

Evaluation of Ridge Gourd (*Luffa acutangula* (Roxb.) L.) Genotypes for Yield and Quality Traits under Coimbatore Condition

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ABSTRACT

The ridge gourd germplasm consisting of thirty five entries were evaluated for yield and quality attributes under Coimbatore conditions during 2012. There were significant differences in yield and quality among the genotypes studied. The genotype IC 413577 recorded earliness in yield while the maximum fruit length and fruit weight was registered in CO 1. The fruit girth and fruit flesh thickness were the maximum in PKM 1 and 090 respectively. The most promising genotype, IC 413577 recorded the maximum number of fruits per vine and fruit yield per vine followed by IC 385912. The genotype 030 had low crude fibre content while IC 413577 and CO 1 recorded the highest carbohydrate and protein content respectively. The variability among the genotypes in the germplasm evaluated for yield and quality attributes can be effectively utilized in crop improvement with IC 413577, the most promising genotype as common parent and other entries with special characters as partners to develop character specific hybrids with maximum yield.

Key words Ridge gourd – Germplasm evaluation – Yield - Quality

Ridge gourd (*Luffa acutangula* (Roxb.) L.) is a cucurbitaceous summer vegetable of south east Asia and few African countries. The young tender fruits of the non-bitter types are eaten fresh like cucumbers, cooked as a vegetable or used in soups. Fruits of *Luffa* are very nutritious and good source of vitamin A, calcium, phosphorus, ascorbic acid and iron.

Despite its economic importance and presence of considerable variability, development of varieties/hybrids in ridge gourd was rather limited. Identification of superior genotypes among the existing germplasm becomes imperative for promoting improvement in yield and yield related traits.

Hence, collection and evaluation of germplasm is a pre-requisite for their utilization and detailed evaluation determines the potential of a germplasm in specific crop improvement programme. Therefore, a trial for characterization and evaluation of presently available ridge gourd germplasm is carried out in order to identify the potential cultivar for different horticultural characters.

MATERIALS AND METHODS

The study was carried out at the Horticultural college and Research Institute, Tamil Nadu Agricultural University, Coimbatore district of Tamil Nadu State during January 2012 (Thai pattam). The materials for the present study, 35 ridge gourd genotypes were collected from different sources and the details is given in Table 1. The experiment was laid out in the randomized block design with two replications. Each experimental unit was represented by 10 plants spaced at 1.5 meter, row spaced 2 meter and the plants were trained on trellis system. The entries were evaluated for days taken for first harvest, fruit length, fruit girth, fruit flesh thickness, fruit weight, fruit number per vine, fruit yield per vine, crude fibre content, carbohydrate content and protein content. The collected data were subjected to statistical analysis adopting standard procedures of analysis (Panse and Sukhatme, 1978).

RESULTS AND DISCUSSION

Yield attributing characters of ridge gourd genotypes:

The thirty five genotypes showed significant differences for days to first harvest, fruit length, fruit girth, flesh thickness, fruit weight, fruit number per vine and fruit yield per vine (Table 2). Earliness in yield is a desirable attribute and among the genotypes valuated, IC 413577 (44.38) showed earliness in yield which was followed by SG 030 (46.11) and *Arka Sumeet* (46.50). Similar results were observed by Krishna Prasad and Singh, 1989 during the evaluation of germplasm of ridge gourd.

Significant difference was observed for fruit characters among the germplasm entries with the genotype CO 1 (47.55 cm) recording the highest fruit length followed by *Arka Sujat* (45.39 cm). The genotype, PKM-1 (21.24 cm) had higher fruit girth followed by SG 030 (20.34 cm). Similar variation in fruit characters was observed in bottle gourd by Suganthi, 2008. The weight of a single fruit determines the overall yield performance of a vine and among the genotypes studied, CO 1 recorded the highest fruit weight (381.25 g) followed by *Arka Sujat* (342.51 g). Flesh thickness is an interrelated character, which determines the market preference. The present study revealed the genotype 090 (1.40 cm) possessed favourable

Table 1. Mean performance of ridge gourd genotypes for yield parameters

Parents / Hybrids	Days to first harvest	Fruit length (cm)	Fruit girth (cm)	Individual fruit weight (g)	Fruit flesh thickness (cm)	Number of fruits per vine	Yield of fruits per vine (kg)	Total seed number per fruit	100 seed weight
IC 92618	63.20	21.45	18.23	210.24	1.31	8.50	4.37	199.90	18.24
IC 92660	53.75	14.14	13.29	194.62	1.04	9.43	6.51	154.38	17.44
IC 92685	51.36	34.35	17.23	231.47	1.26	13.30	6.22	177.46	16.36
IC105554	62.56	17.18	17.26	245.31	1.05	6.19	3.31	153.45	16.57
IC 105579	64.11	34.18	16.15	213.61	1.24	7.51	6.73	149.62	15.42
IC 110892	65.64	37.63	19.11	198.34	1.29	8.40	6.36	179.56	14.48
IC 196589	61.71	31.20	18.38	206.27	1.23	9.98	6.27	171.25	15.24
IC 339239	64.50	36.18	14.42	223.83	1.27	8.32	6.13	159.27	13.49
IC 385912	49.38	42.50	16.49	240.47	1.04	13.45	6.82	218.20	13.48
IC 392334	63.20	27.42	14.37	243.44	1.26	8.36	5.17	159.32	12.28
<i>Arka Sumeet</i>	46.50	32.24	13.63	235.23	1.10	11.37	5.13	186.48	12.67
<i>Arka Sujat</i>	49.58	45.39	16.10	342.51	1.31	12.00	4.35	179.62	11.29
<i>Deepthi</i>	52.19	31.38	15.49	264.37	1.05	6.86	3.58	129.68	11.33
Coimbatore Local	47.53	34.34	14.77	246.42	1.27	7.46	6.30	143.52	10.64
Notchimedu Local	63.27	43.41	12.61	216.54	1.22	8.51	5.81	192.44	10.43
UP Variety Local (var:100)	49.38	34.44	14.50	207.28	1.33	7.62	5.34	128.31	12.29
JA 040	64.56	35.40	13.66	226.42	1.31	5.63	4.98	125.48	12.55
JA 050	51.56	37.38	15.48	216.13	1.25	7.28	4.87	109.39	11.38
CG 020	66.43	38.27	13.49	212.29	1.25	9.50	4.62	120.47	17.53
CG 030	46.11	39.32	20.34	278.48	1.28	5.63	4.52	112.14	16.60
070	51.32	35.19	16.66	190.39	1.22	4.78	4.47	113.44	16.34
090	52.47	30.31	18.49	181.46	1.40	6.38	3.95	118.21	15.56
IC 413592	49.55	33.49	17.08	237.43	1.20	6.53	6.02	159.40	15.34
IC 373361	63.41	31.61	13.42	248.27	1.31	9.56	5.72	171.27	14.38
IC 362481	47.39	33.53	12.40	225.44	1.15	12.19	6.62	149.59	14.12
IC 393014	52.33	31.52	13.26	232.40	1.30	10.34	6.54	186.48	13.59
IC 393016	64.05	44.39	15.57	228.22	1.12	9.23	6.32	189.64	13.29
IC 413577	44.38	34.45	15.60	255.47	1.38	14.13	6.86	174.37	12.50
IC 413587	53.50	26.19	15.19	236.38	1.27	8.32	6.04	163.24	10.44
LA 1	64.12	30.53	12.74	225.49	1.35	9.50	5.73	192.13	11.39
LA 2	57.20	36.43	15.29	239.54	1.15	6.25	4.84	166.65	11.59
2S 134	49.19	30.40	15.15	236.39	1.25	8.13	4.62	174.37	12.31
CO 1	47.35	47.55	13.44	381.25	1.17	8.50	4.07	120.43	11.26
CO 2	58.32	36.61	13.31	227.53	1.12	6.80	3.84	151.26	11.17
PKM – 1	55.62	24.58	21.24	219.28	1.19	9.43	3.76	148.23	12.64
Mean	55.62	33.55	15.53	234.80	1.22	8.72	5.36	157.96	13.58
SEd	0.37	0.32	0.29	0.48	0.07	0.40	0.11	0.29	0.36
CD (5%)	0.75	0.65	0.60	0.98	0.15	0.83	0.24	0.59	0.73

values for this trait followed by IC 413577 (1.38 cm). Similar variability in fruit flesh characters was recorded by Rao, *et al.*, 2000 in ridge gourd.

Number of fruits per vine is an important character which directly contributes to higher yield and significant difference was observed for fruit number per vine among the entries of germplasm studied. Based on the mean performance, the genotype IC 413577 had higher number of fruits per vine (14.13) followed by IC 385912 (13.45). Similar findings for differential yield by the genotypes were reported by Hitesh, *et al.*, 2012 and Suganthi, 2008 in coccinia and bottle gourd respectively.

In the present study, the genotype IC 413577 recorded the highest mean value for fruit yield per vine (6.86 kg) among the genotypes followed by IC 385912 (6.82 kg). Similar findings for variability in fruit yield per vine were reported by Hitesh, *et al.*, 2012 and Dharmatti, *et al.*, 2006 in ivy gourd.

Qualitative characteristics of ridge gourd genotypes:

Significant variations were observed among the genotypes for quality characters *viz.*, crude fibre, carbohydrate and protein content (Table.3). Analysis of crude fibre content in fruit would be useful in the selection as vegetable or as a source of fibre production. Presence of crude fibre in ridge gourd is good in terms of quality to limited extent. The total quantity of crude fibre should be optimum at the time of vegetable maturity. Among the thirty five genotypes evaluated, SG 030 (0.27 mg / 100g) recorded low *per se* values for crude fibre content followed by 090 (0.28 mg / 100g). The results were in accordance with the finding obtained by Brindha, 1994 who recorded the lowest crude fibre content in line CT 56 of cluster bean.

Estimation of total carbohydrate content among 35 ridge gourd genotypes showed significant variability and the genotype IC 413577 recorded the highest *per se* value for total carbohydrate content in fruits (3.44 g /100g) followed by IC 362481 (3.35g / 100g). Protein content of fruit varied with the genotypes and it was the highest in the genotype CO 1 (0.48) followed by CO 2 (0.43) while IC 362481, IC 393016 recorded a carbohydrate content of 3.37 and 0.42 g / 100 g respectively. Similar results were also recorded in bottle gourd and ash gourd by Suganthi, 2008 and Josephin, 2008 respectively.

Selection of genotypes with the highest fruit yield is the primary objective in any crop improvement programme. Among the 35 genotypes evaluated, the genotype IC 413577 recorded the highest mean value of fruit yield per vine (6.86 kg per vine) followed by IC 385912 with the highest mean fruit yield of 6.82 kg per vine. However, IC 105579 (6.73

Table 2. Mean performance of ridge gourd genotypes for quality parameters

Parent	Total crude fibre content (mg/100 g)	Total carbohydrate content (g/100 g)	Protein content (g/100 g)
IC 92618	0.32	2.52	0.35
IC 92660	0.34	2.95	0.25
IC 92685	0.32	2.24	0.39
IC105554	0.35	2.52	0.36
IC 105579	0.35	2.34	0.37
IC 110892	0.33	2.64	0.24
IC 196589	0.38	3.05	0.33
IC 339239	0.51	1.75	0.39
IC 385912	0.38	2.41	0.40
IC 392334	0.34	2.41	0.35
Arka Sumeet	0.39	2.95	0.38
Arka Sujat	0.41	2.43	0.24
Deepthi	0.33	2.83	0.40
Coimbatore Local	0.44	2.52	0.28
Notchimedu Local	0.36	2.24	0.37
UP Variety Local (var:100)	0.37	2.34	0.28
UA 040	0.34	2.52	0.39
UA 050	0.33	2.23	0.39
SG 020	0.38	2.01	0.37
SG 030	0.27	3.24	0.22
070	0.39	2.25	0.25
090	0.28	3.13	0.23
IC 413592	0.35	2.25	0.21
IC 373361	0.39	2.54	0.35
IC 362481	0.30	3.35	0.47
IC 393014	0.34	2.43	0.23
IC 393016	0.32	3.12	0.42
IC 413577	0.30	3.44	0.29
IC 413587	0.32	2.75	0.29
LA 1	0.35	2.61	0.24
LA 2	0.33	1.73	0.36
2S 134	0.34	2.74	0.30
CO 1	0.32	1.92	0.48
CO 2	0.34	3.05	0.43
PKM – 1	0.33	3.11	0.27
Mean	0.35	2.59	0.33
SEd	0.04	0.03	0.06
CD (5%)	0.08	0.06	0.12

kg), IC 362481 (6.62 kg), IC 393014 (6.54 kg) and IC 92660 (6.51 kg) also recorded higher values of fruit yield per vine. The genotype 030 can be used as one of the parent for developing hybrids with low crude fibre content while IC 413577 and CO 1 with the highest carbohydrate and protein content respectively can be used for developing nutrition rich hybrids. This study clearly indicated that varieties/hybrids could be developed with earliness, more number of fruits per vine, more flesh thickness coupled with quality characters of carbohydrate and protein content in ridge gourd. The genotypes performing well can be released as a variety or can be used further in heterosis breeding programme.

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