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Quality and Yield Characterization of Karonda (*Carissa carandas* L.) Genotypes

Umeshagouda S. Patil*, S. I. Athani, Nagesh H. Naik, R C. Jagadeesh, T. B. Allolli and Jnaneshwar B. Gopali

Kittur Rani Channamma College of horticulture, Arabhavi

University of Horticultural Sciences, Bagalkot-587 103

*Corresponding Author E-mail: hortsuren@gmail.com

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ABSTRACT

The present investigation with respect to "Quality and yield characterization of karonda (Carissa carandas L.) genotypes" was carried out at Regional Horticultural Research and Extension Center, Dharwad, Karnataka during 2015-2016. Among the seven genotypes KAR-1 and KAR-7 recorded higher values for quality (TSS, ascorbic acid, titrable acidity, reducing sugar, non reducing sugar and total sugar) and yield (number of fruits per cluster, number of clusters per plant, yield per plant and yield per hectare) parameters.

Key words: *Genotypes, Karonda, Fruits, Cluster*

INTRODUCTION

Karonda (*Carissa carandas* L.) is also known as karamarda, karamcha, kalakkay, avighna and karekayi in India[19]. It is called as 'Kavalikai' in Kannada. It belongs to family Apocynaceae[4] and originated in India and its chromosome number is 2n = 22. It grows throughout India, Myanmar, Sri Lanka, South Africa and Malaya, mostly on sandy or rocky soil in a wild state. In India, it can be cultivated on wide range of soils and has immense potential for commercial planting. Owing to its hardy nature and varied utility, it can be included under wasteland cultivation. It occurs naturally in Bihar, West Bengal and southern India[8]. It is widely planted all over the country, as a protective hedge due to presence of dense branches and sharp spreading thorns[7].

The unripe fruit is sour and astringent and which is used for making pickles, chutneys, further they can be dried and presented in salt. Besides, the fruit can be cooked as a vegetable and used in place of cherry for decoration of sweets and pastries. It is said to possess anti-scorbutic properties[2], the fruits must be fully ripe, dark-red and slightly soft to the touch to be eaten raw. It is enjoyed whole, without peeling or seeding, out-of-hand. Halved or quartered and seeded, it is suitable for fruit salads, adding to gelatins and using as topping for cakes and ice cream.

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Karonda is the source of ayurvedic and *unani* medicine and widely used in India as a medicinal plants by tribals. Different parts of this plant contain various chemical constitutents *i.e.* carissol, carissic acid, ascorbic acid, lupeol, β-sitosterol, glucose, galactose, serine, glutamine, alinine, valine, phenylalanine and glycine etc. This plant is commonly utilized for remedy of several diseases like biliousness, anemia and also used as aphrodisiac for women, antiparasitic, antifungal, antimicrobial, topical wound treatment (juice) and skin remedy. The medicinal and therapeutic uses of fruit, leaves, root and shoot of karonda along with its ethno-botanical relevance[11].

MATERIAL AND METHODS

From each replication five fruit were taken at full ripe stage and juice was extracted to estimate the quality parameters of genotypes of karonda, *viz.*, total soluble solid recorded with the help of hand refractometer and expressed in $^{\circ}$B, titrable acidity was estimated by NaOH solution (0.1N) using 1% phenolphthealein as indicator and values were expressed in percentage, ascorbic acid was estimated by 2, 6-dichlorophenol indophenols visual titration and the values were expressed in milligrams per 100 gram, non reducing sugar the per cent of non reducing sugars was obtained by subtracting the values of reducing sugars from that of total sugars and multiplying the same with 0.95 as given below[17]. Non-reducing sugars (%) = (Total sugars – reducing sugars) × 0.95, reducing sugar and total sugar were recorded at ripe stage from the pulp preserved in 80 per cent alcohol was estimated as per the dinitrosalicylic acid (DNSA) method[9]. The values obtained were expressed as percentage on fresh weight basis. Observations on fruit yield parameters of genotypes of karonda, *viz.*, number of clusters per plant, number of fruits per cluster, number of fruits per plant, yield (kg/plant) and yield (t/ha) were recorded.

RESULTS AND DISCUSSION

Quality characterization: There was significant difference among the karonda genotypes with respect to quality parameters. From the data presented in Table 1, indicated that, The significantly maximum total soluble solids and ascorbic acid were recorded in KAR-2 (14.38°B and 34.44 mg/100g respectively), while the minimum total soluble solids and ascorbic acid were recorded in KAR-5 (8.37°B and 15.78 mg/100g respectively) and the maximum values for titrable acidity, reducing sugar, non reducing sugar and total sugar were found in KAR-1 (2.70%, 18.34%, 2.25% and 20.59% respectively), while the minimum values for titrable acidity in KAR-3 (1.75%), reducing sugar (5.78%), non reducing sugar (0.98%) and total sugar (6.76%) in KAR-6. This variation in quality parameters in the present investigation was may be due to genetic make-up of genotypes and the prevailing climatic conditions as reported by many scientists Srinivas[18] in kagzi lime, Nalawadi and Jayasheela[10]; Joshi *et al*[6].,; Pawar[12]; Sawant *et al*[14].,; Singh *et al*[16].,; Choudhari *et al*[3].,; Bawoor *et al*[1]., and Singh *et al*[15]., in karonda.

Table 1: Quality parameters of different karonda genotypes

Genotypes	Quality parameter of ripen fruits					
	Total soluble solids (°B)	**Acidity (%)**	**Ascorbic acid (mg/100g)**	**Reducing sugars (%)**	**Non-reducing sugars (%)**	**Total sugars (%)**
KAR-1	12.49	2.70	27.90	18.34	2.25	20.59
KAR-2	14.38	2.50	34.44	15.17	1.23	16.40
KAR-3	9.81	1.75	23.70	11.28	1.27	12.55
KAR-4	11.61	2.42	25.81	8.10	1.14	9.24
KAR-5	8.37	1.80	15.78	5.80	1.25	7.05
KAR-6	10.91	1.91	20.98	5.78	0.98	6.76
KAR-7	9.45	2.36	31.06	11.72	1.40	13.12
S.Em±	**0.06**	**0.03**	**0.26**	**0.26**	**0.23**	**0.12**
C.D @ 5%	**0.19**	**0.06**	**0.81**	**0.81**	**0.72**	**0.39**

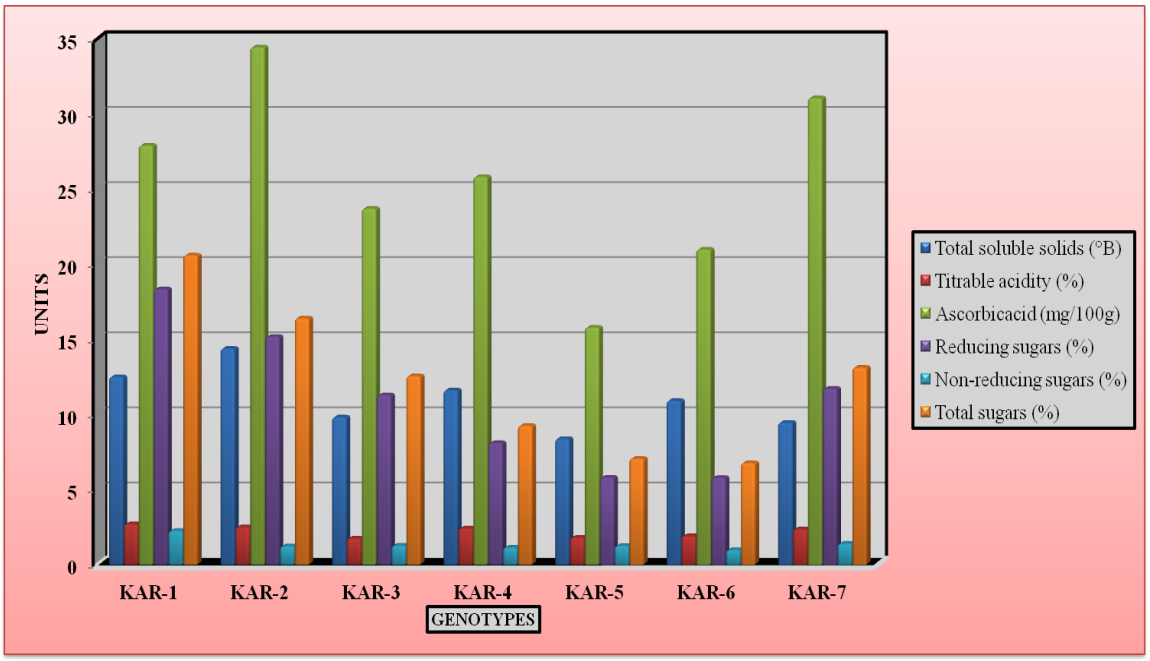
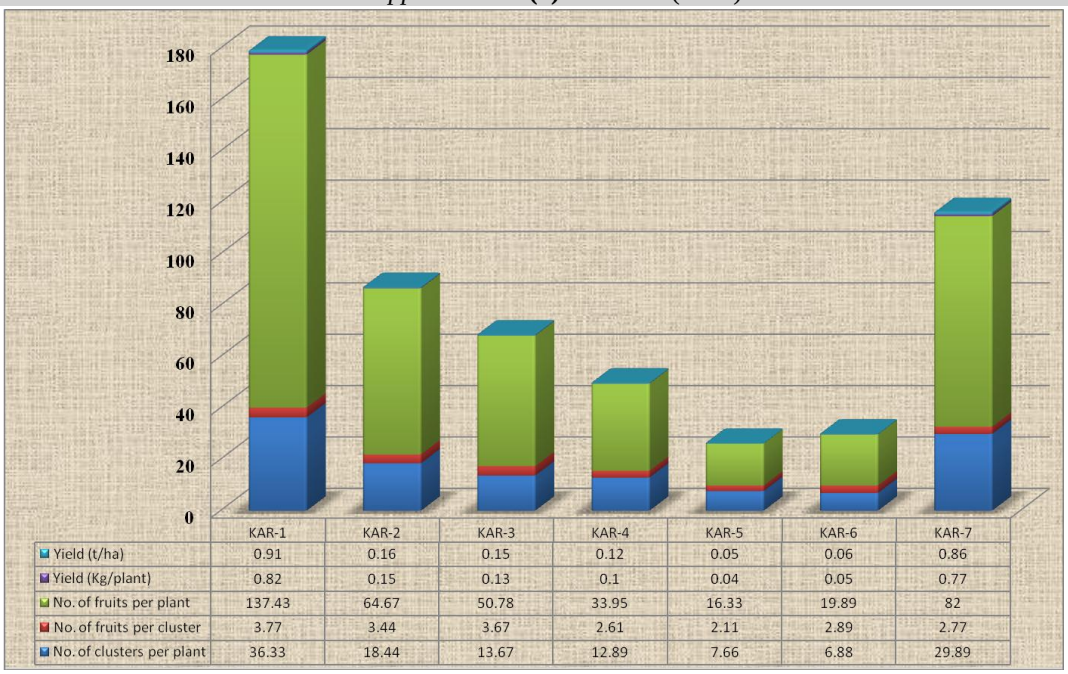


Fig. 1: Quality parameters of different karonda genotypes

Yield of genotypes: The genotypes varied significantly with respect to yield parameters (Table 2). The yield parameters differed significantly among the different karonda genotypes. Maximum numbers of cluster per plant (36.33), number of fruits per cluster (3.77), number of fruits per plant (137.43) were observed in KAR-1 and minimum number of cluster per plant in KAR-6 (6.88) and minimum number of fruits per cluster and number of fruits per plant in KAR-5 (2.11 and 16.33 respectively) and the significantly highest yield per plant and highest yield per hectare was observed in KAR-1 (0.82 kg and 0.91 t/ha respectively), while lowest yield per plant and yield per hectare in KAR-5 (0.04 kg and 0.05 t/ha respectively) this might be due to higher percentage of fruit set, fruit weight and number of fruits per plant. Since the plants are of three years old, the genotypes resulted in lower yield but nearer to the values of several findings reported as by Jaiswal and Misra[5] in beal, Prabhuraj[13] in jamun and Bawoor *et al*[1]., in karonda.

Table 2: Yield parameters of different karonda genotypes

Genotypes	No. of clusters per plant	No. of fruits per cluster	No. of fruits per plant	Yield (Kg/plant)	Yield (t/ha)
KAR-1	36.33	3.77	137.43	0.82	0.91
KAR-2	18.44	3.44	64.67	0.15	0.16
KAR-3	13.67	3.67	50.78	0.13	0.15
KAR-4	12.89	2.61	33.95	0.10	0.12
KAR-5	7.66	2.11	16.33	0.04	0.05
KAR-6	6.88	2.89	19.89	0.05	0.06
KAR-7	29.89	2.77	82.00	0.77	0.86
S.Em±	**1.22**	**0.19**	**4.54**	**0.03**	**0.04**
C.D @ 5%	**3.75**	**0.59**	**13.98**	**0.11**	**0.12**



	KAR-1	KAR-2	KAR-3	KAR-4	KAR-5	KAR-6	KAR-7
Yield (t/ha)	0.91	0.16	0.15	0.12	0.05	0.06	0.86
Yield (Kg/plant)	0.82	0.15	0.13	0.1	0.04	0.05	0.77
No. of fruits per plant	137.43	64.67	50.78	33.95	16.33	19.89	82
No. of fruits per cluster	3.77	3.44	3.67	2.61	2.11	2.89	2.77
No. of clusters per plant	36.33	18.44	13.67	12.89	7.66	6.88	29.89

Fig. 2: Yield parameters of different karonda genotypes

CONCLUSION

From this study of characterization of different karonda genotypes **KAR-1, KAR-7** found promising among the seven genotypes with respect to, yield and quality parameters.

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