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Investigation Of Yield And Quality Values Of Some Registered Chickpea (*Cicer arietinum L.)* Varieties

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ABSTRACT

This study, which was carried out in 2014-2015 to determine the agronomic characteristics of some chickpea lines and varieties under Şanlıurfa ecological conditions, was conducted in the experimental trial areas of GAP Agricultural Research Institute. 20 registered chickpea genotypes and 3 control varieties were used in the study, which was established according to the randomized block design with three replications. In the study, phenological traits such as the number of days until flowering after 50% emergence, the number of days until pod tying, the number of days after emergence and vegetation duration and agronomic traits such as plant height, first pod height, days to maturity, one hundred grain weight and yield per decare were examined in chickpea plants. During the study, *Ascochyta blight* disease controls of chickpea varieties were also carried out depending on the climatic conditions. In the study, the highest grain yield was obtained from Işık (181.65 kg/da) variety and the lowest grain yield was obtained from Uzunlu variety (108.34 kg/da) at Şanlıurfa location. In terms of both growing seasons, the highest average protein analysis values were obtained from Yaşa variety with 25.77% and the lowest from İnci variety wıth22.02%.

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Introduction

Food grain legumes are among the plants used in human nutrition in our country and are important vegetable protein sources; they are an important staple food in human and animal nutrition in terms of protein richness of 22-28%. In animal nutrition, 38% of proteins and 5% of carbohydrates are provided from food grain legumes. Since it contains protein equivalent to animal protein, it is a very important source of protein for those who do not or cannot consume animal protein. Chickpea is an important legume in terms of health and nutrition due to its high protein content and high fiber level (Singh et al., 2003).One of the homelands of chickpea and lentil plants is the lands of our country (Eylem, 2017).

Since chickpea is a legume plant, it takes nitrogen from the air and fixes it with the nodules in its roots and both uses it itself and leaves nitrogen-rich soil for the following plant. Since edible grain legumes leave soil rich in nitrogen and root organic matter to the next crop, they also have an important place in crop rotation due to their role in improving the properties of soils. Due to the use of chickpea in crop rotation, it is easier to control diseases and pests, prevent one-way exploitation of the soil and control weeds. In addition, by binding the free nitrogen of the air to the soil through Rhizobium bacteria in the roots, it both reduces the inputs required for production and contributes to soil improvement. Since chickpea is a leguminous plant,

it also has nitrogen-improving properties thanks to its nodules (Gan et al. 2005).

For the last 20 years, food grain legumes production and consumption have been on an increasing trend all over the world, while in Turkey this increase has been below the world average. When we look at Turkey's food grain legumes production in terms of self-sufficiency, it is seen that it has shown a decreasing trend over the years, with serious decreases in legume production, production cannot meet domestic demand and there has been a significant increase in imports, making Turkey a net importer in the legume sector.

Chickpea, one of the food grain legumes, has a cultivation area of 511,493ha, a production of 630,000 tons, and a grain yield of 12,317hg/ha (FAO, 2022).

Within the scope of chickpea grain production in Şanlıurfa ecological conditions, it was aimed to determine the genotypes suitable for the ecological conditions of the region by revealing the yield performance of registered chickpea varieties and to contribute to the expansion of chickpea cultivation in the region more than the current situation and thus to increase the amount of production. (Ray et al. 2017) It was reported that higher yield was obtained from sowing on November 1 compared to winter sowing on December 1. The most important feature in determining the effects of characters with each other is considered to be climatic characteristics (Ulker and Ceyhan, 2008).

The aim of this study was to determine the performance of some registered chickpea varieties in terms of yield and yield components under Şanlıurfa ecological conditions for two years, as well as to determine suitable chickpea genotypes that can be adapted to the region.

Material and Method

In this study, field trials were conducted in 2014-2015 growing seasons in the research trial plots of GAP Agricultural Research Institute Şanlıurfa locations. The sowing was completed on mid-January and the first emergence was started on mid-February Total of 20 chickpea genotypes including 17 registered varieties and 3 control varieties (Hasanbey, Seçkin, İnci) were used in the experiment. In this study, plots were contained of 4 rows of 5 m length (9 m2 plots) with 45 cm between rows and 8 cm above rows. Before sowing, fertilization was applied at the rate of 2-3 kg N and 5-6 kg P2O5 per decare.

Climatic data is given in Table 1 for Urfa location. In the first year for the Urfa region, the total precipitation during the growing season was below the long-term average. Temperature data was close to the long-term average. Precipitation was below the long-term average especially in May. In the second year, although rainfall was higher than the long-term average, it was below the long-term average in April and May. Low precipitation, especially in April and May, was not very effective on *Ascochyta blight* disease due to the flowering period (Table 1).

Disease readings for tolerance to anthracnose blight disease were taken on a scale of 1-9 (1=resistant, 9=very susceptible) (Reddy and Singh, 1985; Chen et al., 2004). The sowing of the trials was done in December in both years (2014 and 2015) and the harvest of the trials was done in July.

Results and Discussion

In 2014 and 2015 growing seasons, registered varieties yield trials were conducted at GAP Agricultural Research Institute-Şanlıurfa were given in Table 2, statistical difference was found to be significant for all traits examined as a result of the evaluations made in the first year growing season. The highest grain yield was obtained from ILC 482 variety with 202.9 kg/da and the lowest grain yield was obtained from Küsmen variety with 111.1 kg/da. During the observations, no diseases and pests were found to affect the development and grain yield negatively. The number of days to flowering ranged between 93-83.3 days, 47.2-29 cm; plant height between 55.6-44.5 cm, and hundred grain weight between 42.4-28.7 g (Table 2). The intensity of *Ascocyhta blight* disease in cultivars under natural conditions was evaluated according to the 1-9 scale and given in Table 2. Days to flowering and days to pod setting are vegetation traits and are highly influenced by sowing time and ecological conditions (Gregersen et al., 2013). The number of days to flowering and days to pod setting were observed to differ between years and depending on sowing time, which is thought to be related to ecological and sowing time. Mart et al. (2021) determined that the yield components of Inci, Seckin, Hasanbey varieties were the highest in the study conducted in Adana Agro-ecological conditions.

Table 1. Climatic data of Şanlıurfa province for the 2014-2015 growing season

Months	Temperature °C					Rainfall (mm)			Relative humidity (%)		
	Long years	2013-2014	2013-2014	2014-2015	2014-2015	Long years	2013-2014	2014-2015	Long years	2013-2014	2014-2015
	Average	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

In the second year growing season, as a result of the evaluation of the results of some registered varieties trials conducted at Şanlıurfa location, the highest value in terms of grain yield was obtained from Seçkin (188.7 kg/da) variety and the lowest value was obtained from Uzunlu (85.2 kg/da) variety. As can be seen in Table 2, flowering days between 83.3-72.0 days, first pod height between 19.4-30.5 cm, plant height between 40.9-56.0 cm, 100 grain weight between 28.0-44.6 g were obtained. Doğan et al. 2018 in Mardin with 3 chickpea varieties (Aziziye-94, ILC-482 and Diyar-95), the highest values in terms of plant height were obtained in Diyar-95 variety as 54.2, 45.6 and 49.9 cm, respectively, while the lowest values were obtained in ILC-482 variety.

In 2014 and 2015 growing seasons, according to the analysis of variance results of some registered cultivars trials conducted at Şanlıurfa location, there was a statistical difference between the cultivars in terms of all traits examined at 1% significance level. In terms of days to flowering, Uzunlu (87.1 days) was the variety with the longest number of days to flowering, while Gökçe (78 days) was the variety with the shortest number of days to flowering. First pod height and plant height values were obtained from Diyar-95 and Gökçe with 37.28 - 26.98 cm, Hisar and Gökçe with 55.85 - 44.72 cm, respectively. 100 grain weight values varied between 43.51-28.38 g. The variety with the highest 100 grain weight was Dikbaş and the variety with the lowest 100 grain weight was ILC 482. In terms of grain yield, the highest grain yield was given by the variety Işık (181.65 kg/da), while the lowest grain yield was given by the variety Uzunlu (108.34 kg/da). Işık, ILC 482, Yaşa and Hasanbey were the prominent varieties (Table 2).

Table 2. Results of Some Registered Varieties Trial Conducted at Şanlıurfa Location (2014-2015)

	Varieties	Number of Flowering Days (day)			Ascocyta Bligt (1-9)		NDP	First Pod Height (cm)		
		2014	2015	Average	2014	2015	2015	2014	2015	Average
1	Canıtez	85.6 B	79.7A-D	82.67C-E	1	3-4	91.7	29.0 E	25.6 A-C	27.3C
2	Yaşa	83 B	80.0A-C	81.5D-F	1	3	91.3	38.0 BD	22.7 A-C	30.33BC
3	Işık	83.6 B	76.0D	79.83FG	1	4	90.7	38.2 BD	27.1A-C	32.65A-C
4	Hisar	85.0 B	79.7A-D	82.33C-E	1	1	91.3	39.9 AD	31.7A	35.83AB
5	Azkan	84.6 B	80.0A-C	82.33C-E	1	1	91.3	42.2 AB	24.5 A-C	33.33A-C
6	Cakır	83.0 B	80.7AB	81.83D-F	1	1	90.7	36.2 BE	27.0 A-C	31.62A-C
7	Akca	85.0 B	80.0A-C	82.5C-E	1	1	91.3	36.6 BE	23.8 A-C	30.22BC
8	Ilgaz	85.6 B	79.3B-D	82.5C-E	1	1	91.7	34.7 BE	24.9 A-C	29.83BC
9	ILC 482	83.0 B	76.7CD	79.83FG	1	1	91.7	34.4 BE	21.9BC	28.18C
10	Diyar-95	92.3 A	83.3A	87.83A	1	1	91.7	47.2 A	27.3A-C	37.28A
11	Arda	90.3 A	81.3AB	85.83AB	1	1	91.0	40.7 AC	25.0 A-C	32.87A-C
12	Akçin	84.6 B	80.7AB	82.67C-E	1	3-4	92.0	35.0 BE	27.7A-C	31.38A-C
13	Gökçe	84.0 B	72.0E	78G	5	1	91.0	33.2 CE	20.8C	26.98C
14	Küsmen	85.3 B	83.3A	84.33BC	1	3	90.7	39.3 AD	21.9BC	30.58BC
15	Uzunlu	93.0 A	81.3AB	87.17A	1	6	93.3	32.6 DE	30.5AB	31.58A-C
16	Er	84.0 B	80.3A-C	82.17C-F	1	4	92.0	37.3 BD	19.4C	28.33C
17	Dikbaş	83.3 B	78.7B-D	81EF	3	3-4	92.0	35.8 BE	21.0C	28.42C
18	Hasanbey	85.3 B	80.3A-C	82.83C-E	1	1	91.0	35.4 BE	27.1A-C	31.22A-C
19	Seçkin	91.0 A	80.0A-C	85.5AB	1	1	92.3	38.6 BD	20.9C	29.77BC
20	İnci	86.0 B	81.7AB	83.83B-D	1	1	92.0	34.1 CE	21.6BC	27.88C
F		**	**	**			ÖD	**	**	**
CV.(%)		1.36	1.49	0.98			0.85	6.99	12.41	0.97

	Varieties	Plant Height (cm)			100 Grain Weight (gr)			Grain Yield (kg/da)		
		2014	2015	Average	2014	2015	Average	2014	2015	Average
1	Canıtez	47.2 CD	48.7A-C	47.98C-G	39.4 AC	39.7B-D	39.61B-D	158.1AE	132.2BC	145.16A-E
2	Yaşa	55.0 A	50.5AB	52.77A-C	37.1 CD	34.7GH	35.93F-H	190.1 AB	152.0AB	171.05AB
3	Işık	50.8 AD	50.5AB	50.63A-F	42.0 A	38.8B-E	40.39B-D	202.9 A	160.4AB	181.65A
4	Hisar	55.6 A	56.0A	55.85A	39.2 AC	37.9C-G	38.58C-E	139.9CE	123.7BC	131.81B-E
5	Azkan	53.3 AC	50.0AB	51.62A-D	39.8 AC	40.0B-D	39.93B-D	158.3AE	142.6AB	150.47A-D
6	Cakır	53.3 AC	49.0A-C	51.18A-E	41.6 A	41.6AB	41.62AB	175.5AC	163.9AB	169.69A-C
7	Akca	44.5 D	47.7A-C	46.15D-G	40.6 AB	41.6AB	41.14AB	173.4AD	165.4AB	169.37A-C
8	Ilgaz	47.9 BD	47.3A-C	47.62C-G	41.4 A	40.9BC	41.21AB	147.2BE	169.8AB	158.49A-D
9	ILC 482	49.7 AD	50.6AB	50.15A-G	28.7 G	28.0I	28.38J	202.9 A	159.1AB	181A
10	Diyar-95	55.3 A	50.0AB	52.68A-C	37.2 CD	35.1F-H	36.16F-H	128.1CE	160.9AB	144.54A-E
11	Arda	50.6 AD	46.4BC	48.53C-G	35.3 DE	35.73E-G	35.53GH	125.0DE	167.0AB	146.02A-E
12	Akçin	50.5 AD	49.5A-C	50.03B-G	37.6 BD	36.6D-G	37.14E-G	123.7E	134.4BC	129.07C-E
13	Gökçe	46.1 D	43.3BC	44.72G	40.5 AC	41.4A-C	40.91BC	137.3CE	173.7AB	155.25A-D
14	Küsmen	50.6 AD	44.4BC	47.53C-G	41.6 A	40.1B-D	40.87BC	111.1E	126.8BC	118.99DE
15	Uzunlu	53.9 AB	55.5A	54.73AB	41.5 A	40.2BC	40.91BC	131.5CE	85.2C	108.34E
16	Er	49.9 AD	40.9C	45.42FG	38 BD	38.1C-G	38.08D-F	144.4BE	130.9BC	137.64B-E
17	Dikbaş	52.4 AC	42.2BC	47.35C-G	42.4 A	44.6A	43.51A	189.6 AB	134.1BC	161.83A-C
18	Hasanbey	54.6 A	50.1AB	52.38A-C	35.4 DE	38.4B-F	36.88E-H	175.3AC	168.3AB	171.78AB
19	Seçkin	50.4 AD	41.1C	45.8E-G	33.2 EF	36.1E-G	34.68H	130.9CE	188.7A	159.79A-D
20	İnci	49.9 AD	44.5BC	47.23C-G	30.9 FG	32.0H	31.51I	114.1E	168.7AB	141.39A-E
F		**	**	**	**	**	**	**	**	**
CV.(%)		3.95	5.89	1.34	2.76	2.97	0.43	10.27	11.55	29.77

NDP: Number of Days for Pods (day); TUKEY (0.05)

In Şanlıurfa location, it was observed that *Ascocyhta blight* was not very effective in registered varieties in the first year, but in the second year, there was an increase in disease values in the varieties. In Şanlıurfa location, the intensity of Ascocyhta blight disease in varieties under natural conditions was evaluated according to the 1-9 scale and given in Table 2. The number of days to flowering and plant height decreased with the delay in planting time, while yield varied according to rainfall and soil moisture and may be different from year to year (Bejiga and Tollu (1982). It was determined that plant height of chickpea varieties varied between 33.1 and 44.1 cm under Konya ecological conditions (Ceyhan et al (2007). Uzun et al. (2012) emphasized that the number of pods per plant and yield per area were highly positively correlateted. According to the observations, chickpea plants showed normal development during the growing season and no pests and diseases that would significantly affect yield were observed.

Quality Values of Some Registered Chickpea Varieties at Şanlıurfa Location

In 2014 and 2015 growing seasons, quality values (Tables 3 and 4) of some registered varieties yield trials conducted at Şanlıurfa GAP Agricultural Research Institute were analyzed. The average values of the quality results of the trials conducted with a total of 20 varieties, including 17 registered and 3 control varieties at Şanlıurfa location were given in Table 3-4.

In 2014 growing season, as can be seen from Table 3-4, the highest and lowest dry weight values of some registered varieties carried out at Şanlıurfa location in terms of quality values were 44.04-29.80 g, wet weight values were 93.88-61. 53 g, water absorption capacity 0.50-0.32 g/grain, water absorption index 1.15-0.98%, dry volume values 84-73 ml, wet volume values 184-156 ml, swelling capacity 0.50-0.33 ml/grain, swelling index 2.50-2.00%.

Table 3. Quality Results of Some Registered Varieties Trial Conducted at Şanlıurfa

	Varieties	Dry Weight (100 grain weight)(g)			Wet Weight (g)			Water Absorption Capacity (g/grain)			Water Intake Index (%)		
		2014	2015	Average	2014	2015	Average	2014	2015	Average	2014	2015	Average
1	Canıtez	41.74	43.01	42.38	84.98	87.09	86.04	0.43	0.44	0.44	1.04	1.02	1.03
2	Yaşa	37.4	32.54	34.97	76.75	66.77	71.76	0.39	0.34	0.37	1.05	1.05	1.05
3	Işık	40.35	39.42	39.89	86.62	83.21	84.92	0.46	0.44	0.45	1.15	1.11	1.13
4	Hisar	39.94	41.02	40.48	79.21	86.67	82.94	0.39	0.46	0.43	0.98	1.11	1.05
5	Azkan	40.01	37.38	38.70	81.01	75.13	78.07	0.41	0.38	0.40	1.02	1.01	1.02
6	Cakır	43.62	38.69	41.16	88.78	82.99	85.89	0.45	0.44	0.45	1.04	1.14	1.09
7	Akca	43.8	42.53	43.17	93.88	86.88	90.38	0.50	0.44	0.47	1.14	1.04	1.09
8	Ilgaz	40.71	40.57	40.64	87.43	87.05	87.24	0.47	0.46	0.47	1.15	1.15	1.15
9	ILC 482	29.8	30.5	30.15	61.53	62.41	61.97	0.32	0.32	0.32	1.06	1.05	1.06
10	Diyar-95	37.4	35.9	36.65	74.52	72.08	73.30	0.37	0.36	0.37	0.99	1.01	1.00
11	Arda		36.51			74.78		0.00	0.38	0.19		1.05	
12	Akçin	37.6	38.03	37.82	77.95	78.37	78.16	0.40	0.40	0.40	1.07	1.06	1.07
13	Gökçe	43.01	42.47	42.74	86.71	85.59	86.15	0.44	0.43	0.44	1.02	1.02	1.02
14	Küsmen	43.84	41.61	42.73	87.39	84.29	85.84	0.44	0.43	0.44	0.99	1.03	1.01
15	Uzunlu	43.08	37.96	40.52	89.87	77.99	83.93	0.47	0.40	0.44	1.09	1.05	1.07
16	Er	40.52	38.37	39.45	81.65	77.29	79.47	0.41	0.39	0.40	1.02	1.01	1.02
17	Dikbaş	44.04	45.61	44.83	93.78	94.97	94.38	0.50	0.49	0.50	1.13	1.08	1.11
18	Hasanbey	39.33	38.9	39.12	82.17	79.61	80.89	0.43	0.41	0.42	1.09	1.05	1.07
19	Seçkin	35.18	36	35.59	73.03	74.89	73.96	0.38	0.39	0.39	1.08	1.08	1.08
20	İnci	33.13	32.14	32.64	68.31	64.01	66.16	0.35	0.32	0.34	1.06	0.99	1.03
	Varieties	Dry Volume (ml)			Wet Volume (ml)			Swelling Capacity(ml/grain)			Swelling Index (%)		
		2014	2015	Average	2014	2015	Average	2014	2015	Average	2014	2015	Average
1	Canıtez	82	84	83.0	175	177	176.0	0.43	0.43	0.43	2.34	2.26	2.30
2	Yaşa	79	73	76.0	168	157	162.5	0.39	0.34	0.37	2.34	2.48	2.41
3	Işık	81	79	80.0	177	173	175.0	0.46	0.44	0.45	2.48	2.52	2.50
4	Hisar	81	81	81.0	170	174	172.0	0.39	0.43	0.41	2.26	2.39	2.33
5	Azkan	81	78	79.5	172	166	169.0	0.41	0.38	0.40	2.32	2.36	2.34
6	Cakır	83	83	83.0	178	174	176.0	0.45	0.41	0.43	2.36	2.24	2.30
7	Akca	84	85	84.5	184	176	180.0	0.5	0.41	0.46	2.47	2.17	2.32
8	Ilgaz	82	81	81.5	178	177	177.5	0.46	0.46	0.46	2.44	2.48	2.46
9	ILC 482	73	70	71.5	156	152	154.0	0.33	0.32	0.33	2.43	2.60	2.52
10	Diyar-95	79	76	77.5	166	162	164.0	0.37	0.36	0.37	2.28	2.38	2.33
11	Arda		77			165	165.0	-0.5	0.38	-0.06	2.00	2.41	2.21
12	Akçin	78	78	78.0	170	168	169.0	0.42	0.40	0.41	2.50	2.43	2.47
13	Gökçe	83	83	83.0	178	176	177.0	0.45	0.43	0.44	2.36	2.30	2.33
14	Küsmen	84	82	83.0	178	174	176.0	0.44	0.42	0.43	2.29	2.31	2.30
15	Uzunlu	83	78	80.5	180	168	174.0	0.47	0.40	0.44	2.42	2.43	2.43
16	Er	81	78	79.5	172	167	169.5	0.41	0.39	0.40	2.32	2.39	2.36
17	Dikbaş	84	88	86.0	184	184	184.0	0.5	0.46	0.48	2.47	2.21	2.34
18	Hasanbey	80	79	79.5	173	170	171.5	0.43	0.41	0.42	2.43	2.41	2.42
19	Seçkin	77	76	76.5	166	165	165.5	0.39	0.39	0.39	2.44	2.50	2.47
20	İnci	75	72	73.5	160	154	157.0	0.35	0.32	0.34	2.40	2.45	2.43

Table 4. Sieve Analysis Values of Some Registered Varieties Trial Results Conducted at Şanlıurfa (2014-2015)

	Varieties	2014 Sieve Values (%)				2015 Sieve Values (%)				2014-2015 Average Sieve Values (%)			Nitrogen (%)			Protein (%)		
		9 mm	8 mm	7 mm	6 mm	9 mm	8 mm	7 mm	6 mm	9 mm	8 mm	7 mm	2014	2015	ORT	2014	2015	AVR
1	Canıtez		56.50	40.76	3.61	37.28	48.56	14.26			52.53	27.51	3.68	3.69	3.69	22.34	23.04	22.69
2	Yaşa	5.02	72.73	21.94	0.59	8.5	67.39	21.78	3.01	6.76	70.06	21.86	4.46	4.47	4.47	23.61	27.92	25.77
3	Işık	2.50	61.96	32.55	3.43	10.99	65.63	23.45		6.75	63.80	28.00	4.23	4.24	4.24	23.20	26.47	24.84
4	Hisar	1.01	26.55	64.64	8.55	40.38	54.07	4.85	1.07	20.70	40.31	34.75	4.06	4.07	4.07	23.28	25.41	24.35
5	Azkan		37.98	54.73	7.25	39.1	50.91	10.09			44.45	32.41	4.21	4.21	4.21	22.56	26.32	24.44
6	Cakır	12.13	76.83	10.97	1.03	53.52	43.47	3.13		32.83	60.15	7.05	4.39	4.39	4.39	22.96	27.44	25.20
7	Akca	20.27	71.74	8.19	0.7	31.76	64.45	3.93		26.02	68.10	6.06	3.61	3.61	3.61	24.40	22.56	23.48
8	Ilgaz	12.18	76.37	12.23	0	28.92	65.89	5.24		20.55	71.13	8.74	3.71	3.71	3.71	23.47	23.20	23.34
9	ILC 482	8.73	62.70	25.42	3.71	5.23	31.71	55.37	7.84	6.98	47.21	40.40	3.89	3.89	3.89	23.06	24.34	23.70
10	Diyar-95	8.64	73.97	17.46		17.18	65.98	17		12.91	69.98	17.23	3.63	3.64	3.64	24.15	22.72	23.44
11	Arda	0.50	49.86	45.26	5.29	16.79	69.01	14.34		8.65	59.44	29.80	4.07	4.08	4.08	23.08	25.47	24.28
12	Akçin	66.71	28.96	4.60	0.39	16.19	62.82	21.13		41.45	45.89	12.87	3.98	3.98	3.98	22.26	24.90	23.58
13	Gökçe	35.00	57.32	8.36	0	45.45	50.02	4.59		40.23	53.67	6.48	3.78	3.78	3.78	22.66	23.64	23.15
14	Küsmen	9.29	55.13	33.65	2.77	37.53	55.18	7.32		23.41	55.16	20.49	3.85	3.85	3.85	24.69	24.09	24.39
15	Uzunlu	1.86	73.44	24.90	0.4	21.82	63.94	14.24		11.84	68.69	19.57	3.99	3.99	3.99	24.55	24.96	24.76
16	Er	9.55	71.46	18.28	1.47	47.14	43.69	9.18		28.35	57.58	13.73	3.78	3.78	3.78	23.24	23.63	23.44
17	Dikbaş		12.75	75.90	11.53	53.21	34.05	12.78			23.40	44.34	4.16	4.16	4.16	25.12	26.01	25.57
18	Hasanbey	8.75	69.11	21.34	1.16	16.51	68.38	15.14	0.4	12.63	68.75	18.24	3.93	3.93	3.93	23.05	24.56	23.81
19	Seçkin	0.47	51.38	41.55	7.25	9.66	65.57	22.98	1.84	5.07	58.48	32.27	4.35	4.36	4.36	23.07	27.23	25.15
20	İnci		55.01	43.59	1.96	1.5	62.8	32.81	3.17		58.91	38.20	3.49	3.49	3.49	22.20	21.83	22.02

Sieve analysis values were found to vary between 66.71-0.47 in sieve number 9, 76.83-12.75 in sieve number 8, 75.90-4.60 in sieve number 7. As for protein analysis values, the highest value of 25.12% was obtained from Dikbaş variety and the lowest value of 22.20% was obtained from İnci variety and it was determined that they varied between these values. Among the varieties included in this study conducted in Şanlıurfa location, Dikbaş variety stood out by giving the highest values in terms of dry weight, dry volume, wet volume and swelling capacity compared to other varieties.

In the 2015 growing season, as can be seen from Table 3-4, the highest and lowest dry weight values 45.61-30.50 g, wet weight values 94.97-62. 41 g, water absorption capacity 0.49-0.32 g/grain, water absorption index 1.15-0.99 %, dry volume values 88-70 ml, wet volume values 184-152 ml, swelling capacity 0.46-0.32 ml/grain, swelling index 2.60-2.17 %. Sieve analysis values were found to vary between 53.52-1.50 in sieve number 9, 69.01-31.71 in sieve number 8, 55.37-3.13 in sieve number 7. As for the protein analysis values, the highest value of 27.92% was obtained from Yaşa variety and the lowest value of 21.83% was obtained from İnci variety and it was determined that they varied between these values. Among the varieties included in this study, Dikbaş variety stood out by giving the highest values in terms of dry weight, wet weight, water absorption capacity, dry volume, wet volume, swelling capacity compared to other varieties. (Yalçın et al. 2018) showed that the protein ratio varied between 21.66 and 24.91% in their study.

In 2014 and 2015 growing seasons, as can be seen from Table. 3-4, the highest and lowest dry weight values in terms of average quality values of some registered varieties carried out in Şanlıurfa location are 44.83-30.15 g, wet weight values are 94.38-61.97 g, water absorption capacity is 0. 50-0.19 g/grain, water absorption index 1.15-1.00%, dry volume values 86.00-71.50 ml, wet volume values 184-154 ml, swelling capacity 0.48-0.33 ml/grain, swelling index 2.52-2.21%. When the average sieve analysis values were examined, it was determined that they varied between 41.45-5.07 in sieve number 9, 71.13-23.40 in sieve number 8 and 44.34-6.48 in sieve number 7. In terms of both growing seasons, the highest value of 25.77% was obtained from Yaşa variety and the lowest value of 22.02% was obtained from İnci variety. Among the varieties at Şanlıurfa location, Dikbaş variety stood out by giving the highest values in terms of dry weight, wet weight, water uptake index, dry volume, wet volume and swelling capacity compared to other varieties (Table 3-4). Amir et al. (2006), Poniedziaek et al. (2006) found that in chickpea, lentil and bean crops grown under Algerian conditions, protein ratio and total sugar content were higher in years with more rainfall, while other parameters were higher in years with less rainfall. In the study, it was reported that sowing time changed 100 grain weight and protein ratio in grain (Topalak et al. 2015; Atmaca 2008; Singh et al. 1988). It was emphasized that chickpea plant is rich in vitamins and minerals and its versatile uses (Karakullukçu et al. 2008). (Uzun et al. 2012; Waldıa et al. 1995) stated that the criteria affecting the cooking quality are hundred grain weight, grain volume, water absorption capacity and seed coat content.

Conclusion

In this study, some registered chickpea (*Cicer aritinum* L.) cultivars were tested under Şanlıurfa ecological conditions and their regional adaptability and tolerance/resistance to Ascochyta blight under different climatic conditions were investigated by considering important agronomic traits such as days to flowering, plant height, grain yield and hundred grain weight. According to the two-year average results, Diyar95 variety was the late variety with 87.83 days and Gökçe was the early variety with 78 days in terms of days to flowering; Hisar variety stood out with 55.85 cm in terms of plant height; Dikbaş variety had the highest 100 grain weight with 43.51 g and ILC 482 variety had the lowest 100 grain weight with 26.38

g. In terms of grain yield, Işık variety gave the highest grain yield 181.65 kg/da, while Uzunlu variety gave the lowest grain yield 108.34 kg/da. Işık, ILC 482, Yaşa and Hasanbey varieties were the prominent varieties for cultivation in Şanlıurfa location.

In terms of quality values, Cevdetbey variety stood out by giving the highest values in both growing seasons with dry weight, wet weight, water uptake index, dry volume, wet volume, swelling capacity values compared to other varieties.

References

Anonymous, 2022. FAO. https:// www. fao. org/ faostat/

Amir Y, Haenni AL, Youyou A. 2006. Differences in The Biochemical Composition of Dry Legumes Cultivated in North Algeria. EJEAFChe, 5(3); 1411-1418.

Bejiga G, Tollu A. 1982. The Influence of Plantings Dates on the Yield of Three Chickpea (Cicer a Khorgade, PW, Narkhede, M.N. and Raut, S.K. 1985. Genetic Variability Studies in Chickpea. International Chickpea Newsletter, 12; 12-13.

Atmaca E. 2008. The Effect of Different Sowing Times and Row Spacing on Yield, Yield Elements and Quality in Some Chickpea Varieties and Lines in Eskisehir Conditions, PhD Thesis, 90 p., Ankara

Ceyhan E, Önder M, Harmankaya M, Hamurcu M,Gezgin S. 2007. Response of chickpea cultivars to application of boron in boron deficient calcareous soils .Communications in soil Science and Plant Analysis. 38:2381-2399.Chen ve ark., 2004

Chen W, Coyne CJ, Peever TL, Muehlbauer FJ. 2004. Characterization of chickpea differentials for pathogenicity assay of Ascochyta blight and identification of chickpea accessions resistant to Didymellarabiei. Plant pathology, 53, 759-769.

Doğan Ş, Doğan Y, Kendal Y. 2018. Determination of the yield and adaptability of some chickpea (Cicer arietinum L.) genotypes under Mardin conditions. Anatolian Multidisciplinary Studies Congress.

Eylem Tugay Karagül 2017. Genetic resources of edible grain legumes in Turkey, Anadolu Journal of AARI 27 (1) 2017, 56-70.

Gan YT, Siddique KHM, Mac Leod WJ, Jayakumar P. 2005. Managementoptions for minimizing the damage by Ascochyta blight (Ascochyta rabiei) in chickpea (Cicer arietinum L) Field Crops Res. 97; 121-134.

Gregersen PL, Culetic A, Boschian L, Krupinska K. 2013. "Plant senescence and crop productivity". Plant Molecular Biology, 82(6), 603–622

Karakullukçu E, Adak MS. 2008. Determination of Salt Tolerance of Some Chickpea (Cicer arietinumL.) Varieties. Journal of Agricultural Sciences 14 (4): 313-319.

Mart D, Türkeri M, Ramazan A, Atmaca E, Dumrul SE, Çankaya N, Anlarsal AE. 2021. "Evaluation of Morphological, Quality and Yield Characteris tics of Some Regis tered Chickpea (Cicer arietinum L.) Varieties in The Eas tern-Mediterranean Region". Ekin Journal of Crop Breeding and Genetics, 7(2), 116–124

Ponıedzıaek M, Sekara A, Cıura J, Jedrszczyk E. 2006. The Effect of Sowing Times And Locality On Yield And Seed Quality of Two Chickpea Cultivars (Cicer arietinum L.). Katedra Warzywnictwa Z Ekonomika Ogrodnictwa, Akademia Rolnicza, Al. 29-Listopada 54, 31-425 Kraków, Poland.

Ray K, Singh D, Laljat B. 2017.Effect of sowing time and seed rate on growth and yield of chikpea cultivars. Advance Research journal of crop ımprovement, 8 (1), 1-16

Reddy MV, Sing KB. 1984. Evalution of a world collection of chickpea germplasm accessions for resistance to Ascochyta blight. Plant Disease, 65, 586-587.

Singh N, Sandhu SK, Kaur M. 2003. Characterization of Starches Seperated from Indian Chickpea (Cicer arietinum L.) Cultivars, 63 (441-449).

Singh KB, Erksine W, Robertson LD, Nakkoul H, Williams PC. 1988. Influence of Pretreatment on Cooking Quality Parameters of Dry Food Legumes. Journal Science Food Agric., 44; 135-142.

Topalak C, Ceyan E. 2015. Effects of Different Sowing Times on Grain Yield and Some Agricultural Traits in Chickpea. Effects on Grain Yield and Some Agricultural Characteristics. Selcuk Journal of Agricultural Sciences 2(2):128-135.

Uzun A, Özçelik H, Yılmaz S. 2012. Evaluation of some selected chickpea (Cicer arietinum L.) lines for agronomic and quality traits. Academic Journal of Agriculture 1(1): 29-36 (2012) Research ISSN: 2147-6403

Ülker M, Ceyhan E. 2008. Determination of some agronomic characteristics of bean (Phaseolus vulgaris L.) genotypes grown under Central Anatolian conditions. S.Ü. Zir. Fak. Journal, 22(46), 83-96.

Waldia RS, Singh VP, Sood DR, Tomar YS. 1995. Variation for Cooking Quality and Their Association with Seed Mass and Seed Coat İn Kabuli Chickpea. International Chickpea and Pigeonpea Newsletter, 2: 40-42.

Yalçın F, Mut Z, Erbas Kose OD. 2018. Determination of Suitable Chickpea (Cicer arietinum L.) Varieties to Provide High Yield in Afyonkarahisar and Yozgat Conditions. JAFAG, 35 (1), 46-59.