yielder than all the cultivars. In general, foliage yield enhanced in subsequent cuttings may be due to higher regeneration in component characters viz. plant height, branches per plant, leaves per plant and leaves size in successive cuttings. However, in strains 'AV-77' and 'AV-151' the foliage yield declined in Vth cutting due to loss in plant growth per population.

Generally the plant height increased in subsequent cuttings in all the strains and was maximum in Vth cutting (Table 2). The overall mean showed maximum height in the strain 'AV-64' (24.35 ± 3.81) followed by 'AV-190' (23.42 ± 3.19) and 'AV-63' (21.15 ± 2.38)

with some exception. The maximum number of leaves per plant was observed in 'AV-151' (37.46 ± 5.90) followed by 'AV-190' (35.98 ± 8.26) and 'AV-77' (34.53 ± 6.15). In general leaves size was larger in IInd to IVth cuttings. On the overall mean basis maximum leave size was found in the cultivar 'AV-151' (53.46 ± 5.07) followed by 'AV-N-3' (47.27 ± 2.63) and 'AV-64' (37.17 ± 5.96). The characters plant height, branches per plant, leaves per plant and leaves size are the main components for the enhancement of foliage yield. Selection based on these components need to be made for breeding superior varieties. The cultivar 'AV-190', 'AV-45', 'AV- 35/1' and 'AV-64' were found most promising. These may be hybridized for component breeding and selection of genotypes for foliage yield and contributing characters will be rewarding to isolate better plant types in vegetable amaranth.

Table 2. Stages of different cultivars in different traits at different cuttings of vegetable amaranthus

Cultivars/ cuttings	Plant height (cm)					Mean ± SE	Leaves/plant					Mean ± SE	Leaves size (cm^2)					Mean ± SE	Branches/plant					Mean ± SE
	Ist	IInd	IIIrd	IVth	Vth		Ist	IInd	IIIrd	IVth	Vth		Ist	IInd	IIIrd	IVth	Vth		Ist	IInd	IIIrd	IVth	Vth	
AV-35	10.00	14.50	20.84	16.84	32.00	18.84±3.73	11.15	28.67	38.17	24.50	20.67	24.63±4.46	20.92	32.44	42.17	26.66	29.11	30.26±3.52	10.00	8.33	13.34	8.50	4.50	8.93±1.43
AV-45	6.74	15.17	16.34	20.67	30.50	17.88±3.88	14.07	25.33	25.67	31.17	37.17	26.68±3.82	6.11	14.08	20.29	22.04	23.92	17.29±3.25	5.83	8.67	9.50	8.17	11.84	8.80±0.97
AV-35/1	8.12	15.70	14.67	19.67	33.67	18.37±4.25	11.37	17.00	28.67	33.71	57.17	29.58±7.97	10.11	29.54	28.46	45.67	31.96	29.15±5.67	7.27	7.84	9.33	10.84	13.17	9.69±1.07
AV-63	12.90	20.75	22.25	22.17	27.67	21.15±2.38	13.24	24.00	26.17	36.34	25.67	25.08±3.67	26.67	32.29	40.91	36.75	31.67	33.66±2.42	12.34	7.67	13.67	7.67	5.00	9.27±1.62
AV-64	15.33	16.92	31.84	23.50	34.17	24.35±3.81	15.67	16.33	39.50	27.33	34.67	26.70±4.78	21.75	24.43	43.12	52.04	44.50	37.17±5.96	15.17	6.00	16.67	10.34	10.83	11.80±1.89
AV-77	6.34	20.17	20.17	18.17	22.84	17.54±2.90	13.00	29.00	41.00	42.83	46.83	34.53±6.15	19.93	46.46	40.00	36.17	33.62	35.24±4.40	6.16	8.05	12.17	10.50	9.67	9.31±1.03
AV-151	9.95	14.50	17.17	18.33	24.34	16.86±2.36	15.64	40.33	36.00	48.33	47.00	37.46±5.90	45.65	65.70	66.04	44.46	45.46	53.46±5.07	9.99	9.23	12.34	9.50	11.00	10.41±0.57
AV-N-3	13.65	16.34	21.67	18.67	33.17	20.70±3.39	17.50	25.50	31.16	35.00	25.50	26.93±2.97	55.25	50.58	41.33	41.96	47.21	47.27±2.63	15.05	7.84	13.17	8.67	7.00	10.35±1.59
AV-190	12.42	21.50	25.00	26.67	31.50	23.42±3.19	12.37	20.84	44.00	46.83	55.84	35.98±8.26	33.42	35.25	26.20	29.87	26.80	30.31±1.78	11.97	8.17	9.17	10.17	13.50	10.60±0.96
AV-76	6.27	12.00	11.84	9.52	12.92	10.51±1.20	10.15	18.16	30.00	23.83	38.67	24.16±4.88	32.04	35.17	32.17	33.67	40.6	34.73±1.58	7.17	6.50	9.67	7.34	9.67	8.07±0.67
Mean	10.17	16.76	20.18	19.42	28.28		13.42	24.52	34.03	34.99	38.92		27.18	36.39	38.07	36.93	33.49		10.09	7.83	11.90	9.17	9.62	
S.E.	1.04	0.98	1.80	1.44	2.10		0.73	2.28	2.07	2.77	4.03		4.78	4.58	3.99	2.94	2.64		1.10	0.30	0.78	0.40	1.00	
CD 5%	3.38	3.19	5.85	4.68	6.83		1.65	5.15	4.68	6.26	9.11		15.54	14.89	12.97	9.56	8.58		3.58	0.98	2.54	1.30	3.25	
CD 1%	2.35	2.21	4.07	3.25	4.75		2.37	5.40	6.73	9.00	13.10		10.80	10.33	9.02	6.64	5.97		2.49	0.68	1.76	0.90	2.26	

*,** Significant at 5% and 1% respectively.

Table 3. Foliage yield of different cultivars in different cuttings in vegetable amaranth

Cultivars	Cuttings					Total yield (Kg)	Yield (q/ha)
	Ist	IInd	IIIrd	IVth	Vth		
AV-35	0.41	1.00	1.16	2.40	2.06	7.03	122.05
AV-45	0.54	1.30	3.50	4.40	5.85	15.59	270.66
AV-35/1	2.00	0.90	1.30	3.40	5.00	12.60	218.75
AV-63	1.12	1.07	2.30	2.70	4.30	11.49	199.48
AV-64	0.87	0.90	1.80	6.00	3.33	12.15	210.94
AV-151	0.83	1.46	2.10	4.00	2.20	10.59	183.85
AV-N-3	0.31	0.50	0.51	2.01	2.60	5.93	102.95
AV-190	0.43	1.70	3.00	5.80	5.50	16.43	285.24
AV-76	0.55	0.90	0.78	2.00	4.25	8.48	147.22
Mean	0.72	1.06	1.89	3.64	3.97	11.27	195.64
S.E.	0.17	0.11	0.30	0.46	0.43	1.07	18.65
CD 5%	0.55	0.36	0.98	1.50	1.40	2.42	42.19
CD 1%	0.38	0.25	0.68	1.04	0.97	3.48	60.61

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