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Evaluation of Some Chickpea (*Cicer aArietinum* L.) Varieties and Lines In Cukurova Region Regarding Yield and Some Plant Characteristics

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Abstract

Food legumes dry seeds are one of the main protein sources for humans and animals because of the high protein, vitamin and mineral levels they have. This study was conducted under seasonal conditions of Cukurova region with local materials and the materials from ICARDA. This research was made as winter sowing by 20 lines at Dogankent, where East Mediterean Agricultural Research Institute is located and selections and evaluations are conducted for winter sowing.

In 2011 – 2012 season plantations as a part of this study highest yield was obtained from FLIP 05-54C line with 205.03 kg/da and lowest yield was from a local variety with 20.55 kg/da. 100 seed weight varied in between 46.89 and 20.66 gr., flowering days varied in between 61and 78 days and plant height varied in between 66.77 and 53.44cm the year study was conducted. However, Ascochyta Blight (Ascochyta rabiei (pass.)Labr.) appears as a significant problem especially at rainy and mild winters during growing of winter varieties.

Keywords: Chickpea, yield, variety breeding

Introduction

In our country, carbohydrate is the main food resource. Usually, there is insufficient use of herbal or animal protein resources. (Eser ve ark. 1990). Our protein resources are herbal and animal products. Food legumes dry seeds have approximately 18-37 % protein, depending on variety, type, growing and environmental conditions. 22% of herbal proteins and 7% of carbohydrates which are used for human feed, and 38% of proteins and 5% of carbohydrates which are used for animal feed are supplied from legumes (Wery ve Grinac 1983).

In addition to their nutritional value, food legumes have also a good affect the the soil they are grown. Sustainable agriculture and their characteristic of fixing nitrogen in the air to soil further increase their importance. Turkey has 9,6% share for lentil production, 4,6% share for chickpea production and 1% share for bean production in the world (FAO, 2013).

In field crops, food legumes rank second after cereals regarding cultivation area and production. Using chick pea and lentil in arid and half arid areas and beans in wetland areas for crop rotation is important for increasing the yield in unit area and for decreasing fallow areas.

As all other agricultural products that have problems, the biggest problem for chickpea, which is one of food legumes dry seeds, is sensitivity to anthracnosis and lack of machinery utilization for harvest . The biggest target of breeding research is to find new chickpea varieties, which are suitable for machinery harvesting and have tolerance to ascochyta blight.

Developing varities which are suitable to the region is very important for Chickpea, as it is one of the major factors to increase quality and production. This research was conducted in order to have new chickpea varieties in Cukurova region, which have higher quality, higher yield, middle / large seed size and tolerance against diseases / pests.

Material and Method

In this study, ICARDA origin chickpea lines, local leblebi, food legume lines and varieties were used. Winter and summer origin 20 lines are tried in Çukurova winter sowing conditions and varieties are chosen for usage in breeding program as a result of observations and selections.

This study is conducted in trial parcels of Eastern Mediterranean Agricultural Research Ins (Adana) in year 2012 growing season. 45 cm space in between rows and 8 cm space on rows were

given on 5 mt long 4 rows (9 sqm parcels) for trial parcels. 3.0 kg N, 6 kg P2O5 fertilizer per 1.000 sqm was applied before plantation. Morphological observations are made on each parcel. Also readings and observations are made to identify natural tolerance of varieties against anthracnose.

Climatic properties of trial area

When Table 1 is studied, the facts that December – July period, which represents growing season of chickpea, has a total rainfall of 512,9 mm, rain fall is uneven, has much rain during sowing period and has little rain during flowering and pod forming period can be seen. This uneven distribution had a negative affect on plant development.

Table 1 2011-12 Growing year rainfall, average temparature and total relative humidity values of Adana

Months	Rain (mm)		Average Temperature C°		Humidity (%)	
	Long Years	2011-2012	Long Years	2011-2012	Long Years	2011-2012
November	67	34,5	15.3	12,6	84	52,3
December	118	225,4	11.1	10,0	125	65,2
January	111	57,5	9.7	8,2	116	75,3
February	92	49,3	10.4	8,6	83	58,3
March	67	13,4	13.3	11,4	61	55,4
April	51	36	17.5	18,1	69	68,3
May	46	43,0	21.7	20,8	67	74,0
June	25	35,5	25.6	26,7	66	66,2
july		18,3		29,3		65,3

Table 2. Seed yield, flowering period, plant height, first pod height, maturity period and 100 seed weight values in winter sowing chickpea genotypes on year 2011-2012

No	Varieties	Yield (kg/da)	100 seeds weight (gr)	Flowering (days)	Plant height (cm)	First Pod height (cm)	Disease (Ant.) (1-9)
1	FLIP 05-150C	160,22 ab	42,22	68	65,89	30.00	2
2	FLIP 05-170C	106,96 b-d	45,78	69	66,11	31.66	3
3	FLIP 03-126C	148,96 ab	41,77	65	57,78	20.00	4
4	FLIP 01-24C	110,96 b-d	45,11	66	62,05	25.66	4
5	FLIP 05-54C	205,03 a	35,33	68	53,44	19.33	3
6	FLIP 03-28C	152,89 ab	40,88	70	58,22	29.33	3
7	EN 1680	118,29 b-d	43,33	77	60,89	29.66	4
8	EN 1682	134,22 a-c	46,66	68	61,22	35.00	4
9	EN 1683	137,70 a-c	46,89	69	65,44	28.66	3
10	EN 1685	146,51 ab	45,11	75	62,11	31.00	4
11	EN 1750	150,51 ab	43,77	78	66,77	26.66	4
12	EN 1751	157,40 ab	45,89	77	63,00	28.33	3
13	EN 1685	163,03 ab	44,22	78	63,89	33.66	4
14	ENA 133-1	138,89 ab	42,66	72	55,22	26.00	3
15	Denizli -Tavas	37,62 de	25,33	61	55.00	25.00	6
16	Çorum	20,55 e	20,66	61	57.78	25.00	6
17	Antalya	56,81 c-e	35,33	62	57,50	24.00	5
18	HASANBEY	205,18 a	40,89	75	64,00	25.33	3
19	SEÇKİN	163,18 ab	38,44	76	56,77	26.66	2
20	İNCİ	128,96 a-c	33,55	75	57,11	25.00	2
	VK	37,39					

Findings and Discussion

Yield values of the varieties grown in 2011 – 2012 winter growing season at Eastern Mediterranean Agricultural Research Ins. trial parcel are given in Table 2. As a result of drought and uneven rain fall, low values are observed in regards with 100 seed weight and yield.

Highest seed yields are obtained from Hasanbey variety 205.18kg/da, FLIP 05-54C line

205.03kg/da and Seçkin variety 163.18kg/da as shown in Table 2. Lowest values are obtained from local varieties for roasted chickpea use as Çorum 20.55 kg/da, Denizli-Tavas 37.62 kg/da and Antalya 56.81 kg/da. Drought and uneven rain fall in 2012 caused yield losses. Particularly early and sensitive local varieties for roasted chickpea use are affected a lot as shown in values.

Highest values in terms of flowering period are obtained from EN 1750, EN 1685 lines with 78 days and EN 1751 , EN 1680 lines with days and they were observed as the latest varieties. Çorum, Denizli-Tavas varieties with 61 days and Antalya varieties with 62 days are earliest varieties among local varieties for roasted chickpea use. Drought and uneven rain fall in growing season trigerred anhtracnose disease and had negative impact on flowering.

Literature

Anonymous, 2013. TÜİK.

Açikgöz, N., 1987. Nohut Tarımı, Ege Bölge Zirai Arş. Ens. Müd. Yayın No: 76, Menemen-İzmir, 25 s.

Dahıya, B. S. Kapoor, A.C. SolankI,I.S. Waldıa,R.S. 1982.Effect of Cultivar and Location on Seed Protein in Chickpea (*Cicer arietinum* L.) Exp. Agric, 18: 289 –292.

Eser, D.,Avcıoğlu, R., Soya, H., Geçit, H. H., Çiftçi, C.Y. ve Emeklier, H.Y. 1990. Türkiye'de Yemeklik ve Yemeklik BaklagilÜretimi ve sorunları. Türkiye Zir.Müh. 3. Teknik Kongresi, 23-46 s. Ankara.

Finlay, K.W., Wilkinson,G.N., 1966. The Analysis of Adaptation in Plant Breeding Programe. Aust.J.Agric. Res. 14 : 742 – 754.

Mart, D., Anlarsal,E; 2001. Çukurova Koşullarında Nohutta (Cicer arietinum L.) Bazı Önemli Özellikler Yönünden Genotip X Çevre İnteraksiyonları ve Uyum Yeteneklerinin saptanması Üzerine Bir Araştırma. Türkiye 4. Tarla Bitkileri Kongresi 17-21 Eylül 2001, Tekirdağ.

Mart, D; 2006. Investigation of relations amang ascochyta blight and plant morphology with multi – regrassion on winter planted chickpea (Cicer arietinum) varieties in the Çukurova region, Ascochyta 2006, 2-6 Temmuz, Le Tronchet, France.

Mart, D. Cansaran, E. ve Karaköy, T. 2007. Çukurova Koşullarında Bazı Nohut (*Cicer arietinum L.*) Hat Ve Çeşitlerinin Verim Ve Verim Öğeleri İle Bunlar Arasındaki İlişkilerin SaptanmasıTürkiye VII. Tarla Bitkileri Kongresi, 25-27 Haziran 2007, Erzurum (Poster Bildiri)

Result

As a result of observations and measurements for choosing the high yield line and varieties in the area study was conducted, FLIP 05-54C line drew attention with 205.03kg/da yield.The fact that yield figures 205.18kg/da was obtained from Hasanbey variety and 163.18kg/da from Seçkin variety indicates that local varieties show good performance even in extreme conditions. Drought and uneven fall of rain resulted with yield losses in varieties for roasted use. Particularly early and sensitive local varieties for roasted chickpea use are affected a lot as seen from values. Re-evaluation of varieties for roasted chickpea use is considered as a result of extreme conditions of trial year.

Mart,, D.,, Çinkaya, N., T. Karaköy and A. Keçeli, 2010, Adaptation of Registered Chickpea (Cicer arietinum L)Varieties To Cukurova Region And Investigation Of Quality Values In Regional Conditions, Book Abstracts, 5th International Food Legumes Research Conferance (IFLRCV) &7th European Conferance On Grain Legumes (AEP VII); Legumes For Global Health Legume Crops And Products For Food, Feed And Environmental Benefits April 26-30, 2010-Antalya.Muehlbauer, F.J.and K.B. Singh, 1987, Genetics of chickpea. P. 99-125.In M.C. Saxena and K.B. Singh (ed) The chickpea, CAB Int, Oxon UK.

Phadnis, B.A., A.P. Ekbote And S.S. Ainchwar.(1970); Path-Coefficient Analysis in Gram (*C.arietinum*). Bibloography of Chickpea Genetics and Breeding., 115:915.

Saxena, M.C., 1980. Recent Advences İn Chickpea Agronomy. In Proceedings Of The First International Workshop on Chickpea Improvement, 28 Feb- 2 Mar 1979. Icrisat, Hyderabat, India, s.89-96.

Slim, S.N., Saxena. M.C.,1993Adaptation of Spring-Sown chickpea to the Mediterranean Basin.II. Factors ınfluencing Yield under Drought, Field Crops Research, 34, 137-146.

Şehirali, S., 1988. Yemeklik Tane Baklagiller. Ank. Ün. Zir. Fak..yayınları :1089, Ankara, 435 s.

Şehirali, S.,2002. Tohumluk ve teknolojisi, Trakya Ün. Ziraat Fak., Tarla Bitkileri Böl. İstanbul.

Wery, J. and P.Grinac. 1983. Uses of legumes and their economic importance. In: Technical handbook on symbiotic nitrogen fixation. FAO, Rome, Italy.