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Araştırma Makalesi / Research Article

Evaluation of Agricultural Characteristics of Some Winter Chickpea (*Cicer arietinum* L.) Varieties in Different Ecological Conditions

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Abstract

This study, which was carried out to determine the agricultural characteristics of some chickpea lines and varieties in Adana, and Urfa ecological conditions, was carried out in the trial fields of the Eastern Mediterranean Agricultural Research and GAP Agricultural Research Institutes. The study, which was carried out by different institutes using 20 chickpea lines and 3 control types, was established in a randomized block design with three replications. In the study, phenological characteristics such as the number of days until flowering, pod binding, the number of days after emergence and vegetation period after 50% emergence of chickpea plant, and agronomic characteristics such as plant height, first pod height, harvest maturity, hundred grain weight, yield per decare were examined. As a result of the study, *Ascochyta* blight disease controls were also carried out depending on the climatic conditions of chickpea lines and varieties. In the study, when the average grain yield values of two years in Adana location were examined; The highest grain yield was determined as 317.37 kg da⁻¹ from Seçkin control variety, 306.78 kg da⁻¹ from URFA Ç-2 line, 305.41 kg da⁻¹ from URFA Ç-7 line and 304.74 kg da⁻¹ from İnci variety. In the Urfa location, the highest grain yield was determined as 209.56 kg/da in İnci standard variety, 207.66 kg/da in URFA Ç-3 variety with row number 3, 203.92 kg da⁻¹ and kg da⁻¹ in URFA Ç-7 variety, respectively. It is seen that the control varieties İnci, Hasanbey and Seçkin chickpea varieties stand out.

Keywords: Adana/Urfa, chickpea, variety, yield

INTRODUCTION

Chickpea (*Cicer arietinum* L.) is one of the oldest cultivated plants in the world, and Turkey is one of its gene centers (Eylem, 2017). It is one of the important leguminous plants cultivated in our country. Chickpea varieties cultivated in the world are divided into two groups according to grain shape, size and color. Desi chickpeas are small, dark colored, and usually with colorful flowers. Kabuli chickpeas are large grained, light colored and have white flowers (Purushothaman et al., 2014). While Desi type chickpeas are grown in Pakistan and South Asian countries, Kabuli type chickpeas are mainly cultivated in Turkey (Aydemir and Yemencioğlu, 2013). Chickpea cultivation is carried out in almost all regions of our country, and it is grown in winter in the coastal regions and in summer in the Central Anatolian region, which has a continental climate. Due to the decrease in soil moisture and shortening of the growing period, the yield decreases by 26-68%, especially in late sowing (Üstün, 1994). There are many environmental and genetic variables that affect yield and yield parameters in chickpea cultivation. In recent years, it has become possible to breed higher yields in winter plantings by breeding new chickpea varieties that are resistant/tolerant to cold and Ascochyta blight disease (Avelar et al., 2018; Elis et al., 2020; Yücel, 2020). The aim of this study was to determine the chickpea genotypes suitable for winter cultivation for the Mediterranean and Southeastern Anatolia regions, to evaluate the yield and yield parameters, to bring them to breeding studies and to evaluate them in variety registration.

MATERIAL and METHOD

In this research, field trials were carried out in the research trial fields in the Eastern Mediterranean Agricultural Research Institute Adana and GAP Agricultural Research Institute Urfa locations during the 2013-2014 and 2014-2015 growing seasons. In the study, experiments were carried out in two locations with a total of 23 chickpea genotypes, 20 lines and 3 control varieties (Hasanbey, Seçkin, İnci), which were prominent in the chickpea breeding studies conducted in Urfa by the GAP Agricultural Research Institute. In terms of the climatic characteristics of the research area, the meteorological values of the growing season in which the experiments were carried out are given in Table 1 for Adana location and Table 2 for Urfa location. In the first year for Adana region, the uneven distribution of precipitation was determined for the period of November-July, which represents the growing season of chickpea. Although there was drought stress in the trials, especially after planting, Ascochyta blight disease was not seen very often due to the unfavorable precipitation amount and temperature and humidity rates in March and April, which are the flowering and pod-fixing periods. In the second year, the intensity of Ascochyta blight increased due to the precipitation intensity in March (115.81mm), which is the flowering period in this growing season. Since the heavy rains in May (81.02 mm), in the beginning of the pod tying period, yield losses were experienced in sensitive varieties due to Ascochyta blight disease. The uneven and high distribution of precipitation stressed the plants and at the same time, an increase in the intensity of Ascochyta blight disease was observed (Table 1).

Table 1. Adana province 2013-2014; Climate values for 2014-2015 and many years

Month	Mean Temp (C°)			Precipitation (mm)			Relative Humidity (%)		
	Prev. Year. Av.	2013-2014	2014-2015	Prev. Year. Av	2013-2014	2014-2015	Prev. Year. Av	2013-2014	2014-2015
November	15.3	17.7	14.76	67.2	1.0	36.06	63	57.5	54.8
December	11.1	10.4	13.0	118.1	12.2	50.05	66	42.7	71.6
January	9.7	11.48	8.9	111.7	28.19	56.39	66	69.58	66.3
February	10.4	10.84	10.9	92.8	18.54	90.68	66	56.90	70.1
March	13.3	15.06	13.9	67.9	56.09	115.81	66	65.55	64.6
April	17.5	17.68	15.8	51.4	18.56	7.88	69	66.94	62.5
May	21.7	21.26	21.7	46.7	22.36	81.02	67	70.39	64.3
June.	25.6	24.03	24.2	22.4	50.04	0	66	68.19	69.1
July	27.7	28.23	28.0	5.4	0.25	0	68	72.58	69.3

In the first year for the Urfa region, the total precipitation during the growing season was below the long years average. Temperature data, on the other hand, remained close to the long years average. Precipitation was below the long years average, especially in May. In the observations, chickpea plants showed normal development throughout the

growing season, and no diseases or pests that would significantly affect the yield were found. In the second year, although the precipitation is higher than the long years average; It was below the long years average in April and May. Low rainfall, especially April and May rainfalls were not very effective on *Ascochyta* blight disease because of the flowering period (Table 2).

Table 2. Climate data of Şanlıurfa province 2014-2015 growing season

Month	Mean Temp (C°)					Precipitation (mm)			Relative Humidity (%)		
	Prev. Year. Av.	2013-2014	2014-2015	2014-2015	Prev. Year. Av.	2013-2014	2014-2015	2014-2015	Prev. Year. Av.	2013-2014	2014-2015
	Ort.	Min.	Max.	Min.	Max.						
November	13.1			-3.1	17.2	24.4			60.8		
December	7.8	2.5	9.5	-0.6	18.2	49.9	55.4		68.3		
January	6.3	2.4	18.0	2.5	24.8	83.9	44.3	82.5	70.6	65.6	68.8
February	7.5	-1.1	22.1	4.7	29.9	68.4	20.8	100.8	67.0	44.0	74.3
March	11.6	2.2	24.7	11.8	36.9	52.5	91.6	79.0	60.8		58.9
April	16.4	3.6	30.8	16.7	38.4	45.5	33.3	24.3	57.2	47.5	49.7
May	23.1	12.4	38.7	21.4	42.8	21.6	6.0	10.3	45.4		38.0
June.	29.0	15.3	40.1			4.0	20.6	0.7	34.8		35.3

Research Field Studies

Experiments with 23 chickpea genotypes in both locations in 2013-2014 and 2014-2015 growing seasons were prepared in a randomized block experimental design and carried out in field conditions. In this study, sowing was done on 4 rows of 5 m in length and 9 m² plots with 45 cm row spacing and 8 cm spacing between rows. Fertilization was applied with 2-3 kg N, 5-6 kg P₂O₅ per decare

before planting, to determine the inertness readings for tolerance to anthracnose blight disease on a scale of 1-9 (1=resistant, 9=very sensitive) (Reddy and Singh, 1985; Chen et al., 2004) required disease readings. The sowing of the trials was carried out in both locations, in December 2013 and 2014, in winter in both years, and the harvesting of the trials was carried out in July 2014 and 2015. After the harvest, the necessary observations, measurements and analyzes

were made and the materials were evaluated.

BULGULAR ve TARTIŞMA

Evaluation of chickpea agricultural characteristics in adana location

As it can be seen in Table 3 of the trials carried out in Adana location, there is a statistically significant difference between genotypes in terms of the number of flowering days, the number of pod setting days, the first pod height, plant height, 100-seed weight and grain yield in the 2013-2014 growing season. The lowest values varied between 62.3-50 days, 78.6-59.0 days, 36.3-20.5 cm, 76.6-40.0cm, 54.7-27.9 g and 363.1-19.4 kg/da, respectively. Mart et al. (2015), in the winter evaluation of chickpea (*Cicer aritinum* L.) cultivar breeding in Çukurova climatic conditions, it was determined that the hundred-grain weights were between 42.87-31.77g. In the 2014-2015 growing season, there is a statistically significant difference between genotypes in terms of the number of flowering days, first pod height, plant height, 100-seed weight and grain yield, and the lowest and highest values are 109.3-117.0 days, 18.15-46.13 cm, 28.26-44.70 g, and 14.22-294.29 kg da⁻¹, respectively. Ağasakallı and Olgun (1999), on the other hand, reported a variation between 27,-.7-49.6 cm in plant height in 16 chickpea lines and varieties in Erzurum between 1993-1997. Ceyhan et al. (2007). It was determined that the plant height of chickpea cultivars varied between 33.1 and 44.1 cm in Konya ecological conditions. When the average two-year flowering days of the varieties are examined; It was determined that the earliest flowering was 82.5 days,

and the latest flowering was 87.33 days. In chickpea cultivars, it was determined that the average number of pods is 94.67-103.50 days and the average first pod height values ranged between 37.51-21.39 cm. The average plant height values of the two years were determined as the tallest 88.90 cm and the shortest 65.53 cm (Table 3). The plant height is of great importance that varieties with short plant height can cause significant grain losses in machine harvesting and that tall varieties should be preferred (Bakoğlu et al., 2005). In terms of 100 grain weight, the highest grain weight was 48.62 g and the lowest 30.83 g in two-year average. When the average grain yield values of the two years are examined together; The highest grain yield was determined as 317.37 kg da⁻¹ in Seçkin control variety, 306.78 kg da⁻¹ from Urfa Ç-2 line, 305.41 kg da⁻¹ from Urfa Ç-7 line and 304.74 kg/da in İnci variety. As can be seen from here, it was determined that the yield values of the standard control varieties were higher than the lines. The lowest grain yield was obtained from URFA Ç-20 variety with 20 row number at 37.44 kg da⁻¹ (Table 3). Şanlı (2007) in his study in Maraş, determined that there was a 25-30% yield loss in summer plantings compared to winter plantings and recommended winter planting. In terms of Ascochyta blight disease, no adverse effects were observed since it was not seen intensively in the first year. However, in the second year, negative effects on 100 grains and yields were observed in Adana location, as Ascochyta blight was seen in natural conditions due to rainfall intensity. Low values were determined in 100 grain weights due to the disease. This caused yield losses (Table 3).

Table 3. Adana location yield test results-2014-2015

No	Lines	Number of Flowering Days (Days)			AB (L-9)		Pod Binding Days (Days)			First Pod Height (Cm)		
		2014	2015	Ave.	2014	2015	2014	2015	Ave.	2014	2015	Ave.
1	URFA Ç-1	55.3 CD	115.0AB	85.17AB	1-5	4	65.0 C-E	126.3	95.00	27.2 AB	35.56AB	31.39A-D
2	URFA Ç-2	56.3 CD	114.6AB	85.5AB	1-3	5	67.0 B-E	127.0	101.50	26.6 AB	38.86AB	32.77A-D
3	URFA Ç-3	55.0 CD	113.3A-C	84.17AB	1-1	6	64.3 C-D	126.0	103.50	23.3 B	40.53AB	31.93A-D
4	URFA Ç-4	56.3 CD	118.0A	87.33A	4-6	8	65.0 C-E	127.5	103.00	22.7 B	23.42AB	22.22CD
5	URFA Ç-5	56.0 CD	116.3AB	86.17AB	7-8	8	63.6 C-E	129.0	95.67	23.6 B	27.76AB	25.72B-D
6	URFA Ç-6	55.0 CD	112.0BC	83.5AB	1-4	7	66.3 C-E	125.0	97.83	28.8 AB	35.53AB	32.21A-D
7	URFA Ç-7	54.3 C-E	115.0AB	84.67AB	1-2	6	63.6 C-E	126.0	97.00	22.2 B	36.10AB	29.16A-D
8	URFA Ç-8	52.6 DE	114.6AB	83.67AB	1-1	8	63.0 DE	126.3	95.17	23.3 B	20.30B	21.82D
9	URFA Ç-9	52.3 DE	114.0A-C	83.17AB	1-3	8	66.3 C-E	125.3	90.00	22.2 B	30.00AB	26.11A-D
10	URFA Ç-10	53.6 C-E	114.8A-C	85.5AB	4-5	8	66.6 B-E	133.0	96.33	20.5B	18.15AB	21.392D
11	URFA-11	52.0 DE	114.3AB	83.17AB	1-1	3	63.6 C-E	131.0	94.83	28.8 AB	46.13A	37.508A
12	URFA-12	52.3 DE	116.3AB	84.33AB	1-3	7	61.6 DE	133.0	94.67	23.3 B	27.23AB	25.28B-D
13	URFA-13	55.6 CD	113.6A-C	84.67AB	1-1	6	68.3 B-D	130.6	95.83	22.7 B	34.43AB	28.6A-D
14	URFA-14	55 CD	117.0A	86AB	1-1	5	67.0 B-E	133.3	97.33	29.4 AB	37.76AB	33.61AB
15	URFA-15	55.6 CD	114.6AB	85.17AB	1-1	6	67.6 B-E	130.6	97.33	25.5 B	38.33AB	31.95A-D
16	URFA-16	52.0 DE	114.0A-C	83AB	1-1	6	64.3 C-E	130.0	99.50	30.5 AB	33.36AB	31.96A-D
17	URFA-17	55 CD	117.0A	86AB	4-4	7	65.0 C-E	133.3	100.17	28.3 AB	30.56AB	29.45A-D
18	URFA-18	55.6 CD	116.3AB	86AB	1-3	7	66.3 C-E	132.0	99.17	36.3 A	32.76AB	34.58AB
19	URFA-19	50.0 E	115.0AB	82.5B	1-2	7	59.0 E	131.3	97.17	28.33AB	37.23AB	32.78A-D
20	URFA-20	50.0 E	114.8A-C	82.5B	8-8	8	59.0 E	130.0	99.17	20.5 B	32.36AB	25.01B-D
21	İNCI	61.6 AB	113.6A-C	87.67A	1-1	4	75.3 AB	131.6	99.17	23.6 B	41.10AB	32.387A-D
22	HASANBEY	57.6 BC	112.6A-C	85.17AB	1-1	5	72.0 A-C	131.0	95.17	24.9 B	40.53AB	32.77A-D
23	SEÇKİN	62.3A	109.3C	85.83AB	1-1	4	78.6 A	127.3	95.33	24.8 B	40.53AB	32.71A-D
F		*	**	**			**	OD	OD	**	**	**
VK(%)		4.83		1.87			4.28	4.3	4.83	13.41	19.9	1.58
TUKEY (0.05)												

Table 3. Adana location yield trial results 2014-2015 (Continue)

No	Lines	Plant Height (Cm)			100 Seed Weight (G)			Grain Yield (Kg/Da)		
		2014	2015	Ave.	2014	2015	Ave.	2014	2015	Ave.
1	URFA Ç-1	46.6 DE	82.80AB	64.73A-D	47.4 AB	42.60A	45.02A-C	221.9 A-D	150.29A-C	186.11A-E
2	URFA Ç-2	51.7 B-E	81.66AB	67.22A-D	39.9 B-E	37.03AB	38.52D-G	352.8 AB	260.74AB	306.78AB
3	URFA Ç-3	47.7 DE	82.23AB	65A-D	45.8 A-C	38.46AB	42.18B-E	284.6 A-D	196.74A-C	240.7A-D
4	URFA Ç-4	50.5 C-E	65.92B	58.19CD	35.2 D-F	38.86AB	37E-H	145 C-E	14.22C	79.63E-F
5	URFA Ç-5	51.1 C-E	71.13AB	61.12CD	27.9 F	38.60AB	33.29GH	19.4 E	17.03A-C	48.26E-F
6	URFA Ç-6	52.7 B-E	82.20AB	67.49A-D	40.4 B-E	39.93AB	40.22C-F	209.8 A-D	150.44A-C	180.15A-E
7	URFA Ç-7	40.0 E	68.33B	54.17D	33.3 E-F	28.26C	30.83H	851.9 AB	258.88AB	305.41AB
8	URFA Ç-8	47.7 DE	77.80AB	62.79B-D	41 B-E	39.90AB	40.48B-F	229.5 A-D	97.55A-C	163.56C-F
9	URFA Ç-9	45.5 DE	88.90A	67.23A-D	41.8 B-E	39.60AB	40.74B-E	863.1 A	85.62A-C	224.37A-D
10	URFA Ç-10	51.1 C-E	65.65AB	60.42CD	38.9 B-E	39.66A-C	39.45C-G	211.4 A-D	18.51C	114.96C-F
11	URFA-11	78.6 A	80.53AB	78.6A	43.2 B-D	44.50A	43.86A-D	199.7 A-D	152.29A-C	176B-E
12	URFA-12	65 A-D	65.53B	65.27A-D	41.9 B-E	43.80A	42.89A-E	117.1 DE	94.59A-C	105.85D-F
13	URFA-13	66.1 A-D	73.86AB	69.99A-C	42.9B-E	44.70A	43.85A-D	238.2 A-D	199.33A-C	218.78A-D
14	URFA-14	64.9 A-D	68.90B	66.95A-D	41.7 B-E	36.83AB	39.28C-G	271 A-D	206.00A-C	238.52A-D
15	URFA-15	68.3 A-D	78.90AB	73.62A-C	43.4 B-D	44.13A	43.79A-D	291.8 A-C	190.88A-C	241.37A-D
16	URFA-16	67.7 A-D	65.56B	66.67A-D	39.5 B-E	37.13AB	38.34D-G	272.8 A-D	203.40A-C	238.15A-D
17	URFA-17	51.6 C-E	66.10B	58.88CD	42.3 B-E	38.80AB	40.57B-F	188.5 B-E	95.33A-C	141.93C-F
18	URFA-18	76.1 AB	69.43AB	72.77A-C	54.7 A	42.46A	48.62A	182.7 B-E	77.40A-C	130.07C-F
19	URFA-19	55.5 A-E	78.86AB	67.21A-D	48.5 AB	44.56A	46.56AB	196.8 A-D	109.25A-C	153.04C-F
20	URFA-20	56.6 A-E	71.20AB	59.99CD	28.4 F	34.84A-C	31.81GH	25.6E	49.25BC	37.44F
21	İNCI	53.5 A-E	72.76AB	63.16A-D	36.3 C-F	32.33BC	34.33F-H	316.8 AB	292.66A	304.74AB
22	HASANBEY	61.1 A-E	71.66AB	66.39A-D	42.2 B-E	40.26AB	41.24B-E	302.7 A-C	197.33A-C	250.04A-C
23	SEÇKİN	71.6 A-C	84.43AB	78.05AB	39.5 B-E	40.63A	40.09C-F	340.4 AB	294.29A	317.37A
F		**	**	**	**	**	**	**	**	**
VK(%)		13.05	8.2	4.74	7.66	6.5	1.17	23.48	48.7	123.15
TUKEY (0.05)										

Şanlıurfa location evaluation of chickpea agricultural characteristics

As a result of the evaluations made in the trial carried out in Şanlıurfa location in 2013-2014, the statistical difference was not significant in terms of grain yield per unit area. As seen in Table 4, statistical difference was found between cultivars in terms of number of flowering days, first pod height, plant height and hundred-seed weight. The number of flowering days varied between 92 and 83.6 days, while the height of the first pod is 50.5 - 29.1cm; in terms of plant height 57-46.2 cm; Hundred grain weight was found to be

between 45.3-29.0 g. As can be seen in Table 4, while the highest grain yield was obtained from line 3 (URFA Ç-3), 190.33 kg da⁻¹, while it was 207.89 kg da⁻¹ for İnci cultivar; The lowest grain yield in the experiment was obtained from 91.33 kg da⁻¹ from line 4 (URFA Ç-4) variety. In the 2014-2015 growing season, statistical differences were found in terms of the number of flowering days, first pod height, plant height, 100-seed weight and yield values. As can be seen in Table 4, when the average grain yield values are examined; the lowest and highest grain yield values vary between 82.2-228.8 kg da⁻¹. While the number of

flowering days varied between 78.0-83.3 days, it varied between 36.8-26.1 cm in terms of first pod height. It has been determined that the plant height varies between 48.1-58.7 cm and the weight of 100 grains varies between 31.4-51.8 g. When the average two-year flowering days of the varieties are examined; It was determined that the earliest flowering was 81.0 days and the latest flowering was 87.67 days. It was determined that the first pods of chickpea cultivars in the location formed between 90.3 and 92.7 days. When the two-year averages of the first pod height values in plants are examined; pod height was determined as the highest 38.58 cm and the lowest 29.33 cm. When the average plant height values of the two years are examined together; the highest 57.63 cm, the lowest 49.15 cm were determined (Table 4). In terms of 100 grain weight, the highest grain weight was 48.57 g and the lowest 30.2 g. When the average grain yield values of the two years are examined together; The highest grain yield was determined as 209.56 kg da⁻¹ in İnci standard variety, 207.66 kg da⁻¹ in 3 row numbered Urfa Ç-3 variety, 203.92 kg da⁻¹, kg da⁻¹ in 7 row number

Urfa Ç-7 variety, respectively. As can be seen from here, it has been determined that there are no elite lines that exceed the standard varieties, only one variety approaches the standard variety, İnci. The lowest grain yield was obtained at 86.75 kg da⁻¹ (Table 4). Doğan et al. (2018) in the study they carried out to determine the yield and yield components of five chickpea genotypes in Mardin ecological conditions, a difference was found between the grain yield values of 72.4-108.2 kg da⁻¹. In another study Beysari (2012) reported it as 72.4-108.2 kg da⁻¹, Bakoğlu (2011) as 61.6-158.2 kg da⁻¹, Ceyhan et al. (2007) as 13.92-158.43 kg da⁻¹, Ceyan et al. (2012) as 120.42-196.01 kg da⁻¹, Ceyhan et al. (2013) as 30.61-80.97 kg da⁻¹, Topalak and Ceyhan (2015) as 131.40-169.30 kg da⁻¹. In the Urfa location, it was observed that Ascochyta blight was not very effective in the advanced lines in the first year, but there was an increase in the disease values in the second year cultivars. In the Urfa location, the intensity of Ascochyta blight disease in varieties under natural conditions was evaluated according to the 1-9 scale and given in Table 4.

Table 4. Sanliurfa location yield trial results 2014-2015

Sıra No	Lines	Number of Flowering Days (Days)			AB (1-9)		Pod Binding Days(Days)	First Pod Height (Cm)		
		2014	2015	Ave.	2014	2015		2014	2015	2014
1	URFA Ç-1	90.0AC	80.7A-C	85.33A-F	1	1	91.0	35.0 FH	35.6A	35.33 B-E
2	URFA Ç-2	85.0CE	79.7A-C	82.33F-H	1	1	92.0	39.5 BF	36.2A	37.90BC
3	URFA Ç-3	85. CE	80.7A-C	83D-H	1	2-3	91.3	35.7 EG	32.0A-C	33.88C-F
4	URFA Ç-4	84.0DE	78.0C	81H	1	6	92.3	35.3 EH	27.2BC	31.25EF
5	URFA Ç-5	93.0A	80.7A-C	86.83AB	1	1	92.7	34.9 FH	32.7A-C	33.85C-F
6	URFA Ç-6	91.3AB	81.0A-C	86.17A-C	1	1	92.0	37.5 CG	34.2AB	35.86 B-E
7	URFA Ç-7	92.6A	82.7A	87.67A	1	2-3	92.3	39.2 BF	31.1A-C	35.18 B-E
8	URFA Ç-8	90.6AB	79.7A-C	85.17A-F	1	3-4	92.0	36.8 CG	32.2A-C	34.53C-E
9	URFA Ç-9	89AD	80.0A-C	84.5B-G	1	1	91.7	36.4 DG	31.1A-C	33.78C-F
10	URFA Ç-10	83.3E	80.7A-C	82GH	1	1	91.3	29.1 H	29.6A-C	29.40F
11	URFA-11	92. A	80.7A-C	86.33A-C	1	1	91.0	50.5 A	36.8A	
12	URFA-12	92.0A	81.3A-C	86.67AB	1	1	91.3	40.4 BF	31.5A-C	35.93 B-E
13	URFA-13	84. DE	80.7A-C	82.5E-H	1	1	91.3	39.3 BF	26.1C	32.73D-F
14	URFA-14	83.6E	81.0A-C	82.33F-H	1	1	91.3	41.6 BE	30.4A-C	36.03 B-E
15	URFA-15	83.6E	83.0A	83.33C-H	1	1	91.3	43.2 BC	32.2A-C	37.71BC
16	URFA-16	84DE	81.3A-C	82.67D-H	1	1	91.7	42.9 BC	33.8AB	38.36BC
17	URFA-17	91.6A	81.0A-C	86.33A-C	1	1	91.0	44.2 AB	35.5A	
18	URFA-18	92. A	83.3A	87.83A	1	3-4	92.7	44.4 AB	32.8A-C	38.58BC
19	URFA-19	91.3AB	79.7A-C	85.50A-E	1	1	91.0	42.6 BD	32.2A-C	37.40B-D
20	URFA-20	86.BE	78.3BC	82.33F-H	5	6-7	90.3	31.3 GH	27.4ABC	29.33F
21	İNCİ	91.6A	82.0AB	85.67A-D	1	1	92.0	40.2 BF	29.4A-C	35.90 B-E
22	HASANBEY	92.6A	79.7A-C	87.17AB	1	1	92.7	39.1 BF	31.6A-C	34.98B-E
23	SEÇKİN	90.6AB	81.7A-C	86.33A-C	4	1	92.0	34.9 FH	30.8A-C	32.16EF
F		**	**	**			ÖD	**	**	**
VK (%)		1.83	1.50	1.21			0.91	5.23	7.61	6.43
TUKEY (0.05)										

Table 4. Sanliurfa location yield trial results 2014-2015 (Continue)

Sıra No	Lines	First Pod Height (Cm)			Plant Height (Cm)			100 Seed Weight (G)			Grain Yield (Kg/Da)		
		2015	2015	2014	2015	Ave.	2014	2015	2015	2014	2014	2015	
1	URFA Ç-1	35,0 FH	35,6A	35,33 B-E	49,1 FH	58,7AB	53,93A-C	42,8 AD	44,1C-F	43,43B-E	123,70	188,5A	156,09AB
2	URFA Ç-2	39,5 BF	36,2A	37,90BC	52,6 AG	58,1AB	55,4AB	31,7 HI	36,5HI	34,12LM	106,07	200,4A	153,22AB
3	URFA Ç-3	35,7 EG	32,0A-C	33,88C-F	50,4 DH	55,9A-C	53,2A-C	43,3 AC	45,1B-E	44,23B-D	207,89	207,4A	207,66A
4	URFA Ç-4	35,3 EH	27,2BC	31,25EF	50,4 DH	51,5A-C	50,97BC	41,2 AE	42,8D-G	42,03D-G	91,33	82,2B	86,75B
5	URFA Ç-5	34,9 FH	32,7A-C	33,85C-F	54,2 AE	56,8A-C	55,52AB	41,3 AE	48,9AB	45,12BC	163,56	182,4A	172,98AB
6	URFA Ç-6	37,5 CG	34,2AB	35,86 B-E	53,0 AG	55,9A-C	54,48AB	39,5 CG	43,6D-F	41,55D-H	130,44	219,4A	174,92AB
7	URFA Ç-7	39,2 BF	31,1A-C	35,18 B-E	51,8 BG	49,6A-C	50,73BC	29 I	31,4J	30,2N	185,37	222,5A	203,92A
8	URFA Ç-8	36,8 CG	32,2A-C	34,53C-E	48,9 GH	57,1A-C	53,02A-C	35,2 GH	40,3F-H	37,77JK	130,93	178,3A	154,63AB
9	URFA Ç-9	36,4 DG	31,1A-C	33,78C-F	51,0 CH	50,6A-C	50,78BC	35,9 GH	41,9E-G	38,9H-K	131,00	188,5A	159,73AB
10	URFA Ç-10	29,1 H	29,6A-C	29,40F	46,2 H	52,0A-C	49,15C	36,9 EG	41,5E-G	39,2G-K	152,93	182,1A	167,51AB
11	URFA-11	50,5 A	36,8A		56,1 AB	59,1A	57,63A	39,3 CG	44,6C-E	41,93D-G	126,81	200,2A	163,52AB
12	URFA-12	40,4 BF	31,5A-C	35,93 B-E	57,0 A	52,9A-C	54,98AB	44,5 AB	47,9A-C	46,22AB	135,59	217,7A	176,68AB
13	URFA-13	39,3 BF	26,1C	32,73D-F	53,2 AG	48,1C	50,67BC	39,1 CG	42,3D-G	40,7E-I	171,44	207,8A	189,64A
14	URFA-14	41,6 BE	30,4A-C	36,03 B-E	50,5 DH	51,4A-C	50,98BC	39,4 CG	40,4F-H	39,92F-J	154,56	189,7A	172,11AB
15	URFA-15	43,2 BC	32,2A-C	37,71BC	49,0 AF	57,0A-C	55,52AB	40,4 BF	42,9D-G	41,68D-H	147,07	201,8A	174,44AB
16	URFA-16	42,9 BC	33,8AB	38,36BC	51,0 CH	53,4A-C	52,22BC	38,7 DG	36,8HI	37,78I-K	156,44	192,8A	174,61AB
17	URFA-17	44,2 AB	35,5A		55,7 AC	55,4A-C	55,58AB	39,3 CG	39,5GH	39,43G-K	186,85	192,4A	189,61A
18	URFA-18	44,4 AB	32,8A-C	38,58BC	52,7 AG	55,7A-C	54,2A-C	45,3 A	51,8A	48,57A	125,81	189,1A	157,47AB
19	URFA-19	42,6 BD	32,2A-C	37,40B-D	55,0 AD	54,3A-C	54,67AB	40,7BF	46,3B-D	43,52B-E	139,00	177,8A	158,4AB
20	URFA-20	31,3 GH	32,4ABC	29,33F	49,4 EH	51,9A-C	50,7BC	42,3 AD	42,9D-G	42,63C-F	151,70	100,2B	125,94AB
21	İNCI	40,2 BF	29,4A-C	35,90 B-E	51,0 CH	48,9BC	53,77A-C	38,4 DG	33,9IJ	40,13F-J	190,33	226,2A	209,56A
22	HASANBEY	39,1 BF	31,6A-C	34,98B-E	50,1 DH	56,5A-C	50,85BC	36,6 FG	41,8E-G	36,75KL	152,15	228,8A	181,84AB
23	SEÇKİN	34,9 FH	30,8A-C	32,16EF	52,2 AG	51,6A-C	50,57BC	32,1 HI	36,9HI	33MN	109,74	211,5A	167,97AB
F		**	**	**	**	**	**	**	**	**	ÖD	51,88	**
VK (%)		5,23	7,61	6,43	3,04	5,75	1,30	3,67	3,07	0,55	43,59	8,65	79,18
TUKEY (0,05)													

CONCLUSION

According to the results of the study carried out in order to reveal the performance of some chickpea lines and varieties in the ecological conditions of Adana, Eastern Mediterranean and Urfa, in the ecological conditions of the Southeastern Anatolian Region, the registered varieties İnci, Hasanbey and Seçkin are in the first place, and their suitability and stability in the regional conditions should be noted. has drawn. At Adana location, Urfa Ç-2 (306.78 kg da⁻¹), Urfa Ç-7 (305.41 kg da⁻¹) lines; In Urfa location, Urfa Ç-3 (207.66 kg da⁻¹), Urfa Ç-7 (203.92 kg da⁻¹), Urfa Ç-13 (189.64 kg da⁻¹), Urfa Ç-17 (189.61 kg da⁻¹) lines have been determined as the lines that should be emphasized in breeding studies. In such studies, it was concluded that it would be more appropriate to repeat the studies in different locations representing the region and for at least 3 or 4 years in order to make more reliable recommendations with the results to be obtained in adaptation studies.

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