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Determination of yield and some quality characteristics of hybrid melon cultivar candidates in Konya ecological conditions

Konya ekolojik koşullarında hibrit kavun çeşit adaylarının verim ve kalite özelliklerinin belirlenmesi

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Ö Z E T / A B S T R A C T

Aims: It was aimed to determine some yield and quality characteristics of 85 hybrid melon cultivar candidates in Konya, which is one of the most Altınbaş melon growing regions of Turkey.

Methods and Results: This study was carried out in the research and application area of Selçuk University Faculty of Agriculture between May and August 2021. In the experiment, 85 Altınbaş hybrid melon cultivar candidates, obtained as a result of crosses with genotypes showing superior characteristics from a large genetic pool, were used by Selko-Tarım company, which carries out R&D studies on different vegetable species in Antalya. There was a positive correlation between the yield per plant and the number of fruits and fruit length that directly affect the yield. In addition, while the increase in fruit number caused a decrease in fruit weight, a negative significant correlation was found between these two characteristics.

Conclusions: As a result of PCA, the study was explained as high as 75.94% in 6 components. It was determined that hybrid melon cultivar candidates 73, 61, 35, 27, 23, 18 and 30, located at the positive intersection of the components of PC3 and PC4, showed superior characteristics in terms of yield and fruit quality and were promising genotypes.

Significance and Impact of the Study: Some yield and quality characteristics of 85 hybrid melon cultivar candidates were revealed in Konya ecological conditions.

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INTRODUCTION

Melon (*Cucumis melo* L.) is an economically important moderate climate vegetable species in the *Cucurbitaceae* family, which is widely grown and consumed all over the world. Although originally thought to originate in Africa, recent data suggest that

melon and cucumber may be of Asian origin. 28.467.920 tons of melon is produced in the world. Turkey, on the other hand, ranks second after China with a production of 1.724.856 tons (FAO, 2020). 22.8% of the production in our country is made in the Mediterranean region, 19.4% in the Aegean region, 19% in the Central Anatolia region and the rest in other

regions. While most of the production is done in the open, more greenhouse cultivation is done in the Mediterranean region (TUIK, 2020).

While melon contains low protein and fat in terms of nutritional value, it contains plenty of carbohydrates and sugar. It is also rich in vitamins and minerals such as vitamins A, B, C, calcium, potassium, iron, and magnesium (Salunkhe and Kadam, 1998). It is an important vegetable in terms of economy, and besides fresh consumption, it is also used such as fruit juice and fruit salad. In addition, some varieties are used as ornamental plants and some are used in the cosmetics industry (Wien, 1997).

Melon flowers can be in monocious, andromonocious, gynoeocious and hermaphrodite structures. Melon is a highly open pollinated species due to this difference in flower structure. For this reason, it is important to prefer standard or hybrid cultivar in melon cultivation, to preserve the genetic structure and to obtain yield and quality at certain standards. The development of open pollinated or hybrid cultivar is among the essential issues for successful melon cultivation.

Traditional breeding methods such as selection, hybridization, backcrossing, and mutation have been preferred to develop new varieties for melon. Local cultivars and hybrid cultivars available in the market are mostly used in production (Solmaz et al., 2010). Although the local cultivars preferred in melon production are better in terms of quality, hybrid cultivars replace local cultivars in the cultivation areas in terms of being more productive, more resistant to diseases and pests, and adapting to the different environmental conditions (Ünlü et al., 2017). However, selection studies are carried out by many researchers from different regions of Turkey to prevent the loss of rich local melon populations and to ensure that the selected materials are used in breeding studies (Şensoy, 2005).

Altınbaş melons are a group of melons that are widely grown in Turkey and have economic importance. It is known by different names in many parts of Turkey. These melons are odorless melons belonging to the winter melon group. The rind is thick, has dark green spots, and spotted fruits on a yellow background (Kaçar et al., 2018). Altınbaş group melons can be easily grown in many parts of Turkey in open field conditions. Although many breeding studies have been carried out in Altınbaş melons, there is still a need for newly developed hybrid varieties.

Kaçar et al. (2018) conducted a crossbreeding program using inbreed lines in a study they conducted on Altınbaş melons and developed a total of 49 hybrids.

Plant growth, total yield, and fruit characteristics of hybrids were investigated in open field conditions for two years. As a result, some developed hybrids were found promising in terms of the investigated parameters, and new Kırkağaç hybrids were found suitable for registration. Similarly, Dal et al. (2017), in a study they conducted, collected from different regions of Turkey landrace brought to the S4 level by selfing took the morphological observations of 68 cultivar candidates. Using UPOV parameters in morphological characterization, the researchers emphasized that there are important differences in the existing gene pool and a breeding program can be created. In another study, 54 hybrid and 10 open-pollinated cultivars were used in Turkey to characterize the commercial melon cultivar morphologically and to determine the relationship of relative between them. They examined 70 morphological traits in their study to determine morphological diversity. As a result of the study, it was determined that there is a large variation among the varieties (Ermiş and Aras, 2017). Solmaz et al. (2010) collected 78 different melon genotypes from the Eastern and Central Anatolian regions of Turkey and characterized them for 68 morphological features according to UPOV parameters. It was observed that there is a great diversity in terms of characteristics.

In many regions of Turkey, the Altınbaş melon type, which is grown in open field conditions, is still the subject of breeding studies as well as conducting many research. In hybrid cultivar breeding, quality characteristics such as fruit shape, storage life, sugar content, and aroma, as well as yield and resistance to diseases, are among the subjects that have been studied extensively. In addition, cultivar development tolerant to adverse environmental conditions (drought, salinity, lime, high temperature, flooding, etc.) that negatively affect productivity and plant growth in agricultural lands is among the important approaches. In this study, it was aimed to determine some yield and quality characteristics of 85 hybrid cultivar candidates, which were produced by crossing candidates with superior characteristics from a large gene pool, under Konya ecological conditions.

MATERIALS and METHODS

This study was carried out in the research and application area of Selçuk University Faculty of Agriculture between May and August 2021. The climate data of the trial period were taken from the climate station in the trial area. When the data received are examined, the average temperature was between 17.3-

23.8°C, the highest temperature was 40.3°C in June, and the lowest temperature was 11.2°C in June. It was observed that the highest precipitation occurred in August (Table 1). The soil analysis showed that pH:7.51,

EC:199, organic matter 1.2% and soil structure is a loamy texture. Climate and soil characteristics are suitable for melon production (Table 1).

Table 1. Meteorological data of region during experimental year

Month	Max. Temp. (°C)	Min. Temp. (°C)	Mean Temp. (°C)	Mean wind speed (m s ⁻¹)
May	35.9	6.7	18.4	2.4
June	40.3	11.2	21.6	0.8
July	36.2	13.1	23.8	2.8
Aug.	35.2	12.8	23.7	2.4

In the experiment, 85 Altınbaş hybrid cultivar candidates, obtained as a result of crosses between genotypes showing superior characteristics from a large genetic pool, were used by Selko-Tarim company, which carries out Ar-Ge studies on different vegetable species in Antalya. In the study, 4 fathers and 50 females were designed as individuals. However, only 85 genotypes with varietal characteristics were evaluated in this study.

ion system was installed. Seedlings of each genotype were planted separately, and the seedlings were grown and the seedlings that reached the planting size were planted on the field on May 11, 2021. 15 seedlings from each genotype were planted in rows with 100 cm and between row spacing 200 cm. The experiment was carried out on an area of approximately 2550 m². Plant were irrigation according to the needs of the plant. After the seedlings reached certain heights, hoeing was done three times according to root neck filling and weed growth. The fungicide "Luna Tranquility" was applied against root rot with drip irrigation 10 days after planting. Five days after this application, 3.5 kg da⁻¹ of MAP (monoammonium phosphate) and 400 ml da⁻¹ of humic acid were given by drip irrigation. In the following fertilization, humic acid and 200 g da⁻¹ MgO (magnesium oxide) was applied in the same way. Fruits at harvest time were made at once for all plants to determine yield, and measurements were taken by sampling five fruits for fruit characteristics. Yield per plant (kg), number of fruits per plant (pieces), average fruit weight (kg), fruit width (cm), fruit length (cm), fruit flesh thickness (mm), fruit rind thickness (mm), fruit rind color (L, a, b), fruit flesh color (L, a, b) were determined. In the experiment, yield and fruit measurements taken from 85 different Altınbaş melon cultivar candidates were subjected to principal components analysis (PCA) in the JMP-14 computer package program. The distinctions between genotypes were determined by examining the Score Plot graph created in line with the components obtained because

of the analysis.

RESULTS and DISCUSSION

In the study, the average yield per plant of 85 melon cultivar candidates was 4.37 kg. While the highest yield per plant was obtained from genotype 73 with 6.76 kg, genotypes 61 and 37 were the genotypes with the highest yield per plant with 6.07 and 6.02 yields. When the number of fruits per plant was examined, an average of 1.91 fruits were obtained. The genotypes with the highest fruit number were 73 (3.25 fruits/per plant), 29 (2.67 fruits/per plant) and 59 (2.60 fruits/per plant) genotypes, respectively. Considering the fruit weight, the highest fruit weights were recorded in 137 with 3.92 kg, 84 with 3.51 kg, and 103 with 3.33 kg, and the average fruit weight was obtained as 2.35 kg. When the table is examined, the highest fruit width was determined as 20.50 cm (84 genotype) and the lowest 14.75 cm, the average width is 17.74 cm.

Considering the fruit length, it was observed that the average was 19.45 cm and the genotypes with the highest fruit length were 26.75 cm and 27 numbered genotypes, the lowest 15.75 cm 70 genotype.

When the fruit flesh thickness was examined, it was seen that the average was 32.27 mm. The genotype with the highest fruit flesh thickness was 42.94 mm for 65 genotypes, while the genotype with the lowest fruit flesh thickness was 25.03 mm with 79. The average value of the fruit rind thickness was found to be 7.84 mm. The genotype with the highest fruit rind thickness was 11.03 mm for 35 genotypes, while the genotype with the lowest fruit rind thickness was 5.64 mm with 102. When the average of soluble solid contents (SSC) in the fruit was considered, it was found to be 9.23. The highest amount of water-soluble dry matter was obtained from genotype 34 (12.60), and the lowest genotype 93 (5.40). Fruit rind color the highest were 84 genotypes with 71.61 in L value and the lowest 84 genotypes with 49.54. The average fruit rind color a*

value is 7.86, the cultivar candidate with the highest value is 122 with 37.21, and the cultivar candidate with the lowest value is 133 with -3.89. The average fruit rind color b* value is 54.03, the cultivar candidate with the highest value is 116 with 73.80, and the cultivar candidate with the lowest value is 118 with 38.11. The

highest fruit flesh color L, a*, b* values were found in genotype 21 (80.91), genotype number 89 (0.76), and genotype number 65 (17.96). The lowest fruit flesh color L, a*, b* values were found in genotype 65 (51.11), genotype number 121 (-11.4), and genotype number 98 (7.83). (Table 2).

Table 2. Some fruit characteristics of Altınbaş hybrid melon cultivar candidates in Konya ecological conditions

CC	YYP	FNPP	AFW	FW	FL	FFT	FST	SSC	FRC L	FRC a	FRC b	FFC L	FFC a	FFC b
7	4.39	1.73	2.54	18.00	20.00	36.49	7.46	11.40	59.13	10.35	54.19	58.61	-5.81	14.79
9	4.80	2.18	2.20	17.00	17.75	33.53	10.68	10.80	57.19	9.04	46.54	56.78	-4.23	12.02
11	4.39	1.92	2.29	17.25	17.50	34.77	8.81	11.80	58.09	5.65	52.18	59.44	-4.52	13.22
13	3.80	2.18	1.74	18.00	17.50	32.27	6.31	10.50	61.53	9.65	59.15	54.64	-5.33	14.89
19	4.08	1.75	2.33	19.75	19.00	31.27	8.53	10.00	57.53	6.29	47.29	62.34	-6.06	15.36
21	4.42	2.22	1.99	17.50	21.75	30.35	8.86	7.50	59.21	8.25	52.94	80.91	-6.14	14.49
22	3.05	1.20	2.54	17.00	18.00	27.88	7.21	8.60	52.04	0.64	48.29	68.80	-5.92	17.69
23	4.63	2.25	2.06	19.75	18.75	29.95	8.94	8.80	54.88	7.01	47.43	61.59	-4.65	12.44
25	4.36	2.55	1.71	18.00	22.00	40.19	9.65	10.02	66.30	8.81	62.27	60.88	-3.64	10.55
26	4.26	1.83	2.32	17.00	22.50	34.28	7.36	7.80	62.92	6.37	58.05	59.48	-4.59	13.17
27	5.04	2.50	2.02	15.25	26.75	29.04	9.51	8.30	65.54	10.26	53.57	62.09	-4.10	12.41
28	2.48	1.86	1.34	16.00	17.50	31.19	6.75	11.70	57.86	8.44	51.86	61.68	-3.73	12.56
29	4.26	2.67	1.60	16.50	17.00	29.34	6.82	6.50	65.05	9.86	59.03	61.19	-4.77	12.46
30	5.64	2.33	2.42	18.25	20.50	31.28	8.30	10.03	59.09	6.21	52.49	55.20	-5.59	14.07
34	3.85	1.67	2.31	17.25	17.25	28.08	8.94	12.60	63.51	6.78	56.45	64.00	-4.06	11.96
35	4.36	1.91	2.28	19.50	23.50	30.37	11.03	9.20	54.40	4.13	44.76	58.27	-4.08	11.53
36	3.03	1.83	1.65	19.00	20.00	31.18	8.88	9.10	62.25	3.10	53.36	63.06	-7.22	17.58
37	6.02	2.44	2.46	19.00	18.75	40.38	10.73	11.70	55.73	9.37	41.58	59.98	-2.74	9.58
45	4.93	2.50	1.97	17.50	18.75	39.19	6.40	9.60	65.80	5.82	60.09	67.79	-4.81	13.13
47	4.30	2.40	1.79	16.25	18.50	28.25	6.11	8.40	64.49	10.16	63.01	59.57	-4.27	11.97
49	3.81	1.75	2.18	18.25	16.75	35.94	6.24	7.90	56.18	10.93	48.27	52.64	-6.53	15.61
51	4.08	2.27	1.80	18.00	18.75	31.00	7.68	6.40	68.28	-0.55	57.33	64.52	-6.11	15.72
53	4.34	2.25	1.93	16.65	18.50	37.29	7.79	10.60	55.47	-3.54	46.08	60.97	-4.84	12.47
58	4.88	2.30	2.12	17.25	19.00	31.50	6.98	12.50	52.89	8.75	53.00	59.33	-2.88	9.34
59	4.62	2.60	1.78	14.75	17.25	29.20	7.46	9.23	51.65	4.61	39.34	62.59	-4.89	13.20
60	4.02	1.56	2.58	17.00	19.25	27.75	7.71	9.70	59.46	2.59	50.14	72.39	-5.32	13.68
61	6.07	2.45	2.47	16.75	24.75	25.49	9.30	8.40	58.72	9.66	54.77	73.26	-4.83	12.32
62	4.62	2.00	2.31	16.00	17.25	31.95	6.43	10.20	62.90	10.66	59.45	60.82	-4.96	13.47
63	4.70	2.33	2.01	17.75	19.50	27.49	9.65	7.90	65.73	6.89	61.11	69.78	-4.91	13.11
65	5.27	2.18	2.42	17.25	20.75	42.94	7.18	10.10	54.93	11.99	48.39	51.11	-8.07	17.96
66	3.35	1.20	2.79	18.75	22.75	32.38	7.62	9.20	68.02	10.97	64.54	69.86	-2.10	10.31
67	4.02	1.78	2.26	17.75	21.25	28.88	7.53	10.10	69.70	9.30	67.42	69.09	-3.22	10.49
68	2.47	1.60	1.54	15.25	16.00	26.11	7.57	11.50	53.09	2.37	42.11	58.75	-5.36	13.96
69	2.61	1.44	1.81	17.50	18.00	30.78	7.73	8.90	59.66	6.47	55.15	58.06	-5.38	13.53
70	3.15	1.64	1.93	16.25	15.75	32.25	7.26	10.50	53.71	4.14	43.66	63.32	-4.93	12.56
71	4.11	2.18	1.88	17.50	19.00	34.15	9.69	9.40	61.36	13.34	51.73	59.22	-3.51	11.01
73	6.76	3.25	2.08	17.00	17.75	33.49	10.17	10.60	60.83	10.44	57.47	57.06	-3.69	10.26
74	3.82	1.50	2.55	17.25	19.75	29.44	8.55	10.52	56.00	10.42	46.61	54.14	-7.27	16.90
75	4.22	1.73	2.44	18.50	17.00	31.24	10.20	11.30	50.94	6.62	38.49	63.34	-4.12	11.03
77	4.82	2.38	2.03	16.00	17.25	30.69	6.63	11.40	54.14	5.79	47.42	61.24	-5.28	14.08
79	3.95	1.80	2.19	15.50	20.25	25.03	6.76	8.10	67.43	11.68	63.82	62.40	-6.79	16.57
82	3.79	1.67	2.27	17.00	17.75	31.36	7.15	11.20	65.40	11.91	61.81	66.26	-5.31	17.02
83	4.04	1.80	2.24	18.75	18.50	33.29	9.51	9.90	55.08	9.77	43.46	64.83	-5.77	15.00
84	4.82	1.38	3.51	20.50	22.50	27.14	9.00	8.30	71.61	7.76	61.60	61.43	-5.37	16.09
85	4.87	2.09	2.33	18.00	17.50	26.47	7.01	6.80	58.24	5.84	48.13	63.93	-4.68	12.39
87	5.65	2.09	2.70	18.75	18.75	33.19	5.73	9.10	59.55	6.67	51.42	57.37	-6.54	16.06

Table 2 (continued). Some fruit characteristics of Altınbaş hybrid melon cultivar candidates in Konya ecological conditions

88	5.52	1.88	2.95	19.00	25.00	41.36	5.96	9.10	65.58	8.00	65.68	68.78	-4.12	10.65
89	4.14	1.78	2.33	18.25	17.25	33.78	7.68	6.90	59.25	5.85	50.89	65.09	0.76	19.51
90	4.90	1.67	2.94	17.75	20.00	33.51	8.65	10.00	65.27	14.61	64.74	63.95	-3.08	9.51
91	4.82	2.00	2.41	18.75	19.75	29.86	8.54	9.90	61.29	11.54	55.13	60.79	-4.93	12.26
92	3.48	1.67	2.09	17.75	19.25	32.95	7.84	10.20	61.98	14.98	58.82	53.69	-4.46	11.61
93	5.54	2.56	2.17	18.50	20.50	33.36	5.78	5.40	65.67	7.20	63.49	72.79	-8.31	13.70
94	4.11	1.75	2.35	17.75	16.75	33.50	8.34	8.80	61.84	14.02	61.73	57.40	-3.62	10.32
95	4.73	2.27	2.08	19.00	18.25	33.96	8.21	8.10	64.17	3.15	59.47	62.97	-5.26	14.33
96	3.77	1.29	2.93	20.25	18.50	40.71	8.92	9.10	60.54	1.29	54.66	68.78	-4.12	10.65
97	4.53	2.10	2.16	19.50	19.00	32.40	9.56	11.20	64.12	9.64	62.71	66.54	-4.19	11.64
98	3.75	1.44	2.60	18.25	19.75	36.94	7.11	8.70	59.97	6.20	59.06	58.22	-2.12	7.83
99	5.29	2.09	2.53	18.75	20.50	33.75	7.67	10.40	61.62	8.93	55.18	64.47	-5.24	13.48
101	4.95	2.18	2.27	17.50	19.25	27.62	9.18	11.10	58.30	6.65	52.49	68.61	-5.06	12.75
102	3.20	1.10	2.91	16.75	17.75	37.03	5.64	8.90	70.22	3.03	68.83	57.70	-4.01	10.07
103	5.42	1.63	3.33	19.75	20.50	35.15	7.85	6.20	57.57	1.04	50.33	65.31	-4.77	12.93
104	3.39	1.17	2.91	18.25	16.00	38.50	6.90	10.30	60.69	16.59	61.06	53.58	-5.07	12.58
105	4.65	1.83	2.53	18.50	20.00	28.53	8.20	8.00	69.38	11.04	64.14	57.00	-2.85	11.02
107	5.05	2.18	2.31	17.50	21.75	31.84	7.40	6.90	62.53	15.79	61.80	62.44	-4.64	13.03
111	4.44	1.91	2.33	17.74	19.45	28.74	6.44	10.70	54.56	6.07	47.72	63.60	-4.81	13.15
112	3.64	1.25	2.91	17.75	20.00	27.68	7.50	9.60	65.51	3.96	62.85	62.06	-3.31	10.54
113	5.23	2.00	2.62	17.74	19.45	36.55	6.99	8.40	60.28	7.86	54.03	66.76	-4.42	11.12
114	3.71	1.33	2.79	16.50	17.00	28.82	6.51	9.23	53.69	6.83	44.09	62.59	-4.89	13.20
115	4.63	2.18	2.12	17.75	17.50	31.17	6.74	9.23	60.68	9.99	56.61	62.59	-4.89	13.20
116	3.79	1.40	2.71	17.00	20.75	32.27	6.59	7.90	63.69	10.79	73.80	62.05	-5.11	13.08
117	4.28	1.45	2.94	17.50	19.25	39.18	6.33	10.10	49.54	5.47	37.15	61.59	-5.86	13.94
118	3.83	1.33	2.87	20.25	24.25	36.53	8.70	9.20	50.90	3.01	38.11	62.13	-4.85	12.70
119	3.92	1.83	2.14	19.75	19.25	35.92	7.46	10.00	53.78	0.89	45.76	59.70	-6.09	14.64
121	4.25	1.50	2.83	19.00	19.25	34.72	8.94	8.60	66.29	4.68	57.83	58.75	-11.4	14.84
122	4.36	2.20	1.98	15.00	18.50	27.00	6.63	8.60	66.81	37.21	60.29	65.74	-5.26	12.99
123	5.38	2.25	2.39	17.25	22.50	30.75	7.96	8.60	56.91	12.31	55.63	60.07	-4.62	15.11
127	5.17	2.17	2.38	15.50	20.75	32.64	8.69	7.90	57.24	10.51	49.27	65.16	-5.07	12.85
128	3.97	1.40	2.84	18.00	22.75	33.94	9.22	10.70	66.64	16.59	61.10	59.23	-5.39	15.86
129	3.62	2.00	1.81	18.25	18.75	35.77	9.76	7.90	60.00	4.29	53.99	63.53	-6.16	16.32
133	3.09	1.64	1.89	17.25	19.00	31.84	7.37	5.90	60.56	-3.89	47.27	65.56	-7.00	17.13
134	3.86	1.40	2.75	18.50	18.00	25.75	6.66	10.40	63.97	6.56	51.20	59.76	-3.35	10.97
135	3.57	1.57	2.27	18.75	18.00	31.34	9.15	7.00	51.20	1.49	40.47	71.67	-5.69	14.86
137	5.88	1.50	3.92	18.25	19.00	33.25	5.80	7.30	52.58	5.28	40.05	68.93	-4.65	13.25
138	5.63	2.00	2.82	16.50	21.00	31.20	4.10	6.30	60.28	7.86	54.03	63.81	-5.53	13.31
139	5.00	2.00	2.50	18.50	24.50	27.91	7.75	8.00	65.15	9.15	63.90	72.64	-3.64	10.88
Av.	4.37	1.91	2.35	17.74	19.45	32.27	7.84	9.23	60.28	7.86	54.03	62.59	-4.89	13.20

CC (Candidate Cultivar), YPP (yield per plant (kg)), FNPP (Fruit number per plant (pieces)), AFW (Average fruit weight (kg)), FW (Fruit width (cm)), FL (Fruit length (cm)), FFT (Fruit Flesh thickness (mm)), FRT (Fruit rind thickness (mm)), SSC (soluble solid contents), FR L (Fruit rind color L), FR a (Fruit rind color a), FR b (Fruit rind color b*), FF L (Fruit flesh color L), ME a (FF color a*), FF b (Fruit flesh color b*)

In a study in which 30 inbred lines and 1 commercial cultivar were used in Altınbaş group melons, it was reported that fruit weight varied between 354.17 g - 3840.42 g. The fruit width was found to be between 9 cm and 18.07 cm, the wall thickness was between 2.48 cm and 6.16 cm, and the SSC value was between 6.71% and 11.67% (Aydın, 2013). In another study, it was reported that the highest yield per plant was 10.17±4.12 kg and the lowest yield per plant was 5.025±3.46 kg in 21 hybrid cultivar candidates. The

longest fruit was found as 32.55±3.50 cm and the shortest fruit was as 25.58±2.50 cm. They reported that the highest fruit rind thickness was 8.45±0.50 mm (Seçim, 2019). Esiyok et al. (2005) determined the performance of five different hybrid cultivars in different regions, and they achieved an average yield of 1.95 kg/plant in Bornova and 4.11 kg/plant in Çine. In terms of fruit number, they reported that they obtained an average of 2.14 fruits per plant in Bornova and 3.31 in Çine. Kayak et al. (2020) determined some features

of 83 F1 melon genotypes in a study they conducted. In F1 melons, the highest yield per plant was 9.84 kg, the highest fruit weight was 5.44 kg, the highest fruit length was 31.63 cm, the highest fruit width was 19.63 cm and SSC was between 6.8-13.02. Dal et al. (2017). When the studies are examined, it is seen that the melon genetic pools have a wide genetic variation and there are great differences in terms of measurements and observations. This situation is seen as an advantage when genetic diversity is high in cultivar breeding. As a result of the correlation analysis, significant correlations between yield and fruit measurements were determined in 85 hybrid melon cultivar candidates (Table 3). It was seen that there was a positive

correlation between the yield per plant and the number of fruits and fruit length, which directly affect the yield. In addition, while the increase in fruit number caused a decrease in fruit weight, a negative significant correlation was found between these two characteristics. The increase in fruit width affected the fruit weight positively, and a positive correlation was found between these two parameters. When fruit rind color measurements were examined, a high positive correlation was found between L, a* and b* values. In the flesh color measurements, it was observed that there was a high positive correlation between the a* value and the b* value in the flesh.

Table 3. Correlation between some fruit traits of Altınbaş hybrid melon cultivar candidates

	YYP	FNPP	AFW	FW	FL	FFT	FST	SSC	FRC L	FRC a*	FRC b*	FFC L	FFC a*	FFC b*
YYP														
FNPP	0.624													
AFW	0.287	-0.552												
FW	0.088	-0.253	0.397	1.000										
FL	0.346	0.064	0.274	0.197	1.000									
FFT	0.115	-0.029	0.176	0.313	0.017	1.000								
FST	0.071	0.166	-0.139	0.293	0.179	-0.004	1.000							
SSC	-0.131	-0.042	-0.112	-0.076	-0.242	0.100	0.231	1.000						
FRC L	0.014	0.027	0.032	0.030	0.266	-0.109	-0.071	-0.224	1.000					
FRC a*	0.174	0.153	-0.007	-0.250	0.097	-0.089	-0.030	0.113	0.312	1.000				
FRC b*	0.025	0.018	0.037	-0.018	0.246	-0.040	-0.184	-0.157	0.884	0.386	1.000			
FFC L	0.120	0.040	0.076	0.045	0.262	-0.236	0.025	-0.328	0.087	-0.169	0.053	1.000		
FFC a*	0.044	0.010	0.052	-0.006	0.024	-0.018	0.107	0.161	0.083	0.120	0.142	0.053	1.000	
FFC b*	-0.178	-0.086	-0.114	-0.018	-0.093	-0.089	-0.112	-0.216	-0.142	-0.145	-0.227	-0.020	-0.558	1.000

CC (Candidate Cultivar), YPP (yield per plant (kg)), FNPP (Fruit number per plant (pieces)), AFW (Average fruit weight (kg)), FW (Fruit width (cm)), FL (Fruit length (cm)), FFT (Fruit Flesh thickness (mm)), FRT (Fruit rind thickness (mm)), SSC (soluble solid contents), FR L (Fruit rind color L), FR a (Fruit rind color a), FR b (Fruit rind color b*), FF L (Fruit flesh color L), ME a (FF color a*), FF b (Fruit flesh color b*)

In the experiment, yield and fruit measurements taken from 85 melon hybrid cultivar candidates were subjected to PCA analysis and it was aimed to determine the important measurements that distinguish the genotypes from each other (Table 4). As a result of PCA, the data was explained as high as 75.94% in 6 components (Table 4). When the results were examined, the first component explained 18.17% of the study, and FL, FRC L, FRC a and FRC b parameters were positively explained. The second component explained 14.67% of the study, with AFW and FW being the parameters explained positively and FNPP being explained negatively. The third component explained 13.24% of the study, and YPP, FRT, FW and SSC were the parameters that explained positively, and FFC b

negatively. The fourth component explained 12.52% of the study, and YPP, FNPP and FFC L were the parameters that explained positively, and SSC and FW were the parameters that explained negatively. When the fifth component was examined, 9.24% of the study was explained, and there were features that explained FFT in the positive direction, and FFC L and FFC a* in the positive direction (Table 4). The sixth component explained 8.08% of the study, with AFW in the negative direction and FW and FST in the positive direction. Kayak et al. (2020) reported that 68.1% of the data was explained in three components in a study they conducted on 83 hybrid melon genotypes with similar characteristics.

Table 4. Principal component analysis of yield, quality and morphological characteristics of different melon cultivar candidates in Konya ecological conditions

Items	PC1	PC2	PC3	PC4	PC5	PC6
Eigenvalue	2.544	2.0544	1.8545	1.7527	1.2945	1.1314
Percentage of variance	18.172	14.674	13.246	12.52	9.247	8.082
Cumulative variance	18.172	32.846	46.092	58.612	67.859	75.94
Eigenvectors						
YYP	0.270	0.045	0.351	0.412	0.278	-0.293
FNP	0.139	-0.401	0.282	0.461	0.151	0.025
AFW	0.135	0.540	0.019	-0.143	0.110	-0.350
FW	0.030	0.518	0.169	-0.023	0.042	0.355
FL	0.351	0.252	0.073	0.241	-0.030	0.132
FFT	-0.045	0.243	0.252	-0.122	0.491	0.030
FRT	-0.018	0.033	0.411	0.103	-0.229	0.621
SSC	-0.177	-0.183	0.355	-0.366	0.039	0.123
FRC L	0.496	-0.054	-0.257	-0.143	0.042	0.296
FRC a*	0.301	-0.280	0.024	-0.162	0.275	-0.046
FRC b*	0.509	-0.083	-0.232	-0.213	0.090	0.182
FFC L	0.159	0.1499	-0.113	0.336	-0.534	-0.119
FFC a*	0.197	-0.064	0.330	-0.300	-0.402	-0.236
FFC b*	-0.264	0.044	-0.399	0.283	0.234	0.224

Similarly, Seymen (2020) reported that the first two components explained 72.82% of the data in the PCA. performed for the identification of 73 hybrid cultivar candidates in squash. In the study, F1 melon cultivar candidates were tried to be defined with the loading plot graph drawn from the first four components because of PCA made from yield and fruit parameters obtained from 85 melon cultivar candidates (Figure 1). Similar methods have been applied in different studies to identify genotypes in a large genetic pool (Seymen et al., 2019; Kayak et al., 2020; Seymen, 2020). When the figure is examined, the positive region of PC1 was the region explained in terms of fruit rind color. On the other hand, the positive region of PC2 was the region with the highest value in terms of fruit width and fruit weight. Genotypes 66, 84, 88 and 139 located at the intersection of both components came across as heavy fruited genotypes with high fruit color and fruit width. The positive region of PC3 is the genotypes with high yield, fruit rind thickness and SSC value. When the intersection point of the positive regions of PC2 and

PC3 was examined, genotypes 35, 75, 88, 96, 103, 117, 118 and 137 revealed genotypes with high fruit weight, fruit width, yield, SSC and rind thickness. PC4, on the other hand, genotypes with high yield and fruit number in its positive region. The positive region of PC3 and PC4 was defined as an important region for genotypes with superior yield and high fruit quality. When the positive intersection point of both components was examined, it was revealed that the hybrid melon cultivar candidates numbered 73, 61, 35, 27, 23, 18 and 30 showed superior characteristics in terms of yield and fruit quality. Kayak et al. (2020) reported that the G39 genotype, located in the positive region of both components, showed superior characteristics in terms of yield and fruit quality and could be a promising cultivar candidate in their melon study. Similarly, Seymen (2020) reported that the hybrid cultivar candidates 31x34, 23x28, 13x23, 38x40, 29x37, 30x31 and 23x29 and 40x29, located in the positive region of both components, are promising.

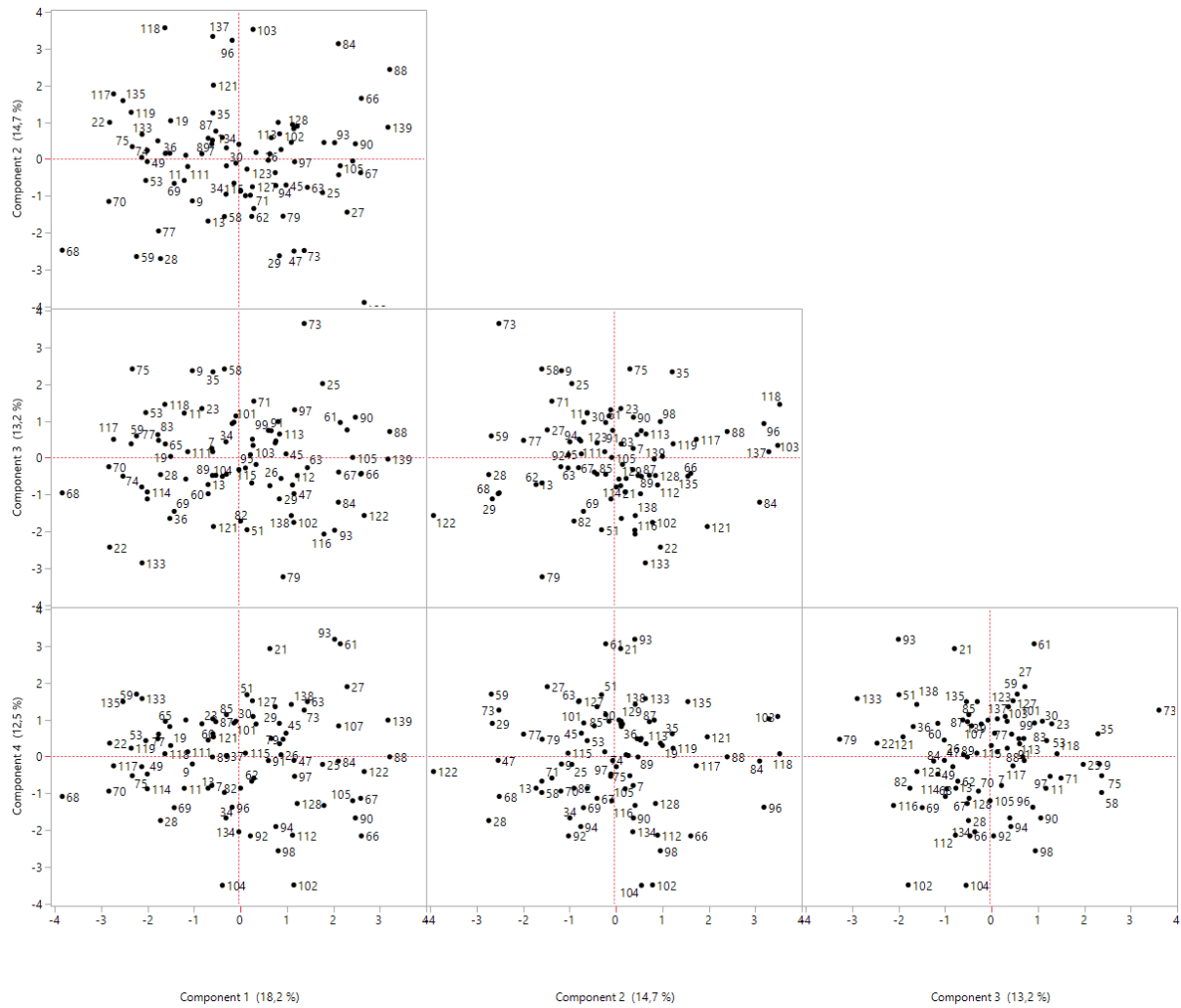


Figure 1. Score Plot plot drawn from PC1, PC2 and PC3 because of the principal components analysis of yield and quality parameters of different F1 melon cultivar candidates in Konya ecological conditions

In conclusion, with the study, some yield and quality characteristics of 85 hybrid melon cultivar candidates were revealed in Konya ecological conditions. It was seen that there was a positive correlation between the yield per plant and the number of fruits and fruit length that directly affect the yield. In addition, while the increase in fruit number caused a decrease in fruit weight, a negative high correlation was found between these two characteristics. As a result of PCA, the study was explained as high as 75.94% in 6 components. Hybrid melon cultivar candidates numbered 73, 61, 35, 27, 23, 18 and 30, located at the positive intersection of PC3 and PC4 components, showed superior characteristics in terms of yield and fruit quality and emerged as promising hybrids. The obtained cultivar candidates should be subjected to yield trials with hybrid Altınbaş cultivars grown in the region and superior cultivars should be determined. It is thought that the emerging cultivation candidate will make significant contributions to the agriculture of the

region.

ÖZET

Amaç: Çalışmada Türkiye’de en çok Altınbaş kavun yetiştirme bölgelerinden biri olan Konya’da 85 adet melez kavun çeşidi adayının bazı verim ve kalite özelliklerinin belirlenmesi amaçlanmıştır.

Yöntem ve Bulgular: Bu çalışma 2021 yılı Mayıs-Ağustos ayları arasında Selçuk Üniversitesi Ziraat Fakültesi araştırma ve uygulama arazisinde gerçekleştirilmiştir. Denemede bitkisel materyal olarak Antalya’da farklı sebze türlerinde Ar-Ge çalışmaları yürüten Selko-Tarım şirketi tarafından geniş bir genetik havuzun içinden üstün özellikler gösteren genotiplerde yapılan melezlemeler sonucunda elde edilen 85 adet altınbaş kavun çeşit adayı kullanılmıştır. Çalışma sonucunda bitki başına verim ile meyve sayısı ve meyve boyu arasında verimi doğrudan etkileyen pozitif bir ilişki olduğu görülmüştür. Ayrıca meyve sayısındaki artış meyve

ağırlığında azalmaya neden olurken, bu iki özellik arasında negatif yüksek korelasyon bulunmuştur.

Genel Yorum: PCA sonucunda 6 bileşende çalışma %75.94 gibi yüksek bir oranda açıklanmıştır. PC3 ve PC4 bileşenlerinin pozitif kesişim noktasında yer alan 73, 61, 35, 27, 23, 18 ve 30 numaralı hibrit kavun çeşidi adaylarının verim ve meyve kalitesi açısından üstün özellikler gösterdiği ve gelecek vaat eden genotipler olduğu belirlendi.

Çalışmanın Önemi ve Etkisi: Çalışma ile Konya ekolojik koşullarında 85 melez kavun çeşidi adayının bazı verim ve kalite özellikleri ortaya çıkarılmıştır.

Anahtar Kelimeler: *Cucumis melo*, PCA, karakterizasyon, genetic varyasyon.

CONFLICT OF INTEREST

The authors declare no conflict of interest for this study.

AUTHOR'S CONTRIBUTIONS

The contribution of the authors is equal.

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