MJAVL
Manas Journal of Agriculture Veterinary and Life Sciences
ISSN/e-ISSN 1694-7932
Volume 15 (Issue 1) (2025) Pages 53-61

Research Article

Determination of Yield and Fruit Characteristics of Some F1 Tomato Variety Candidates in Konya Ecological Conditions

Banu Çiçek ARI *[1] Gülbanu GAYRETLİ [1] Ünal KAL [1]

[1]Department of Horticulture, Faculty of Agriculture, Selçuk University, Konya, Türkiye

*Corresponding author e-mail: banu.ari1212@gmail.com

ABSTRACT

The high economic value of tomatoes in our country, as well as all over the world, has made them the subject of many studies from cultivation to breeding. Breeding programs and new varieties are receiving intense interest in line with changing producer and consumer demands. In the experiment, 20 F1 village tomato variety candidates which were determined to be promising in previous field trials were evaluated. The experiment was established in Selçuk University, Faculty of Agriculture, Department of Horticulture, Department of Vegetable Breeding Research and Application Plot according to the randomised plots experimental design.. In the grown plants; yield per plant, number of fruits per plant, average fruit weight, fruit length, fruit width, pericarp thickness, carpel length, fruit hardness, fruit color and brix measurements were made. Among the candidate varieties, the highest yield per plant was K11 with 5744.50 g/plant, the number of fruits per plant was K11 with 40.00 pieces/plant, the average fruit weight was 242.77 g, the fruit length and width were 67.59 mm and 83.30 mm, respectively, K2, the highest fruit hardness was 4.90 with K11, and the candidate variety was K13 with 6.26% TSS. As a result of the study, it is thought that the candidate varieties K13 and K18 can be taken to yield trials in different locations.

ARTICLE INFO

Received: 03.09.2024
Accepted: 23.12.2024

Keywords: *Breeding programs, locations, grown plants*

Bazı F1 Domates Çeşit Adaylarının Konya Ekolojik Koşullarında Verim ve Meyve Özelliklerinin Belirlenmesi

ÖZET

Domatesin tüm dünyada olduğu gibi ülkemizde de ekonomik değerinin yüksek olması, yetiştiriciliğinden ıslahına kadar birçok araştırmaya konu olmasını sağlamıştır. Değişen üretici ve tüketici talepleri doğrultusunda ıslah programları ve yeni çeşitler yoğun bir ilgi görmektedir. Denemede daha önceki arazi denemelerinde ümit var olarak belirlenmiş 20 adet F1 köy domatesi çeşit adayı değerlendirilmeye çalışılmıştır. Selçuk Üniversitesi Ziraat Fakültesi Bahçe Bitkileri Bölümü Sebze Yetiştirme Islahı araştırma ve uygulama parselinde tesadüf parselleri deneme desenine göre kurulmuştur. Yetiştirilen bitkilerde; bitki başına verim, bitki başına meyve sayısı, ortalama meyve ağırlığı, meyve uzunluğu, meyve genişliği, perikarp kalınlığı, karpel uzunluğu, meyve sertliği, meyve rengi ve brix ölçümleri yapılmıştır. Çeşit adaylarında bitki başına verimde 5744,50 g/bitki ile en yüksek K11 çeşit adayı, bitki başına meyve sayısı 40,00 adet/ bitki ile K11, ortalama meyve ağırlığında 242,77 g ile K2, meyve uzunluğu ve genişliğinde sırasıyla 67,59 mm ve 83,30 mm ile K2, meyve sertliği en yüksek 4,90 ile K11 ve % 6,26 SÇKM ile K13 kodlu çeşit adayları ilk sıralarda yer almışlardır. Çalışma sonucunda K11 ve K5 çeşit adaylarının farklı lokasyonlarda verim denemelerine alınabileceği düşünülmektedir.

MAKALE BİLGİSİ

Geliş: 03.09.2024
Kabul: 23.12.2024

Anahtar kelimeler: *Islah programları, Lokasyonlar, Yetiştirilen bitkiler*

Cite this article as: Arı, B. Ç., Gayretli, G. & Kal, Ü. (2025). Determination of yield and fruit characteristics of some F1 tomato variety candidates in Konya ecological conditions. *Manas Journal of Agriculture Veterinary and Life Sciences*, 14(2), 53-61. https://doi.org/10.53518/mjavl.1541227

INTRODUCTION

Tomato belongs to the Lycopersicon genus of the Solanacea family and is a warm climate vegetable produced and consumed in almost every season in many countries of the world. Tomato is a rich source of minerals, vitamins, organic acids, essential amino acids and dietary fiber. It is also a source of vitamin A, vitamin C and potassium, and also contains minerals such as iron and phosphorus. Due to its content, tomato consumption has been shown to have positive effects on reducing the risk of diseases such as cancer, diabetes and cardiovascular disease (Krauss et al., 2006; Li et al., 2018; Ray et al., 2011; Sönmez & Ellialtıoğlu, 2014). According to FAO statistics, approximately 190 million tonnes of tomatoes are produced in the world (FAO, 2022). Approximately 31.5 million tons of production was realized in Turkey in 2022. The largest share in vegetable production belongs to tomatoes (41-42%). According to the latest data, the amount of tomato production in Turkey is approximately 13 million tons (TUIK, 2022). Although there are differences in tomato production in Turkey over the years, it is understood that 70% of it is done in the open and 30% under cover (Güvenç, 2019).

The F1 hybrid variety is formed as a result of the crossbreeding of two different purified lines and provides higher total yield and earliness than its parents and standard varieties. In addition to their high adaptability, they are also seen to carry more disease and pest resistance genes than their parents (Çelik et al., 2022). Developing hybrid varieties in tomato breeding consists of the following stages: creating a population with a wide genetic diversity, selfing of lines (purifying for homozygosity), determining the morphological, phenotypic and agronomic characteristics of the lines, testing and evaluating the general and specific combination abilities of the lines, setting up field trials, selecting varieties that are equivalent to or higher than commercial varieties on the market, and seed production (Zengin et al., 2015). As with many plant species, producer and consumer demands can change in tomatoes, and genetic diversity must be preserved in order to develop varieties that will adapt to this change. The most important indicator of this diversity is perceived as the diversity in morphological structure. Because it is very important to know the variations found in cultivated species and to apply the distribution of this variation to breeding programs (Bliss, 1981). When aiming to obtain a hybrid variety, it is important to know the variation of the genotypes in the gene pool being studied, however, the presence of genotypes with a very distant degree of relatedness from each other indicates that the chance of achieving hybrid strength is higher (Gözen, 2008).

This study was carried out to determine some yield and yield components of some F1 tomato candidate varieties in the ecological conditions of Konya province

MATERIALS AND METHODS

The study was carried out between May and September 2021 in the research and application area of Selçuk University Faculty of Agriculture and 20 F1 village type tomato variety candidates developed by SELKO ARGE company were used. The research was established according to the randomized plots trial design with 10 plants from each variety and 3 replications. Some climate data of the trial year are given in Table 1. As a result of the soil analysis, it was determined that pH was 7.8, organic matter was 1.2% and the soil had no salinity problem and had a clayey-loamy structure.

Table 1. *Some climate data of the study area*

Months	Max. Heat. (°C)	Min. Heat. (°C)	Average Temp. (°C)	Average Wind Speed (m/s^{-1})	Precipitation (mm)
May	35.9	6.7	18.4	2.4	2.5
June	40.3	11.2	21.6	0.8	1.4
July	36.2	13.1	23.8	2.8	5.8
August	35.2	12.8	23.7	2.4	13.4
September	30.2	4.9	17.3	2.3	14.4

After laying drip irrigation pipes on the land where soil was cultivated in early spring, plots were created on May 5, 2021 with 100 cm between rows and 50 cm between rows. Irrigation was done with drip irrigation system at 5-7 day intervals according to the needs of the plant. When the plants reached a certain height, throat filling process was done and hoeing was done 3 times according to the weed development. During the growing period, 8 kg/da N, 10 kg/da P0O2 and 10 kg/da K2O were applied. In the candidate varieties, fruits that reached harvest size were harvested separately from each parcel. The first harvest was made on July 18, and the trial was terminated after a total of 3 harvests. In order to make measurements and observations on the fruit, 10 fruits representing the genotype were sampled and the necessary measurements and observations were made.

Within the scope of the study; yield per plant (g), number of fruits (piece/plant), fruit weight (g), fruit length (cm), fruit diameter (mm), pericarp thickness (mm), carpel length (cm), fruit hardness, fruit color values (L, a, b), TSS (brix) measurements were carried out.

In the experiment, yield and fruit measurements taken from 20 F1 village tomato variety candidates were subjected to principal components analysis (PCA) in the JMP-17 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. The standard deviations of the measurements taken were calculated and interpreted, and the data were evaluated.

RESULTS AND DISCUSSION

Yield and fruit measurements of hybrid tomato variety candidates are given in Table 2. While the yields per plant of the candidate varieties varied between 5744 g (K11) and 923 g (K16), the average yield per plant was found to be 2729 g. When the number of fruits per plant of the candidate varieties was examined, the highest number of fruits was measured in the candidate variety K11 with 40 pieces, similar to the yield parameter, while the lowest number of fruits was in the candidate variety K16 (6.40) The average fruit weight of the candidate varieties was measured as 146.14 g. The lowest fruit weight was measured in candidate variety K17, while the highest was measured in candidate variety K2 (72.11 g and 242 g, respectively).. While the average fruit length of the candidate varieties was measured as 54.01 mm; the shortest candidate varieties were K1 (47.21 mm), K8 (49.33 mm), K23 (49.26 mm); the longest was K2 (67.58 mm). Fruit diameter was measured in tomatoes and the average of the variety candidates was found to be 67.59 mm. The candidates with the smallest fruit diameters were found to be K9, K12 and K4 (60.34, 60.87 and 61.72 mm), and the widest fruit diameters were observed for varieties K2 and K18 (83.31 and 80.66 mm, respectively) . The average pericarp thickness of the candidate varieties was measured as 2.95 mm, with candidate number K9 being the smallest (2.19 mm) and candidates numbered K20 and K12 being the largest (3.68, 3.57 mm). In a study, they observed the average fruit weight, total yield, fruit length and fruit width of 20 tomato lines in the F6 generation in order to determine the fruit and quality characteristics. They stated that it was 14.93 t/da, 200.80-384.00 g, 53.68-75.05 mm and 71.95-98.29 mm, 6.60 respectively. In addition, it was found that the fruit flesh firmness values of tomato lines varied between 0.41-1.32 kg/cm^2; brix values were 6.10-9.60%; vitamin C values were between 20.03-25.57 mg/100 g; total phenolic content was between 13.28-30.72 mg/100 g; lycopene content was between 4.69-9.68 mg/100 g, and beta carotene content was between 0.83-2.17 mg/100 g (Demir, 2024). In a study conducted by (Aktaş, 2020), they observed the effects of different rootstocks on plant growth, fruit quality and yield in tomato plants. They stated that the use of rootstock affected the parameters of fruit firmness, distance between bunches, number of leaves, plant height, EC, pH, titratable acidity, TSS, fruit height. (Dar & Sharma, 2011) They observed the effects of genetic variability, heredity and genetic advantage on yield and fruit quality of tomato with 60 tomato genotypes and they clearly saw that heredity had a significant effect on the amounts of β-carotene, vitamin C and lycopene and thus they concluded that these traits could be improved in the lines to be crossed.

Table 2. *Yield and fruit measurements of a variety of candidates*

Candidates	Yield per plant (g)	Number of fruits per plant	Fruit weight (g)	Fruit length (mm)	Fruit diameter (mm)	Pericarp thickness (mm)
K1	3119.44	22.78	136.95	47.21±1.50	70.04±0.59	3.05±0.42
K2	2030.45	8.36	242.77	67.58±3.02	83.31±9.58	3.49±0.57
K4	1952.78	14.44	135.19	50.48±2.40	61.72±2.30	3.25±0.82
K5	4637.50	29.60	156.67	50.18±2.95	63.16±2.91	2.72±0.65
K6	2910.56	19.78	147.16	50.67±4.92	65.48±6.19	3.02±0.45
K8	2486.00	18.30	135.84	49.33±1.25	64.86±1.35	2.99±0.33
K9	2423.00	18.80	128.88	57.27±4.64	60.34±10.31	2.19±0.34
K11	5744.70	40.00	143.61	54.26±2.24	72.62±5.99	3.15±0.60
K12	2596.30	21.40	121.32	49.01±3.62	60.87±4.15	3.57±0.66
K13	2837.22	16.78	169.10	57.57±6.08	67.21±5.97	2.78±0.43
K14	3018.33	25.11	120.19	54.18±3.25	66.60±8.05	3.37±0.68
K15	3185.00	26.90	118.40	52.19±1.33	64.37±5.31	2.35±0.68
K16	923.00	6.40	144.21	55.31±3.36	66.08±1.34	2.75±1.35
K17	2366.82	32.82	72.11	54.86±3.74	65.59±4.25	2.65±0.43
K18	3128.50	16.80	186.22	59.41±5.10	80.66±4.91	2.58±0.38
K20	2732.22	19.11	142.96	55.05±4.19	66.17±3.70	3.68±0.47
K21	1632.58	13.84	117.97	57.19±2.95	65.26±5.13	2.49±0.62
K23	2486.50	15.40	161.46	49.26±7.57	68.18±13.98	3.12±0.51
K24	2008.50	13.30	151.01	56.32±2.99	64,83±1,22	2.43±0.87
K25	2364.50	12.40	190.68	54.67±4.02	74.56±4.82	3.37±0.59
Average	**2729.20**	**19.62**	**146.14**	**54.01**	**67.59**	**2.95**

Other fruit measurements of tomato variety candidates are given in Table 3. When the carpel lengths were examined from the table, it was seen that the average was 7.58 mm. Variety candidates K9 and K23 were measured as the shortest with 6.52 mm and 6.55 mm, respectively; while variety candidates K24 and K1 were measured as the longest with 8.58 mm and 8.53 mm, respectively. When fruit firmness was examined, it was seen that the average of the variety candidates was 2.09, while candidates K9 and K20 were determined to have the softest fruits (0.50 and 0.70), and candidates K11 and K5 were determined to have the hardest fruits (4.90 and 4.30). Tomato fruit colour was measured by Konica Minolta CR 200 colourimeter as L, a* and b* values. L indicates the lightness or darkness of the colour from black: 0 to white: 100'a*, while a* and b* determine the colour in a* colour plane perpendicular to L. On the horizontal axis, positive a* indicates red and negative a* indicates green; on the vertical axis, positive b* indicates yellow and negative b* indicates blue.While the average of L values of the variety candidates was determined as 40.94, the lowest L value was measured as 35.27 (K15), and the highest as 45.60 and 45.27 (K2, K23). The average of a* value from the color values was 28.59. It was observed that the K2 variety candidate had the lowest values with 19.79, while the K5 and K8 varieties demonstrated the highest values 32.44 and 32.78, respectively. The average of the color b* value was 26.95, the lowest was measured as 21.35 (K15), and the highest was measured as 33.90 (K2). The average of the TSS amount of the tomato variety candidates in the study was 5.41. In a characterisation study carried out in 14 different genotypes at S2 stage, the L value expressing the lightness-darkness of tomato fruit was the highest in genotype D1 and the lowest in genotype S1. The highest positive a value expressing redness was measured in genotype E1 and the lowest in genotype KH1 (Güngör, 2023). The highest TSS amount was measured in the variety candidates K13, K8 and K6 (6.26, 6.10, 6.08, respectively). In a study conducted in two different places under open field conditions, it was observed that the L value of 7 tomato genotypes varied between 41.29-27.54, a value between 26.81-18.02 and b value between 29.57-12.89 in terms of morphological, physiological, chemical and yield characteristics. It was also stated that the SÇKM values varied between 4.97 and 5.93 (Özbay, 2021). In another study, some morphological and pomological characteristics were examined in 14 tomato genotypes in the S2 stage taken from different regions of Kırşehir province. The obtained data were subjected to cluster analysis and examined in four separate groups. The first group included the K5, K2 and K3 genotypes with red fruit color and standard round, the second group included the red but small-sized P1, S1, A1, AT1 and K4 tomato genotypes. The third group included the genotypes K1, MS1 D1 and K6 beef type with fruit weights over 140 g, and the fourth group included beef type KH1 and E1 tomato genotypes with pink fruit color (Güngör, 2023). (Gölükçü M, 2018) determined that there were significant differences in some physical and chemical properties in a study they conducted to compare the quality traits of six parent and parent lines and three tomato varieties developed as a result of their crossbreeding. As a result of the research, it was determined that variations could be created in quality traits such as sugar composition, lycopene content and color of tomatoes with crossbreeding studies. In the study conducted by (Sönmez, Ellialtıoğlu, & Oğuz, 2015), 37 local tomato populations were examined in terms of

26 traits, and among these traits, perceptual traits such as fruit weight, fruit shape, rind thickness, rind color (Chroma), color tone (Hue) and lycopene content were determined as selection criteria and scored. Five accessions that have the potential to be used in breeding studies in terms of fruit characteristics, color and lycopene content were identified.

Table 3. *Fruit measurements of a variety of candidates*

Candidates	Carpel length (mm)	Fruit firmness	Fruit color L value	Fruit color a* value	Fruit color b* value	TSSC
K1	8.53±1.04	1.18±1.86	42.33±1.72	26.10±2.73	26.65±1.46	5.52±0.93
K2	7.35±0.64	3.82±3.32	45.60±3.68	19.79±4.94	33.90±2.93	5.28±0.08
K4	8.14±1.25	2.10±3.58	44.05±2.13	26.48±3.44	29.40±2.86	4.62±0.84
K5	8.15±0.58	4.30±2.05	39.48±3.35	32.44±2.90	26.32±1.39	5.33±0.20
K6	7.39±0.73	2.90±1.14	38.39±3.64	30.86±3.26	27.61±3.91	6.08±0.84
K8	7.51±0.92	1.50±0.71	43.40±3.12	32.78±2.41	26.57±4.19	6.10±0.32
K9	6.52±1.24	0.50±0.00	39,05±2.43	28.37±0.73	25.82±1.51	6.02±0.51
K11	8.35±0.58	4.90±2.70	39.14±2.46	28.96±4.26	24.75±2.12	5.66±0.23
K12	7.06±0.66	2.20±1.20	44.11±3.45	28.66±1.73	26.25±1.32	5.76±0.48
K13	7.83±0.78	1.70±1.30	39.87±4.90	28.34±3.03	25.91±3.64	6.26±0.55
K14	7.51±0.25	1.50±1.22	38.16±2.60	29.78±5.66	26.05±4.29	5.26±0.21
K15	7.10±0.28	2.30±2.17	35.27±2.26	25.55±1.73	21.35±1.60	5.28±0.64
K16	7.53±1.73	2.30±1.64	39.08±3.83	29.90±6.70	25.88±3.92	5.26±0.17
K17	7.07±1.45	2.70±2.05	42.04±4.32	29.03±1.89	26.41±1.56	4.98±0.29
K18	8.32±1.48	1.10±0.89	37.89±1.87	30.46±3.74	24.73±2.68	5.20±0.19
K20	7.39±1.11	0.70±0.45	41.56±2.70	26.16±2.34	25.34±4.06	5.24±0.36
K21	7.19±1.02	1.50±1.00	37.91±1.56	30.68±1.90	27.04±2.77	4.52±0.76
K23	6.55±1.92	2.10±1.95	45.57±3.49	29.34±2.14	29.55±4.09	4.88±0.51
K24	8.58±0.65	1.30±0.84	42.73±2.55	28.46±2.56	30.98±4.42	5.60±0.51
K25	7.53±0.92	1.10±0.89	43.26±1.93	29.77±3.81	28.55±1.92	5.26±0.39
Average	7.58	2.09	40.94	28.59	26.95	5.41

In the experiment, yield and fruit measurements taken from 20 F1 village tomato variety candidates were subjected to PCA analysis to determine the important measurements that separate the genotypes from each other (Table 4). As a result of PCA, the data was explained at a high rate of %100 in 12 components (Table 4). When the results were examined, the first component explained 31,14% of the study, C,D,E,F,G,I and K parameters were explained positively. The second component explained 19,62% of the study, A and B were the positively explained parameters, while I was the negatively explained parameters. The third component explained 13,49% of the study, A, B, F and H were the positively explained parameters, while C be negatively.

The fourth component explained 9,37% of the study, and A, C and G were the parameters that explained positively, and B and D awere the parameters that explained negatively. When the fifth component was examined, 7,80% of the study was explained, and there were features that explained D in the positive direction, and F and H in the positive direction (Table 4). The sixth component explained 6,104 of the study, with A in the negative direction and C and D in the positive direction. Bhattarai et al. (2016) obtained 5 principal component axes in 71 tomato genotypes and were reported to explain more than 92% of the total variation. In a study, they reported that it explained 63.35% of the total variation (Jin et al., 2019).. Zhou et al. (2015) reported that they explained 78.54% of the total variation. Figàs et al. (2015) reported that the total variation in the first and second components of PCA in tomato genotypes Cherry, Borseta, Cor, Penjar, Plana, Pruna, Redona and Valenciana was 22.6% and 11.8%, respectively.

Table 4. *Principal component analysis of yield, quality and morphological characteristics of Some F1 Tomato Variety Candidatesin Konya ecological conditions*

Number	Eigenvalue	Percent	Cum Percent
1	3,737293	31,144	31,144
2	2,355395	19,628	50,772
3	1,619828	13,499	64,271
4	1,125062	9,376	73,646
5	0,936182	7,802	81,448
6	0,732504	6,104	87,552
7	0,601450	5,012	92,564
8	0,350531	2,921	95,485
9	0,273362	2,278	97,763
10	0,170408	1,420	99,183
11	0,092014	0,767	99,950
12	0,005972	0,050	100,000

Table 5. *Basic declared analysis results basic declared axes*

	Prin1	Prin2	Prin3	Prin4	Prin5	Prin6	Prin7	Prin8	Prin9	Prin10	Prin11	Prin12
A	-0,24748	0,53813	0,05685	0,03270	0,06905	-0,06765	0,06771	0,19733	-0,22175	0,50218	0,04795	-0,53697
B	-0,37069	0,35563	0,13171	-0,23985	0,10599	-0,03578	-0,12668	0,43503	0,12890	0,01890	-0,11536	0,64276
C	0,39928	0,25214	-0,16390	0,27247	0,04925	0,01499	0,26491	-0,19795	-0,42106	0,30897	0,17254	0,51125
D	0,31300	0,08764	-0,50388	-0,19397	0,16900	0,10408	-0,03779	0,18231	0,58733	0,22603	0,36092	-0,04968
E	0,32509	0,34554	-0,25820	-0,01934	-0,08844	-0,24924	0,31283	0,34564	-0,08819	-0,54909	-0,29840	-0,14931
F	0,21026	0,16910	0,51570	-0,01033	0,15166	-0,49770	0,25392	-0,31085	0,46430	0,09544	-0,06571	0,01817
G	0,00170	0,34017	-0,05017	0,38789	-0,64840	-0,12260	-0,46339	-0,13004	0,21400	-0,06669	0,10995	0,04335
H	-0,02739	0,47216	0,13544	-0,29437	0,04230	0,58500	0,08398	-0,44092	0,04148	-0,32911	0,11440	-0,05219
I	0,32239	-0,04294	0,53760	0,09553	0,02166	0,11988	-0,10239	0,45632	-0,12298	-0,18696	0,55564	-0,06087
J	-0,31471	-0,10637	0,03290	0,36406	-0,29871	0,27650	0,67953	0,17028	0,29613	0,02303	0,09575	0,04692
K	0,42255	-0,01429	0,22632	0,06416	-0,11762	0,45998	-0,11889	0,18619	0,13533	0,30991	-0,61389	-0,02171
L	-0,10854	0,11261	-0,06219	0,66795	0,62964	0,11664	-0,19305	-0,00932	0,14127	-0,21451	-0,10512	-0,03287

A:Yield Per Plant; B:Number Of Fruit Per Plant; C:Fruit Weight;D: Fruit Length; E:Fruit Width; F:Thickness Of Pericarp; G:Carpel Length; H:Fruit Firmness; I:Fruit Color L Value; J: Fruit Color a* Value; K:Fruit Color b* Value; L:Brix

It was reported that there was a positive correlation when the angle between the vectors was 90°, but there was no significant correlation when the angle between the vectors was not 90° (Yan and Kang, 2003). When table 5 is analyzed, the highest positive correlation was found between fruit length and fruit width. On the other hand, the highest negative correlation was found between yield per plant and fruit L colour.

The basic method in variety breeding studies is to select plants with the desired characteristics by creating a wide genetic variation. Genetic materials with these characteristics determined as a result of analyses can help to create a heterogeneous gene pool in tomato breeding studies.

It was observed that genotypes K18 and K13, which were in the positive region in both components, showed superior characteristics in terms of yield and fruit quality and could be a promising variety candidate in tomato studies.

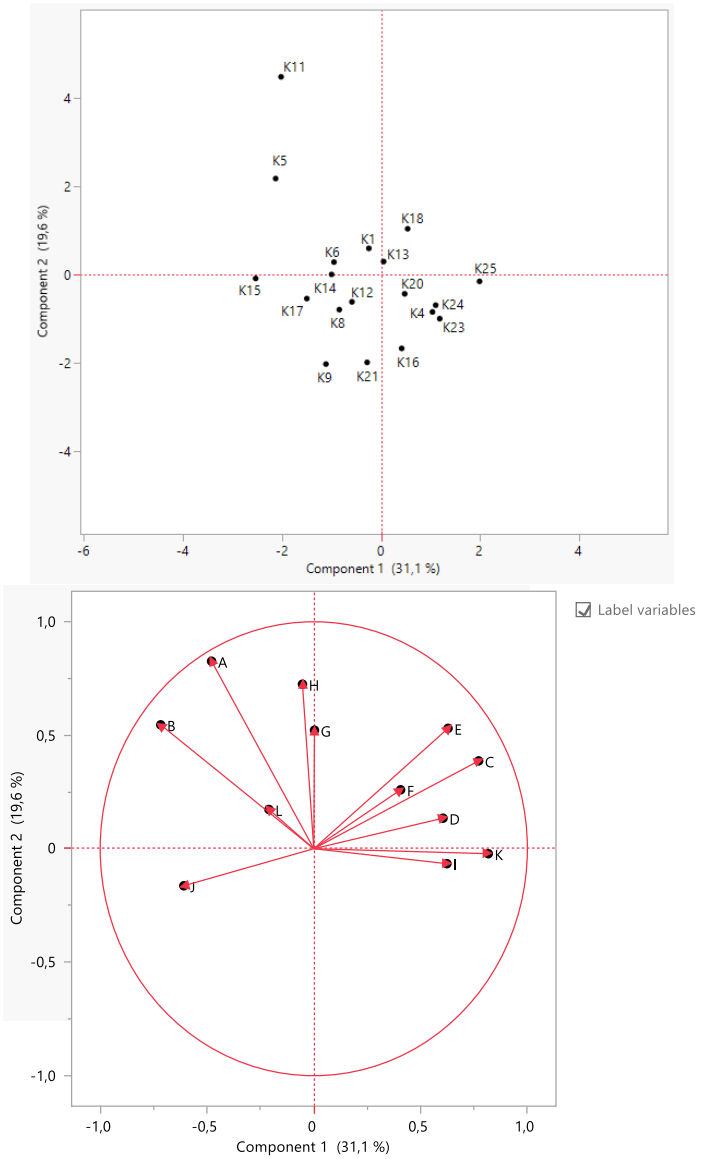

Figure 1. *Score plot and loading plot graph*

CONCLUSION

In this study, the performances of 20 hybrid tomato variety andidates developed by the private sector in terms of fruit quality and yield elements were examined in detail. According to the measurements made, it was seen that the variety candidates had different characteristics in terms of yield and quality parameters. . As a result of the study, it was revealed that the K13, K2 and K18 variety candidates could be taken to yield trials in different locations. According to the results obtained, it is predicted that examining the variety candidates in terms of yield and fruit characteristics will be useful for the development of new varieties. It is thought that these variety candidates can be grown in open field conditions in regions such as Konya ecology and will contribute to the country's agriculture.

CONFLICT OF INTEREST

The authors declared no conflict of interest.

AUTHOR CONTRIBUTION

All authors contributed equally.

ETHICAL APPROVAL

During the writing process of the study titled " **Determination of Yield and Fruit Characteristics of Some F1 Tomato Variety Candidates in Konya Ecological Conditions** ", scientific rules, ethical and citation rules were followed; No falsification has been made on the collected data and this study has not been sent to any other academic media for evaluation. Ethics committee approval is not required.

REFERENCES

Aktaş, H. (2020). Domateste kullanılan farklı anaçların bitki büyümesi, verim ve meyve kalitesi üzerine etkilerinin belirlenmesi. *Ziraat Fakültesi Dergisi, 15*(1), 27-40.

Bhattarai, K., Louws, FJ., Williamson, JD., Panthee, DR. (2016). Diversity Analysis Of Tomato Genotypes Based On Morphological Traits With Commercial Breeding Significance For Fresh Market Production In Eastern USA. *Australian Journal of Crop Science*, 10 (8): 1098-1103.

Bliss. F, A., (1981). Utilization of vegetable germplasm [Ploidy levels]. HortScience.

Çelik, İ., Aydın, S., Kayıkçı, H. C., & Ünlü, A. (2022). Aday Domates Çeşitlerinde Verim Ve Bazi Morfolojik Özelliklerin Belirlenmesi. *Bahçe*, 358.

Dar, R., & Sharma, J. (2011). Genetic Variability Studies Of Yield And Quality Traits In Tomato (Solanum Lycopersicum L.).

Demir, Ö., Ünlü, H., & Ünlü, H. (2024). Determination of Yield And Fruit Quality Characteristics of Some Beef Type Tomato Lines. *Ziraat Fakültesi Dergisi*, 19(1), 55-62.

FAO, (2022). *Food And Agriculture Organization Of The United Nations*. http://www.fao.org/faostat/en/#data/QC. Access date: 15.11.2024.

Figàs, M.R., Prohens, J., Raigón, M.D., Fernández-de-Córdova, P., Fita, A., Soler, S. (2015). Characterization Of A Collection Of Local Varieties Of Tomato (Solanum Lycopersicum L.) Using Conventional Descriptors And The High-Throughput Phenomics Tool Tomato Analyzer. *Genetic Resources and Crop Evolution*, 62 (2): 189-204.

Gölükçü, M., Kabaş, A., Bayır Yeğin, A., Vuran, F.A., Yüksel. K., Tanır, A. (2018). Domatesin bazı fiziksel ve kimyasal kalite özelliklerinin melezleme ile değişimi. *Derim, 35*(2), 152–160.

Gözen, V. (2008). Hıyarda (Cucumis Sativus L.) Örtü Altı Yetiştiriciliğine Uygun Hibrit Çeşit Islahında Morfolojik Karakterizasyon, Hibrit Kombinasyonları Ile Hibrit Tohum Verim Ve Kalitesinin Belirlenmesi. *Derim*. 26(1), 51-59.

Güngör, R. (2023). S2 kademesindeki domates genotiplerinin morfolojik ve pomolojik karakterizasyonu. *Kırşehir Ahi Evran Üniversitesi Ziraat Fakültesi Dergisi, 3*(2), 152-163.

Güngör, R., Başak, H., & Aydın, A. (2023). S2 Kademesindeki Domates Genotiplerinin Morfolojik ve Pomolojik Karakterizasyonu. *Kırşehir Ahi Evran Üniversitesi Ziraat Fakültesi Dergisi*, 3(2), 152-163.

Güvenç, İ. (2019). Türkiye'de Domates Üretimi, Dış Ticareti Ve Rekabet Gücü. *Kahramanmaraş Sütçü İmam Üniversitesi Tarım Ve Doğa Dergisi, 22*(1), 57-61.

Jin, L., Zhao, L., Wang, Y., Zhou, R, Song, L., Xu, L., Cui, X., Li, R., Yu, W., Zhao, T. (2019). Genetic Diversity Of 324 Cultivated Tomato Germplasm Resources Using Agronomic Traits And Indel Markers. *Euphytica*, 215 (4): 1-16.

Khan, T., Rashid, R., Shah, L., Afroza, B., Khan, S., Bhat, M. A., ... & Sun, H. J. (2024). Genetic And Phenotypic Diversity İn Solanum Lycopersicum Genotypes: İnsights From Morpho-Molecular And Biochemical Analyses. *Plant Biotechnology Reports, 18*(2), 207-221.

Krauss, S., Schnitzler, W. H., Grassmann, J., & Woitke, M. (2006). The Influence Of Different Electrical Conductivity Values In A Simplified Recirculating Soilless System On Inner And Outer Fruit Quality Characteristics Of Tomato. *Journal Of Agricultural And Food Chemistry, 54*(2), 441-448.

Li, Y., Wang, H., Zhang, Y., & Martin, C. (2018). Can The World's Favorite Fruit, Tomato, Provide An Effective Biosynthetic Chassis For High-Value Metabolites? *Plant Cell Reports, 37*, 1443-1450.

Özbay, N. (2021). 'Guldar' Domatesinin Coğrafi İşaret Almasına Yönelik Yürütülen Arazi ve Laboratuvar Çalışmaları. *Türk Tarım ve Doğa Bilimleri Dergisi, 8*(2), 492-500.

Ray, R. C., El Sheikha, A. F., Panda, S. H., & Montet, D. (2011). Anti-Oxidant Properties And Other Functional Attributes Of Tomato: An Overview. *International Journal Of Food And Fermentation Technology, 1*(2), 139-148.

Sönmez, K., & Ellialtıoğlu, Ş. (2014). Domates, karotenoidler ve bunları etkileyen faktörler üzerine bir inceleme. *Derim, 31*(2), 107-130.

Sönmez, K., Ellialtıoğlu, Ş. Ş., & Oğuz, A. (2015). Useage of Weighted Scaling Method in The Evaluation of Local Table Tomatoes Germplasm. *Tarım Bilimleri Araştırma Dergisi, 8*(1), 14-19.

TUİK. (2022). Türkiye İstatistik Kurumu (TUİK). Bitkisel Üretim İstatistikleri, (Erişim tarihi: 15.08.2024).

Zengin, S., Kabaş, A., Oğuz, A., Eren, A., & Polat, E. (2015). Determining of general combining ability for yield, quality and some other traits of tomato (Solanum lycopersicum L.) inbred lines. *Akdeniz University Journal of the Faculty of Agriculture*, *28*(1), 1-4.

Zhou, R., Wu, Z., Cao, X., Jiang, F. (2015). Genetic Diversity Of Cultivated And Wild Tomatoes Revealed By Morphological Traits And SSR Markers. *Genetics and Molecular Research*, 14 (4): 13868-13879.