



EVALUATION OF BARAMASI LEMON GERMPLASM UNDER PUNJAB CONDITIONS

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ABSTRACT: Baramasi lemon plants are common found growing in various agro-climatic zones including sub mountainous tract of Punjab and chance for the selection of elite strains are high due to wide genetic diversity in the exiting germplasm. To assess the genetic variability in baramasi lemon, the fruit samples collected and analysed for various physico-chemical attributes. A wide range of variability with respect to fruit attributes like fruit weight, rind thickness, vitamin C content and number of segments have been recorded. This variability may possibly be exploited for the selection of superior genotypes for conservation, evaluation, utilization and a source for crop improvement in future breeding programme under sub tropical conditions.

Keywords : Baramasi lemon, genetic diversity, fruit size, fruit quality.

Citrus is one the widely grown fruit in India. Out of various citrus fruits, limes and lemons are third most important fruits. Baramasi lemon, an indigenous variety of lemon is generally grown in India due to greater adaptability, high yield and tolerance to citrus canker disease as compared to kagzi lime. These are known to possess curative value for certain diseases of bones and joints, bilious diseases, prevention of capillary bleeding, piles, dysentery, cold, influenza, constipation and scurvy (Dhillon, 5). Baramasi lemon is heterozygous in nature and thus exhibits wider variability in seedling population. Introduction and selection is one the most widely used breeding method in citrus which involves identification of promising types from the present population. The superior chance seedlings can be selected as variety/strain after their evaluation under particular agro-ecological zone. Baramasi lemon is found growing naturally in sub-mountainous area of Punjab as scattered plantation in various parts of North India. Importance of clonal selections in crop improvement is well recognized by earlier workers (Badge and Patil, 3, Badiyala *et al.* 4). So, it is essential to identify superior strains of Baramasi lemon for their collection, conservation, evaluation and utilization in the future breeding programmes.

MATERIALS AND METHODS

To assess the genetic variability in baramasi

lemon, the fruit samples collected from different growing zones of Punjab during a state level Citrus Show were analysed for various physico-chemical attributes viz; fruit size, fruit weight, peel thickness, number of articulates, number of seeds, juice percentage, total soluble solids, total titratable acid content and vitamin C content. Fruit size (Length Breadth) and rind thickness were estimated with the help of digital Vernier Calliper. Juice content was estimated by extracting juice from the pulp by citrus juice extractor and juice percentage was worked out on fresh fruit weight basis. The extracted juice was strained through a muslin cloth and total soluble solids were noted with Bausch and Lomb hand refractometer in term of degree brix (%) and values were corrected at 20°C. Juice acidity was estimated by titrating 10 ml juice against 0.1 N NaOH using phenolphthalein as indicator and ascorbic acid by titration against 2, 6 dichlorophenol indophenol dye (AOAC, 1).

RESULTS AND DISCUSSION

The data pertaining to physico-chemical attributes of Baramasi lemon depicted a high degree of variability with respect to fruit morphology and quality characteristics (Table 1). The fruit size is a market governing factor for Baramasi lemon especially in the winter crop when the size of fruit extends too large. Among the

Table 1: Fruit quality characteristics of different Baramasi lemon strains.

Entry No.	Fruit wt. (g)	Fruit length (cm)	Fruit breadth (cm)	Peel thickness (mm)	TSS(%)	Acidity (%)	Juice content (%)	No. of articulate	Vit. C (mg/100 g)
3855	52.5	4.67	4.72	2.9	8.8	5.4	38.0	14	65.26
3853	86.3	5.37	5.45	3.2	7.8	5.8	37.8	13	73.50
4790	61.3	5.75	4.60	2.3	7.0	4.9	34.1	13	68.00
5643	51.7	5.80	4.16	2.9	8.5	7.3	39.5	11	65.26
5676	55.0	4.80	4.60	2.3	8.1	6.7	47.6	12	25.28
5631	55.0	4.83	4.66	2.1	8.4	6.9	46.5	12	36.45
5642	90.0	5.75	5.50	2.5	8.0	7.2	29.7	13	54.68
6124	60.0	4.97	4.83	2.3	8.8	6.5	37.1	13	47.62
5635	71.6	5.78	5.03	3.0	7.8	5.7	37.0	11	54.09
847	75.0	5.47	5.00	2.4	8.0	6.7	54.6	11	38.80
2339	76.7	5.33	5.32	3.0	7.9	5.9	41.7	18	64.68
5481	58.8	5.15	4.60	2.1	7.4	6.4	44.8	11	55.80
6122	56.3	4.97	4.75	2.2	8.2	6.0	52.7	13	64.68
6002	113.3	6.87	5.90	4.1	8.4	4.7	36.9	13	43.51
5649	78.3	5.73	5.33	2.9	8.6	5.8	44.5	14	53.50
3994	111.7	6.50	5.90	2.6	7.8	5.4	48.0	14	56.10
5673	50.0	4.67	4.50	2.4	8.8	7.4	46.0	13	52.60
6000	95.0	6.00	5.70	4.0	7.5	4.9	35.6	13	56.20
6193	96.7	5.60	5.70	3.3	7.9	6.6	37.7	15	53.50
5447	53.8	4.80	4.55	2.2	8.2	6.0	39.9	13	44.30
4680	53.3	4.53	4.77	2.4	7.8	5.9	37.1	15	67.62
5672	51.3	4.77	4.50	2.0	8.4	6.6	41.9	12	75.85
5946	83.3	5.60	5.30	2.8	8.6	5.0	44.3	13	75.34
5732	56.6	5.23	4.67	2.4	8.1	4.8	43.2	12	50.56
5665	80.0	5.33	5.20	2.9	8.0	5.8	41.0	13	42.92
5641	80.0	5.17	5.50	2.6	7.5	5.7	47.3	14	58.80
3996	100.0	5.90	5.76	3.3	8.1	5.2	46.0	13	50.56
5669	63.3	5.20	4.93	2.6	7.5	4.8	36.7	13	69.39
6191	68.3	4.90	5.20	2.3	7.6	6.1	47.1	15	79.48
5735	66.6	6.73	4.67	2.5	7.9	5.4	36.5	12	49.39
1690	58.3	5.13	4.77	2.6	7.5	5.1	32.2	12	92.91
6196	70.0	5.20	5.13	2.4	7.3	5.7	40.5	14	63.50
2285	157.5	6.80	6.60	3.2	7.2	5.5	42.1	11	53.60
6123	58.3	4.83	4.83	2.4	8.0	6.5	40.8	11	55.27
5731	78.3	5.70	5.35	1.9	7.6	4.8	37.3	13	36.45
6126	34.0	4.08	4.04	2.0	8.6	6.4	43.4	11	80.40
1147	58.7	5.20	4.75	3.0	8.0	5.6	43.1	11	43.51
Average	72.08	5.38	5.05	2.66	7.99	5.87	41.36	12.84	57.28
CV (%)	31.78	11.76	10.50	18.81	5.76	12.70	12.90	11.38	24.35

Table 2: Baramasi lemon showing matrix of correlation coefficients between different physio-chemical attributes.

	Fruit weight	Fruit length	Fruit breadth	Peel thickness	TSS	Acidity	Juice content	No. of articulate	Vitamin C content
Fruit weight	1.00	0.790**	0.958**	0.622**	-0.344*	-0.334*	0.052	0.138	-0.177
Fruit length		1.00	0.68**	0.59**	-0.299	-0.418*	0.200	-0.042	-0.231
Fruit breadth			1.00	0.62**	-0.351*	-0.378*	0.049	0.311	-0.141
Peel thickness				1.00	-0.080	-0.346*	-0.238	0.128	-0.055
TSS					1.00	0.395*	0.204	-0.054	-0.129
Acidity						1.00	0.251	-0.143	-0.138
Juice content							1.00	-0.068	-0.228
No. of articulate								1.00	0.19
Vitamin C									1.00

**Significance at 0.01level

* Significance at 0.05 level

various parameters the maximum variability was noted in fruit weight (31.78%) followed by vitamin C content (24.35%), peel thickness (18.81 %) and juice content (12.90%). In different evaluated strains, fruit weight varied from 34.0 g to 157.5 g. Fruit length and breadth indicates the size and shape of fruit. Similarly, the significant variation in length (4.08 to 6.80 cm) and breadth (4.04 to 6.60 cm) was noted in evaluated fruit samples. A great variability was also recorded in peel thickness which ranged from 1.9 to 4.1 mm. However, a moderate variation in number of articulates per fruit was recorded which ranged from 11 to 15. Citrus fruits are generally used for juice purposes and their acceptability depends upon the juice content present in the fruit especially in the lime and lemon. A wider range (29.7 - 57.0 %) in juice content was recorded among the evaluated samples. The biochemical properties of fruits were observed in terms of total soluble solids, fruit acidity and vitamin C content and recorded variability of 7.0 to

8.8 % 4.7 to 6.9 per cent and 25.28 mg/100g to 80.40 mg/100g, respectively. The present findings indicate that the strains can be selected from seedling population on the basis of fruit weight, vitamin C content and rind thickness. Fruit weight exhibited a significant positive correlation with fruit length (0.79), fruit breadth (0.96) and peel thickness (0.63) (Table 2). In the evaluated strains number of articulates, TSS, acidity and vitamin C content showed non significant correlation with fruit weight. Similar variation in fruit characters in lemon cultivars was reported by Arora and Daulta (2), Fallahi *et al.* (6) and Prasad *et al.* (7). This variability may possibly be exploited for the selection of superior genotypes for conservation, evaluation, utilization and a source for crop improvement in future breeding programme under sub-tropical conditions. The plants of Baramasi lemon having desired fruiting attributes can be raised after the collection of bud sticks from the identified entries.

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