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Full Length Research Paper

Comparison of some local melon genotypes selected from Lake Van Basin with some commercial melon cultivars for some yield and quality related traits observed in field and high tunnel conditions

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This study aimed to compare some local melon (*Cucumis melo* L.) genotypes selected from the Lake Van Basin (65 ER 02, 65 ER 04, and 13 TAT 05) with some commercial melon cultivars (Ananas, Makdimon F_1, and Rambo F_1) for some yield and quality related traits observed in field and high tunnel conditions for two years. At the end of the study, it was determined that Makdimon F_1 produced the highest early and total yields (14.76 and 30.51 t ha^{-1}, respectively). While the locally selected melon genotype 65 ER 04 followed Makdimon F_1 for the early yield (11.43 t ha^{-1}), the locally selected genotype 65 ER 02 followed Makdimon F_1 for the total yield (22.49 t ha^{-1}). The cultivars Rambo F_1 and Makdimon F_1 had higher soluble solid contents than the others.

Key words: Genotype, melon, field, protected cultivation, quality, selection, yield.

INTRODUCTION

Anatolia, especially the province Van, is a secondary gene pool for melon (*Cucumis melo* L.) (Gunay, 1993). Consequently, the Lake Van Basin where melon has been cultivated since the ancient times contains some large variation in melon because there have been some out-crossing due to its flower structure and agronomical practices in the region.

The climate of the Lake Van Basin differs from the cold Eastern Turkey where it is located. The basin has a microclimate which allows for vegetable production. The province Van lies between 35° 55' and 39° 24' N latitude and 42° 05' and 44° 22' E longitude and 1725 m altitude; the altitude of Lake Van is 1646 m and the altitude of the basin varies from 1600 to 2500 m (Gulser, 1992).

The variety trials in melon have been carried out in different regions by several researchers who determined that the yield varied from 25.0 to 28.8 t ha^{-1}; there were varieties which matured in less than 75 days and some cultivars performed superior and showed better response to some pests than the others (Boyhan et al., 1991; Mullins and Straw, 1993; Gu, 1998; Quattrucci and Conti, 1997).

It has been known that there is a positive correlation between the yield and soluble solid content (determined as 8 to 12% and 10 to 17.5% in some studies) (Novi, 1990; Gırıbyan and Bayazuyan, 1990) in the melon genotypes collected from different regions or having different origins. The selected seventy melon genotypes from the Pavlosk region of Leningrad, Russia were evaluated for some traits such as marketable yield, soluble solid content, taste, earliness and the highest marketable yield was found as 48 t ha^{-1} (Shamuradova, 1990). The lines H1 and H10 were found the most promising ones out of 20 selected genotypes form India, and they were compared with the control cultivars; H1 had the highest yield (38.4 t ha^{-1}) among them (Khurana et al., 1995). Again in India, 54 melon lines were compared for seven yield related traits in 1986, and it was stated that the early yield and fruit number per plant had the highest positive effects on the total fruit yield per plant (Pandita et al., 1990).

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Table 1. Some physical and chemical characteristics of the experimental area (Gorgun, 2001).

Depth (cm)	Texture (%)			Texture class	Salt (%)	Calcareous (%)	Organic matter (%)	pH	Total N (%)	P (ppm)	K (ppm)	Fe (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)
	Sand	Clay	Loam												
0 - 20	26.8	34.0	39.2	clayish-loamy	0.015	12	0.41	8.4	0.060	3.6	285	2.7	0.6	2.6	1.1
20 - 40	30.8	30.0	39.2	clayish-loamy	0.015	14	0.30	8.5	0.050	6.0	285	0.6	0.6	1.6	1.0

Six hybrid cantaloupes were studied under high plastic tunnels for two winter seasons; cv. Galia was found to be the earliest one, while Tania and Paqutio were the latest ones (Abd-El-Gawad, 1994). Tania and Paqutio had the heaviest fruit and the highest dry matter contents. Galia and Tania had the highest values for the fruit number per plant and per area, the flesh width, soluble solid content and total sugar content. It was found in a study comparing nine yield related traits of 16 hybrid melons in Italy that the most important determining traits were the mean fruit number, fruit density, and rind width (Benedetelli et al., 1999). In the same study, the marketable fruit yield was negatively affected by fruit density and rind width affecting fruit cracking and there was also positive correlation between soluble solid content and mean fruit weight.

A collection and selection study has been carried out in melons grown throughout the Lake Van Basin lying in secondary gene center of melon. This study aimed to compare three melon genotypes selected from this Basin out of fifty-three with some commercial melon cultivars for some yield and quality related traits observed in field and protected cultivation conditions for two years.

MATERIALS AND METHODS

This study was carried out in the field and high plastic tunnel located at the Experimental Research Farm of the Department of Horticulture, the Faculty of Agriculture, the University of Yuzuncu Yil, Van, Turkey in 2003 and 2004. The height and width of the UV and IR endorsed plastic tunnel were 2 and 3 m, respectively. The melon seedlings used in the present study were grown in an unheated glasshouse.

The plant material consisted of 3 local genotypes and 3 commercial cultivars. Local melon genotypes (65 ER 02, 65 ER 04, and 13 TAT 05) were selected from the Lake Van Basin. The commercial cultivars were Makdimon F_1, Rambo F_1, and standard Ananas which are intensely grown for especially earliness in melon production in Turkey

Some physical and chemical properties of soil, sampled 0 - 20 cm and 20 - 40 cm, at the experimental area are presented in Table 1. Soil was calcareous and poor for organic matter and had a clayish-loamy structure and low salt content. Soil was slightly alkaline and had poor nitrogen and phosphorous contents and adequate potassium content. Of microelements, manganese was adequate but iron and zinc were inadequate (Anonymous, 1982).

The study was carried out in field and high plastic tunnel conditions with three replications each having 12 plants at 150 x 50 cm spacing from April to October months in Van province of Turkey in 2003 and 2004. The melon seeds were sown to plastic pots having 250 g equal mixture of farmyard manure, soil, and sand at the first week of April and transplanted to the plots applied with farmyard manure (40 t ha^{-1}) and fertilizers (80 kg N $ha^{-1}$and 50 kg P_2O_5 ha^{-1}) at the last week of June. The early and total yields, mean fruit weight, fruit flesh thickness, and soluble solid content were measured, and other traits such as taste, external aroma, and existence of cracks were observed by a group consisting five people in both years. The obtained parametric data were analyzed with Costat statistical package program and means where the effects of applications were significant were ranged with Duncan Multiple Range Test (Duzgunes et al., 1987). The non parametric data were presented in the tables without statistical analysis.

RESULTS

Early yield

The genotypes and growing conditions had significant effects ($P<0.05$) on the early yield (Table 2). Makdimon F_1 had the highest early yield (12.448 t ha^{-1}) in the first year, while Ananas had the lowest one (7.33 t ha^{-1}). The selected local genotypes, 13 TAT 05 and 65 ER 04 had higher early yields (11.86 and 11.63 t ha^{-1}, respectively) than the cultivars Ananas and Rambo F_1. The yield obtained from the high plastic tunnel was significantly higher than that of the field.

Makdimon F_1 had also the highest early yield (17.07 t ha^{-1}) in the second year, while Rambo F_1 and Ananas had the lowest ones (6.01 and 6.48 t ha^{-1}, respectively). The selected local genotype, 65 ER 02 had the second highest early yield.

Based on the mean values of the years and as it seen above, the highest average early yield was obtained from Makdimon F_1. All of the selected local genotypes were more superior for early yield than the cultivars Rambo F_1 and Ananas. The lowest mean early yield value was obtained from Ananas.

Total yield

On the total yield, there were significant effects ($P<0.05$) of the genotypes in the first year; there

Table 2. Climatic data of the area both during the study and overall years (Anonymous, 2005; Celik, 1986).

Month	2003					2004					From 1953 to 1985		
	Max. Aver. Temp. (Cº)	Min. Aver. Temp. (Cº)	Mean Temp. (Cº)	PPT (mm)	Rel. Hum. (%)	Max. Aver. Temp. (Cº)	Min. Aver. Temp. (Cº)	Mean Temp. (Cº)	PPT (mm)	Rel. Hum. (%)	Max. Aver. Temp. (Cº)	Min. Aver. Temp. (Cº)	Mean Temp. (Cº)
April	12.6	4.2	8.4	78.8	73.0	12.1	1.9	6.9	26.9	66.4	2.2	12.4	7.29
May	19.3	8.5	14.5	6.4	64.2	16.9	7.0	12.4	68.7	67.8	6.5	18.1	12.32
June	22.9	11.7	18.2	50.2	61.5	23.8	11.8	18.5	3.1	57.8	10.0	23.5	16.76
July	27.8	16.7	23.1	-	55.4	26.7	14.4	21.4	2.0	52.7	14.2	27.8	20.80
August	27.8	16.7	22.8	15.7	56.2	28.0	15.3	22.2	–	46.5	13.7	27.8	20.76
September	22.,8	11.2	17.0	16.4	64.5	24.7	12.0	18.0	–	48.7	10.1	23.7	16.92
October	18.4	8.4	13.0	23.6	71.0	18.9	7.0	12.0	48.1	64.1	4.7	16.9	10,91

Table 3. The early and total yield data of the study (t ha^{-1}).

Year		Early yield							Total yield						
		Ananas	Rambo	Makdimon	65 ER 02	65ER 04	13TAT05	Average	Ananas	Rambo	Makdimon	65 ER 02	65ER 04	13 TAT05	Average
1st year	Open field	6.824	9.92.8	12.036	8.156	10.996	10.670	9.788	13.274	17.534	29.754	20.076	23.690	15.870	20.024
	Hightunnel	7.836	11.216	12.860	7.716	12.272	13.042	10.966	17.740	17.518	33.058	24.528	24.554	16.647	22.896
	Average	7.330C*	10.572AC	12.448 A	7.936BC	11.634AC	11.856AB		15.507C	17.526BC	31.406A	22.302BC	24.122AB	16.258BC	
2nd year	Open field	6.940	7.518	20.146	12.976	13.480	9.656	11.784A	17.930	14.444	40.192	33.648	19.016	29.892	25.854A
	Hightunnel	6.022	4.494	13.984	12.330	8.984	5.330	8.496 B	6.620	4.328	19.098	12.330	12.572	5.328	10.046B
	Average	6.481C	6.006C	17.065 A	12.653AB	11.232BC	7.493BC		12.275AB	9.386B	29.645A	22.989AB	15.794AB	17.610AB	
Av. of years	Open field	6.878	8.722	16.090	10.566	12.238	10.162	10.776	15.602	15.856	34.942	26.564	20.320	22.882	22.694A
	Hightunnel	6.930	7.856	13.422	10.024	10.628	9.186	9.730	12.180	10.922	26.078	18.430	19.130	12.154	16.482B
	Average	6.904C	8.289BC	14.756 A	10.295AB	11.433BC	9.674C		13.891B	13.389B	30.510A	22.497AB	19.725B	17.518B	

* Significantly different at $p<0.05$

were significant effects ($P<0.05$) of the growing conditions in the second year; and there were significant effects ($P<0.05$) of these two factors in the mean of the years (Table 3).

Makdimon F_1 had the highest total yield (31.41 t ha^{-1}) in the first year, and was followed by the selected local genotypes, 65 ER 04 and 65 ER 02 with 24.12 and 22.30 t ha^{-1} of yields, respectively. The lowest total yield value was obtained from Ananas in 2003.

Makdimon F_1 had also the highest total yield (29.65 t ha^{-1}) in the second year, and was followed by the selected local genotype, 65 ER 02 with 22.99 t ha^{-1} of yield. The lowest total yield value was obtained from Rambo F_1 in 2004.

Based on the mean values of the years and as it seen above, the highest average total yield was also obtained from Makdimon F_1 which was followed with the selected local genotype, 65 ER 02. The lowest mean total yield value was obtained from Rambo F_1 in both years.

Table 4. Mean fruit weight (g) and SSC (brix) data of the study.

Year		Mean fruit weight							SSC						
		Ananas	Rambo	Makdimon	65 ER 02	65ER 04	13 TAT 05	Av.	Ananas	Rambo	Makdimon	65 ER 02	65ER 04	13 TAT 05	Av.
1st year	Open field	971.8	1358.9	1182.1	818.1	997.7	1318.0	1107.8	6.73ab	8.24a	8.24a	4.4b	6.66ab	7.91ab	7.07B
	High tunnel	888.9	1390.3	993.2	755.2	941.1	1323.0	1048.6	9.37a	9.25a	8.29a	7.68ab	7.60ab	7.65ab	8.30A
	Average	930.4CD*	1374.6A	1087.6BC	786.6D	969.4CD	1320.5AB		8.05AB	8.74A	8.26AB	6.17C	7.13BC	7.78AB	
2nd year	Open field	780.5	1000.2	1033.2	722.7	573.8	888.0	833.0	10.17ab	9.60ab	9.39ab	7.83b	8.92ab	7.53 b	8.90B
	High tunnel	767.4	1064.2	1018.0	681.1	616.8	859.7	834.5	11.21ab	13.00a	9.54ab	7.13b	7.68b	9.90ab	9.74A
	Average	773.9AB	1032.2A	1025.5A	701.9 AB	595.3B	873.9AB		10.68AB	11.30A	9.46BC	7.48D	8.29CD	8.71CD	
Av. of years	Open field	876.2	1179.6	1107.5	768.9	785.7	1103.0	970.1	8.45	8.93	8.82	6.25	7.79	7.73	7.99B
	High tunnel	828.2	1127.2	1005.6	718.1	778.9	1091.4	924.9	10.29	11.30	8.92	7.40	7.64	8.78	9.02A
	Average	852.2B	1153.4A	1056.5A	743.5B	782.3B	1097.2A		9.37AB	10.02A	8.87BC	6.82E	7.71DE	8.25CD	

*Significantly different at p<0.05.

Average fruit weight

Genotypes but not the growing conditions had significant (P<0.05) effects on the average fruit weight (Table 4). Rambo F_1 had the heaviest fruit (1375 g) in the first year, while 65 ER 02 had the lowest one (787 g). The results obtained in the second year of the study were similar to the ones obtained in the first year. Rambo F_1 had also the heaviest fruit (1032 g) in the second year. The local genotype 13 TAT 05 had higher mean fruit weight than Ananas, and there was no statistical difference among the genotypes for this trait. When the mean values of both years were taken into consideration, the highest (1153 g) and the lowest (743 g) mean fruit weights were obtained from Rambo F_1 and 65 ER 02. The second heaviest one was the local genotype 13 TAT 05 which superseded Ananas and Makdimon F_1 for this trait.

Soluble solid content (SSC)

Genotypes, growing conditions, and their interactions had significant effects (P<0.05) on the SSC of fruit (Table 4). Rambo F_1 had the highest SSC (8.74 brix^o) in the first year, while 65 ER 02 had the lowest one (6.17 brix^o). One of the interesting points was the field grown 13 TAT 05 had higher SSC value than the field grown Ananas though it was insignificant. Rambo F_1 had also the highest SSC (11.30 brix^o) in the second year. The commercial cultivars had higher SSC values than the locally selected ones in both years. 13 TAT 05 had higher SSC values among the locally selected genotypes. There was significant difference between the years for this trait; the second year, SSC was higher than the first year.

Flesh thickness

Genotypes but not the growing conditions had significant effects (P<0.05) on the flesh thickness (Table 5). Rambo F_1 and Makdimon F_1 had the thickest fleshes (29.31 and 28.36 mm, respectively) in the first year, while 65 ER 02 had the thinnest one (22.79 mm). The results obtained in the second year of the study were similar to the ones obtained in the first year. Makdimon F_1 and Rambo F_1 had the thickest fleshes (34.8 and 30.83 mm, respectively) in the first year, while 65 ER 02 had the thinnest one (22.58 mm). Over all, 65 ER 04 and Ananas beside 65 ER 02 were also thinner fleshes than others.

Rind thickness

Genotypes but not the growing conditions had significant effects (P<0.05) on the fruit rind thickness (Table 5). There was no significant difference for this trait in the first year. Makdimon F_1 had the thickest rind (7.14 mm) in the first year, while 65 ER 04 had the thinnest one (5.80 mm). However, there was significant difference for this trait in the second year. Makdimon F_1 had the thickest rind (4.99 mm) of all. When the mean values of both years were taken into consideration, the thickest rind (5.99 mm) was obtained from Makdimon F_1.

Table 5. Flesh and rind thickness data of the study (mm).

Year		Flesh thickness							Rind thickness						
		Ananas	Rambo	Makdimon	65 ER 02	65ER 04	13 TAT 05	Av.	Ananas	Rambo	Makdimon	65 ER 02	65ER 04	13 TAT 05	Average
1st year	Open field	23.08	30.83	27.26	21.72	25.06	27.55	25.91	5.56	6.07	7.45	6.21	5.17	5.46	5.98
	High unnel	23.89	27.79	26.46	23.88	26.27	26.60	26.31	6.20	6.93	6.82	7.31	6.44	6.44	6.69
	Average	23.48BC*	29.06A	26.86A	22.80C	25.66AC	27.07AB		5.88	6.50	7.13	6.76	5.80	5.95	
2nd year	Open field	24.19	28.73	34.65	23.34	22.94	24.90	26.46	3.53	3.95	4.52	3.18	2.19	2.63	3.33
	High unnel	25.22	32.93	34.97	21.82	25.45	26.90	27.88	3.06	1.97	4.08	3.55	3.73	3.08	3.24
	Average	24.70C	30.83AB	34.80A	22.58C	24.19C	25.90BC		3.29B	2.95B	4.99A	3.36B	2.95B	2.86B	
Av. of years	Open field	23.63	29.78	30.95	22.53	24.00	26.23	26.18	4.55	5.00	5.99	4.70	3.68	4.05	4.66
	High unnel	24.55	30.36	32.21	22.85	25.86	26.75	27.09	4.63	4.45	5.45	5.43	5.09	4.77	4.97
	Average	24.09C	30.07AB	31.58A	22.69C	24.93C	26.49BC		4.59B	4.73B	5.72A	5.06AB	4.38B	4.40B	

*Significantly different at $p<0.05$.

Taste

The commercial cultivars had better taste than the locally selected ones in both years (Table 6). It was observed that 65 ER 02 had better taste in high tunnel, and 13 TAT 05 had better taste in the field conditions.

External aroma

The locally selected genotypes had rich external aroma, but the commercial cultivars had no external aroma in both years.

Cracking

None of the genotypes except 13 TAT 05 presented cracking in fruit.

DISCUSSION

In this study, it was determined that the genotypes and growing conditions were significant effects on the early yield. The high tunnel condition was especially superior for this trait (10.97 t ha^{-1}) in the first year. Turkmen (1998) reported that protected cultivation techniques caused increases in early yield in the region. In the second year of this study, rodents caused some yield decrease in high tunnel condition. Makdimon F_1 gave the highest early yield in both field and high tunnel conditions in both years. The local genotypes 13 TAT 05 and 65 ER 04 had higher early yields than the others in the first and second year, respectively.

On the total yield, there were significant effects of the genotypes in the first year, were significant effects of the growing technique in the second year, and were significant effects of these two factors in the mean of the years. Higher total yield was obtained from the high tunnel condition in the first year, but not in the second year due to the reason mentioned above. Makdimon F_1 also having the highest early yield, had the highest total yield. Another study showed that there was high and positive influence of early yield and the fruit number on the total yield (Pandita et al., 1990).

Genotypes but not the growing conditions had significant effects on the mean fruit number. Rambo F_1, Makdimon F_1 and 13 TAT 05 had significantly heavier fruit than the others. The fruit weight ranged from 550 to 1300 g in the present study. Akinci et al. (1995) studied the effects of pruning on the Galia F_1 grown in glasshouse condition and concluded that while pruning with one branch gave the highest total yield (89.25 t ha^{-1}) and the heaviest fruit weight (1207 g), production with the main stem gave the lowest total yield (51.65 t ha-1) and the lowest fruit weight.

Genotypes but not the growing conditions had significant effects on the flesh thickness and fruit rind thickness. Rambo F_1 and Makdimon F_1 had significantly thicker flesh than the others. Makdimon F_1 and 65 ER 02 had significantly thicker fruit rind than the others. The thicker the fruit rind is, the longer the shelf life of fruit is. It was reported that cv. Sarda, a variety form Afghanistan, had longer shelf life in India (Kohli and Pathania, 1989). It was also reported in another study conducted on 16 hybrid melon cultivars with 9

Table 6. Taste, external aroma, and cracking data of the study.

Parameter		Genotype					
		Ananas	**Rambo**	**Makdimon**	**65 ER 02**	**65ER 04**	**13 TAT 05**
Taste	Open field	Very sweet	Very sweet	Very sweet	Slight sweet	Slight sweet	Sweet
	High tunnel	Very sweet	Very sweet	Very sweet	Sweet	Slight sweet	Slight sweet
External aroma	Open field	Absent	Absent	Absent	Present	Present	Present
	High tunnel	Absent	Absent	Absent	Present	Present	Present
Cracking	Open field	Absent	Absent	Absent	Absent	Absent	Present
	High tunnel	Absent	Absent	Absent	Absent	Absent	Present

yield parameters in Italy that the marketable yield was negatively affected by the thin rind and soft flesh (Benedetelli et al., 1999).

Genotypes, growing conditions, and their interactions had significant effects on the soluble solid content of fruit. SSC ranged from 4.4 to 13.0 brix^{o}, and the commercial cultivars had higher SSC values than the selected genotypes. Benedetelli et al. (1999) reported that there was a positive correlation between the SSC and the mean fruit weight. In this study, Rambo, having larger fruit, had the highest SSC value.

Although Makdimon F_1 had the highest early and total yield, the selected genotypes of Lake Van Basin, especially 65 ER 02 and 65 ER 04, had superior for these traits than the other commercial ones. All of the locally selected genotypes had rich external aroma, but the commercial cultivars. The other selected genotype of Lake Van Basin, 13 TAT 05, had the second largest fruit in the study. This genotype had also higher SSC value than the other selected ones. These selected genotypes might be employed in hybrid breeding program in order to develop much better cultivars in the future.

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REFERENCES

Abd-El-Gawad MM (1994). A comparative study for some cantaloupe hybrids in winter season under north Sinai conditions. Ann. Agric. Sci. 32(1): 469-477.

Akinci IE, Akinci S, Turkmen O, Karatas A (1995). Effects of pruning on melons grown in glashouse conditions. The 2nd Hort. Cong. of Turkey, Adana, pp. 216-220.

Anonymous (1982). Handbook of Soil and Water Analysis Laboratories. Agr. Ministry, Village Affairs Dept., Ankara. (in Turkish).

Anonymous (2005). Records of Regional Meteorology, Van. (in Turkish)

Benedetelli S, Chisci G, Nencini A, Tesi R (1999). Multiple variable evulation of some melon hybrids (*Cucumis melo* L. var. *reticulatus* Naud.). Acta Hortic. 492: 57-64.

Boyhan GE, Norton JD, Abraham BR, Pitts JA, Carden EL, Hollingsworth MH, Eason JT, Ivery HW (1991). Watermelon & cantaloupe variety trials 1988-1990. Progress Report-Alabama Agricultural Experiment Station, 124: 4.

Celik N (1986). Climatic Analysis of Van. M. Sc. Thesis, University of Istanbul, Turkey, pp. 74-78 (in Turkish).

Duzgunes A, Kesici OT, Kavuncu O, Gurbuz F (1987). Reseach and Experimental Methods (Statistical Methods II). Ankara Univ.Agr. Fac. Publ. No. 1021. 381(in Turkish).

Giribyan GA, Bayazuyan EO (1990). Study and selection of new varieties and hybrids of melon in the plain. Nauka-ovoshchevodstvu. Erivan, Armenian SSR. pp. 42-45.

Gorgun Y (2001). Determination of cultivar and sowing times of spinach in Van. M. Sc. Thesis, University of Yuzuncu Yil University, Van, Turkey (in Turkish).

Gu W (1998). Evaluation of main horticultural characters and selection of melon varieties. Acta Agric. Shanghai, 14(3): 41-45.

Gulser F (1992). The productivity levels of Van Lake Basin's. M. Sc. Thesis, University of Yuzuncu Yil University, Van, Turkey (in Turkish).

Gunay A (1993). Special Vegetable Production V. Ankara Univ.Agr. Fac. Hort. Dept. Course nots, Ankara, pp. 37-48 (in Turkish).

Khurana DS, Dhiman JS, Sharma BR (1995). Evaluation of various genotypes of longmelon. Punjab Vegetable Grower, 30: 50-53.

Kohli UK, Pathania NK (1989). Sarda melon-it's first successful cultivation in India. Seeds Farms, 15(2): 32-33.

Mullins CA, Straw RA (1993). Cantaloupe varieties for fall production in Tennessee. Tenn. Farm Home Sci. 165: 48-51.

Novi A (1990). Regional comparison of some early melon cultivars and hybrids in the field. Buletini i Shkencave Bujqesore. 1: 47-53.

Pandita ML, Dahiya MS, Vashistha RN (1990). Correlation and path coefficients in round melon. Res. Dev. Rep. 7(1-2): 106-110.

Quattrucci M, Conti D (1997). Evaluation of muskmelon cultivars for production in the open field. Inf. Agrario. 53(6): 53-56.

Shamuradova RV (1990). Melon varieties and hybrids promising for growing in the plastic greenhouse in the north west of the Non-chernozem zone of the RSFSR. Nauchno-Tekhnicheskii Byulleten, 199: 53-56.

Turkmen O (1998). Protected cultivation in Lake Van Basin. East Anatolian Agr. Cong., 14th-18th September 1998, pp. 667-676 (in Turkish).