WALIA journal 30(S1): 363-370, 2014
Available online at www.Waliaj.com
ISSN 1026-3861

To study the effects of cultivar, plant density and weed control on number of weeds in farm of faba bean in climatic conditions of Khuzestan

Ferydon Ghorban Alizadeh *, Nazer Aryannia, Shpoor Lorzadeh

Department of Identifying and fighting weeds, Shoushtar Branch, Islamic Azad University, Shoushtar, Iran

Abstract: In order to study the effects of plant density and cultivar on weed control in faba bean fields in climatic conditions of Shushtar, an experiment was conducted in Mian-Ab Region of Shushtar, 13 km, Shushtar-Ahwaz Road, for one year in agricultural year of 2011-2019. In this experiment a complete randomized block design in a factorial-split arrangement with four repetitions was used, in which faba bean cultivar was considered at three levels (Barakat, V1; Saraziri, V2; and Mahalli, V3), density at three levels (7,11 and 14 plants per square meter; D1,D2 and D3 respectively), and weed population of %0 , %50 and %100 (R3,R2 and R1 respectively). The analysis of variance revealed that number of narrow leaf weeds was not influenced by cultivar in all five stages of sampling and was not significantly affected by plant density. Also the results revealed that number of narrow leaf weeds were significant affected by different levels of weed removal in five stages sampling. The results showed that the number of broadleaf weeds was highly significant under effect of different levels of weed removal in the each five times of sampling. So that at the first time, the highest number of broadleaf weed was obtained with an average 19.89 in condition under 50% weed removal and at four times sampling, under without weed control condition, the highest number of broadleaf weeds was obtained with averages of 16.22, 11.22, 8.56 and 9.78 plants per square meter, respectively. The results showed that the total number of narrow leaf and broad leaf weeds in five sampling stages were not affected by cultivar. The number of narrow leaf and broadleaf weeds, only in first stage, were highly significant under effects of crop density. So that the highest number of narrow leaf and broadleaf weeds was obtained 23.77 mean plant of broadleaf and narrow leaf per square meter under condition density of 14 plants.

Key words: *Faba bean; Cultivars; Plant density; Weed control percentage; Narrow leaf; Broad leaf*

1. Introduction

Weeds are considered as a persistent pressure on agricultural productions, which in case not being weeded, can reduce quality and quantity of crop through competing with main plant (Kavarmasi et al., 2010). Ideal plant density is one by which all environmental factors (water, air, sunlight, and soil) are completely used while intra- and extra-plant competion is at the minimum level so that the maximum yield can be achieved with a desirable quality. Alternatively, that density must provide adequate space for maintanance and harvest operations (Khajeh-pour, 2008; Sharifi-zadeh et al. 2012). Mathew et al. (2008) believe that plant density is the most determining factor for plant growth and dry mater accumulation. Ideal density depends on various factors the most important of which are: plant,s properties, vegetative duration, date and method of planting, soil,s productivity, plant size, available humidity, solar radition, planting pattern and weed condition (shirtlif and Johanson, 2002).

Castro Coelho and Aguiarpinto (1989) observed that in lower densities of cultivation, dry matter accumulation in pod, stem and leaf was more than that in pod, stem and leaf in higher densities of cultivation in equal days after planting; moreover, increase in dry weight was more in pod rather than stem and leaf and that rate of matter accumulation in this organ heightened as pod started to fill, due to fact that pod was a strong target. In studying 8 planting densities from 7 to 91 plants per square meter, index harvest in vetch decreased as density levels increased; however, no significant different was observed in seed weight of soya. It seems that a plant adjusts its final size to the environment which from the beginning exhibits its prominence by primarily changing the number of pods per plant (Lemma et al., 2009). Also, in studying three distances on rows of faba bean with 10,20 and 30 cm in densities of 14.2 , 7.1 and 4.7 plants per square meter respectively it was determined that increase in distance on rows caused pod number per plant, primary stem and, thus, seed yield to heighten (Idris,2008). Actually, improvement and breeding management of faba bean can be planned more accurately in the future by evaluating and analyzing and agricultural traits, especially traits effective in faba bean yield. Not much research has so far been performed to investigate the agricultural techniques used for faba bean in Khuzestan Province. Therefore, conducting some research of this kind can help the increase in faba bean yield in the Province.

* Corresponding Author.

2. Materials and methods

This experiment was conducted in field located on 13th km, Shushtar-Ahwaz Road, for one year in agricultural year of 2010-2011. This field with a height of 67 m above sea level and 32º 3′ north latitude and 48º 50′ east longitude is locate in the southwestern part of Iran. On the whole, all the south coastal lands of the country whose height is less than 100 meters have desert climate. Therefore, whole the plain of Khuzestan to the feet of Lodestones Mountains have the properties of this kind of climate. There is an intense warm all over this region (the absolute maximum temperature recorded for this region is 53º related to Ahwaz). Average rainfall in this region is low and at the same time irregular. All the rainfall almost happens in winter, and 7 months of the year lacks rainfall (kuchaki et al., 1995).

This experiment used a complete randomized block density in a factorial-split arrangement with four repititions in which cultivar of faba bean was considered at three levels (Barakat, V1; Saraziri, V2; Mahalli, V3), density at three levels (7, 11, and 14 plants per square meter; D3, D2 and D1 respectively) and population of weed of %0, %50 and %100 R1, R2 and R3 respectively). For weed which was considered at three levels of %0, %50 and %100, R1, R2 and R3 respectively, at %0 level weeds were removed until the end of growth period. At % 50 levels, 50 percent of weeds were controlled. Their control was performed in the manner of removing them from between 1 and 2, 3 and 4, and 5 and 6 lines. From the time of growth of weeds fighting against them started and continued until the end of plant growth such that weeds on the one side of the hill were removed and weeds on the other side were not. In other words, weeds of one ditch were removed and weeds of the next one were not (weed control of every other ditch). At level R3, weeds existed until the end of growth period. Final harvest was performed at time of ripeness from line 4. The entire length of line (6m long) was harvested by using method after removing upper and downer 0.5-mere margins. Obtained data were inserted into tables of spreadsheet of Excel after conclusion and classification. Raw data were variance analyzed by SAS statistical program, and means comparison was performed using Duncan test method. Diagrams were depicted by using Excel Software.

3. Results and discussion

Table 1: Analysis of variance (mean squares) number of weeds

S.O.V	df	mean squares					
		Number of narrow leaf-1	Number of broad leaf-1	Total-1	Number of narrow leaf-2	Number of broad leaf-2	Total-2
R	3	261.9825*	109.8722 ns	6727.493*	** 1067.115	6969.64 sn	ns 6625.133
Cultivar	2	11.3914 ns	7600.83 ns	3266.40 ns	0573.65 ns	9392.9 ns	ns 4785.115
R ×Cultivar	6	35.5543	9904.140	2767.63	7653.33	4558.50	0339.48
Density	2	64.5806 ns	6669.445*	** 4377.774	7960.10 ns	ns 7500.258	ns 0460.227
weed control	2	685.7938**	1174.4312**	** 0022.8347	** 1534.252	** 1133.2541	** 4695.4282
Cultivar× Density	4	43.8592 ns	4096.20 ns	3805.44 ns	5426.11 ns	5855.99 ns	ns 9922.107
Cultivar× weed control	4	26.7610 ns	8657.26*	2653.41*	2342.28*	9598.55*	2510.89*
Density × weed control	4	57.6823*	9871.168*	9949.316*	0456.23*	9027.157*	8650.110*
weed × Density ×Cultivar control	8	87.9794 ns	2780.115**	** 7903.191	2245.20*	6319.78*	8148.74**
Error	72	65.15	1249.104	6377.153	9011.16	58.90	1867.90
CV (%)	-	46.56	58.79	93.68	38.59	68.98	69.77

respectively significant (p≤0.05) and highly significant (p≤0.01) :** ,* ns: non significant,

3.1. Number of weeds

According to observations and notes, weeds in vicia faba fields included: Sinapis arvensis, Malva, beetroot, wild oat, Chenopodium album, Plantago lanceolata and Melilotus officinalis which broadleaf weeds were dominant in the field. Sinapis arvensis and beetroot from broadleaf weeds and wild oat from narrow were dominant leaf weeds than other weeds.

3.2. Number of narrow leaf weeds

The analysis of variance revealed that number of narrow leaf weeds was not influenced by cultivar in all five stages of sampling and was not significantly affected by plant density. Also the results revealed that number of narrow leaf weeds were significant affected by different levels of weed removal in five stages sampling (Tables 1,2,3). So that in all of stages numbers of weeds in the treatment without weed control and the treatments with 100 % weeds

removal were maximum and minimum, respectively. However in the fourth stage, maximum of narrow leaf weeds were observed in treatment with 50% weed removal.

Table 2: Analysis of variance (mean squares) number of weeds

S.O.V	df	mean squares					
		Number of narrow leaf-3	*Number of broadleaf-3*	*Total-3*	*Number of narrow leaf-4*	*Number of broadleaf-4*	*Total-4*
R	3	6425.18 ns	6924.73 ns	0709.37 ns	5627.17 *	8010.76 *	7060.117 **
Cultivar	2	2305.4 ns	0843.3 ns	0490.1 ns	1021.22 ns	5345.29 ns	3814.6 ns
Cultivar × R	6	5878.2	4937.42	7157.43	2713.23	4720.16	8202.24
Density	2	9242.0 ns	3156.87 ns	0340.106 ns	5345.1 ns	5886.20 ns	3604.33 ns
weed control	2	3025.67 **	5168.1144 **	4544.178 **	2192.43 **	4414.768 **	2102.1147 **
Density × Cultivar	4	1586.4 ns	0061.5 ns	3650.6 ns	3713.6 ns	3845.10 ns	1067.25 ns
weed control × Cultivar	4	0139.8 *	1567.6 *	5872.6 *	1915.13 *	5936.20 *	8143.36 *
weed control × Density	4	7376.3 ns	5149.74 *	3124.83 *	3187.2 ns	2383.27 *	4400.24 *
Cultivar × Density × weed control	8	3458.5 *	1224.8 ns	9294.19 **	3417.8 ns	5368.6 *	3035.13 *
Error	72	0602.8	8119.39	9927.43	47.6	8216.19	4037.26
CV (%)	-	98.44	47.100	16.89	28.106	87.83	54.78

ns: non significant,* ,** : respectively significant (p≤0.05) and highly significant (p≤0.01)

The results showed that the number of narrow leaf weeds weren't affected by the cultivars interaction and plant density in all five stages of sampling. Results showed that the numbers of narrow leaf weeds the in first and fifth stages were not influenced by the cultivar interaction in weed removal; But the number of narrow leaf weed was significant in third, fourth and fifth stages because of cultivars interaction and weed removal effects (Tables 1,2,3). So that the highest number of narrow leaf weeds was observed in the second and third stages of sampling in treatment without weed control and Barakat cultivar; But in the fourth stage of sampling was obtained the highest number of narrow leaf weeds with 50% weed removal and Barakat cultivars.

Analysis of variance showed number of narrow leaf weeds were significant in the first and second stages because of interaction of plant density on weed removal at the 5% level of significance, statistically, but the number of narrow leaf weeds in third, fourth and fifth stages and were not affected by the interaction of plant density and weed removal (Tables 1,2,3). The comparisons between the plant density interactions and weed removal on number of narrow leaf weeds showed in the first stage, the highest number of narrow leaf weeds was obtained in without weed control and density with 7 plants per square meter conditions. In the second stage, the highest number of narrow leaf weeds obtained in without weed control and density with 11 plants per square meter conditions.

Results showed that the number of narrow leaf weeds in the first, fourth and fifth stages were not influenced by the triple interaction; cultivars interactions, plant density and weed removal. However, in the second and third stages was significant triple interaction at the 5 % level of significance, statistically (Tables 1,2,3). Figure 1-4 shows in second time, the highest number of narrow leaf weeds was obtained in condition of without weed control, density of 11 plants per square meter of faba bean and for Barakat cultivar. This figure also shows that the number of narrow leaf weeds, in condition of density of 14 plants per square meter in Barakat and Saraziri cultivars, in treatment with 50% weed removal are more than in treatment without weed control and in other conditions, the narrow leaf weeds in all the three cultivars was observed in without weed control conditions. Figure 2 shows in third time, the highest number of narrow leaf weeds was obtained in condition of without weed control and the density of 14 plants per square meter in Barakat cultivar. Generally, this figure show in this time of sampling, the number of narrow leaf weeds was higher than that the other two treatments in condition of without weed control.

3.3. Number of broadleaf weeds

Analysis of variance revealed the number of broadleaf weeds sampling were not influenced by cultivar in each 5 times of. Also, number of broadleaf weeds in the first time sampling was influenced by crop density (Tables 1,2,3). So that in first time, the highest number of broadleaf weeds was obtained in condition under density of 14 plants per square meter with an average 17.37. The results showed that the number of broadleaf weeds was highly significant under effect of different levels of weed removal in the each five times of sampling. So that at the first time, the highest number of broadleaf weed was obtained with an average 19.89 in condition under 50% weed removal and at four times sampling, under without weed control condition, the highest number of broadleaf weeds was obtained with averages of 16.22, 11.22, 8.56 and 9.78 plants per square meter, respectively. The results showed

that the number of broadleaf weeds isn't affected by the interaction of cultivars and plant density on all of five times sampling. This attribute were significant because of interaction of plant density and weed removal on the each time of sampling unit (Tables 1,2,3).

Table 3: Analysis of variance (mean squares) number of weeds

S. O. V	df	mean squares		
		Number of narrow leaf-5	*Number of broadleaf-5*	*Total-5*
R	3	0823.12 ns	4218.17 ns	6590.42 ns
Cultivar	2	8778.1 ns	6509.16 ns	0903.9 ns
Cultivar × R	6	3567.3	2459.50	3896.41
Density	2	7154.4 ns	9242.17 ns	7600.23 ns
weed control	2	2562.44 *	1944.923 **	9011.1324 **
Density × Cultivar	4	9513.10 ns	7449.19 ns	3263.9 ns
weed control × Cultivar	4	2846.5 ns	5694.5 *	8818.4 *
weed control × Density	4	1574.1 ns	5227.41 *	5324.41 *
Cultivar × Density × weed control	8	9592.5 ns	3076.56 *	1051.77 *
Error	72	3620.10	96.47	5177.59
CV (%)	-	26.53	51.116	48.107

ns: non significant,* ,** : respectively significant (p≤0.05) and highly significant (p≤0.01)

The results show that the highest number of broadleaf weeds, the first and second times, averages were 26.33 and 22.67 broadleaf weed plants per square meter, respectively; under condition of without weed control and crop density of 14 plants per square meter. In third time, average was 12 broadleaf weed plants per square meter under both of conditions without weed control and 50% weed removal at the density of 14 plants per square meter. In the fourth time, under condition of 50% weed removal and crop density with 14 plants per square meter, average was 9.67 broadleaf weed per square meter and in the fifth time, the highest number of broadleaf weed was obtained under condition with without control of weed and in treatment with 7 plants per square meter.

Analysis of variance showed on five times sampling, number of broadleaf weeds was significant at the 5 % level of significance, statistically, that is affected by interaction of cultivar and weed removal. So that mean comparisons of interaction indicates that the highest number of broadleaf weed, in the first time, was obtained a mean of 22.33 weed plants per square meter, under condition 50% of weed removal on Saraziri cultivar. In the second time, the mean was obtained 19.33, without weed control, in the third, fourth and fifth times, the means were obtained 11.67, 10.67 and 10.67, respectively, under condition without weed control on local cultivar. Analysis of variance revealed the number of broadleaf weeds is affected by the interaction of triple cultivars on plant density with weed removal that was significant for all time except third time (Tables 1,2,3). Figure 3 shows the highest number of broadleaf weeds, in first time, was obtained under condition of without weed control and crop density of 14 plants per square meter on Saraziri cultivar. Figure 4-4 shows the highest number of broadleaf weed, in second time, was obtained under condition of without weed control and crop density of 14 plants per square meter on Barakat cultivar. This figure also shows that Barakat cultivar isn't favorable to compete with weeds, under conditions without weed control. However, with the density of 11 plants per square meter, this cultivar has competitive ability better than the other cultivars. It also shows the number of broadleaf weeds in all three levels of density and treatments with weed removal, range of variation is less on the Saraziri cultivar.

Figure 5 shows the number of broadleaf weeds in the fourth time. It is seen that the number of broadleaf weeds is great without control and there isn't significant differences between the without control and 50% weed removal. Even with density of 14 plants per square meter and in Saraziri cultivar, number of broadleaf weeds in treatments with 50% weed removal is great. Figure 6 shows that the highest number of broadleaf weeds was obtained on five time in the without control condition and in the density of 7 plants per square meter on local cultivar. It also shows Saraziri cultivar better able to control broadleaf weeds at high densities of 11 and 14 plants per square meter. This reduction of number of weeds with faba bean density increasing can be due to abundance of environmental resources such as light, nutrients and moisture in the lower density of the faba bean which it is made to grow more weed (Enafcheh et al., 2009).

3.4. The total number of narrow leaf and broad leaf weeds

The results showed that the total number of narrow leaf and broad leaf weeds in five sampling stages were not affected by cultivar. The number of narrow leaf and broadleaf weeds, only in first stage, were highly significant under effects of crop density (Tables 1,2,3).

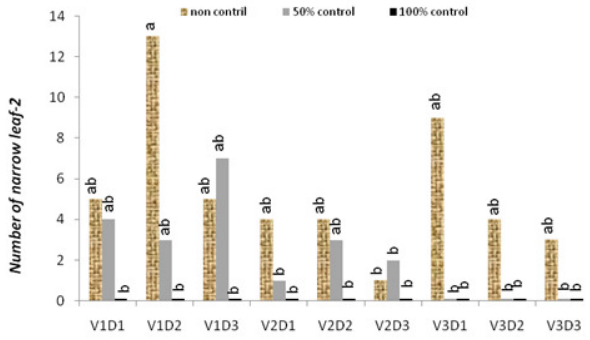

Fig. 1: effect of density, weed control and Cultivar in Number of narrow leaf-2

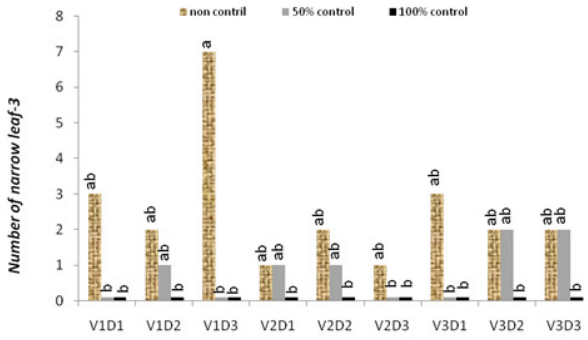

Fig. 2: effect of density, weed control and Cultivar in Number of narrow leaf-3

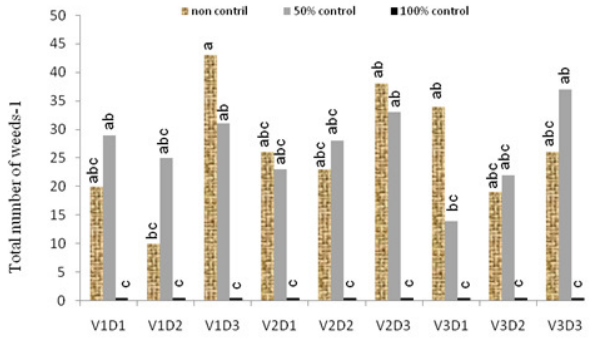

Fig. 3: effect of density, weed control and Cultivar in Number of broadleaf-1

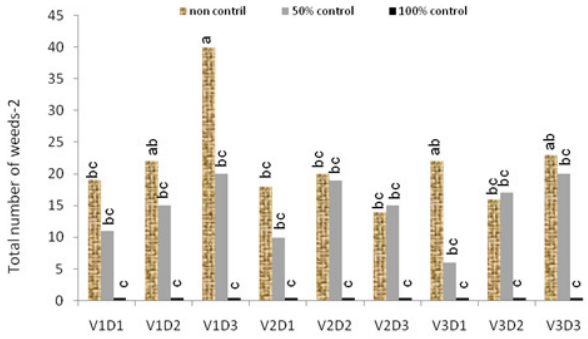

Fig. 4: effect of density, weed control and Cultivar in Number of broadleaf-2

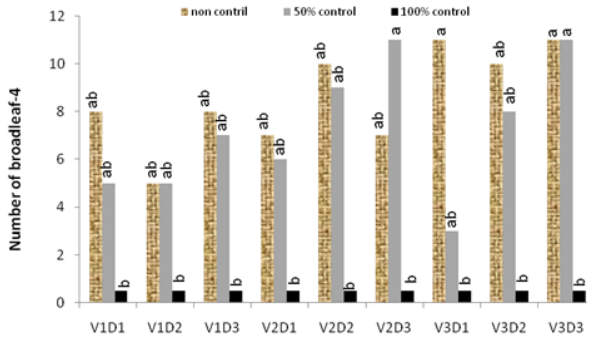

Fig. 5: effect of density, weed control and Cultivar in Number of broadleaf-4

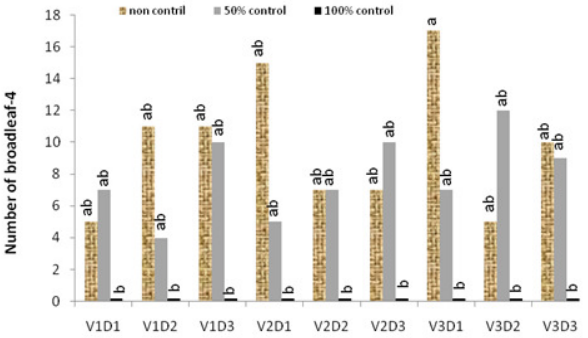

Fig. 6: effect of density, weed control and Cultivar in Number of broadleaf-5

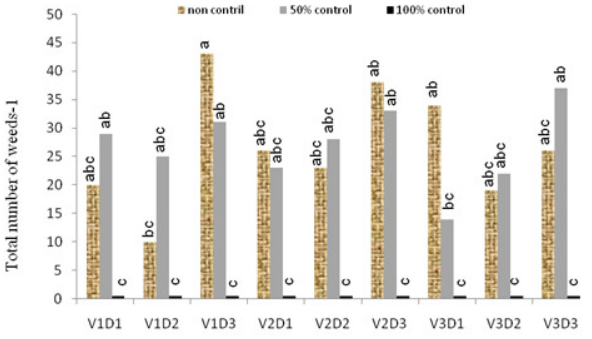

Fig. 7: Effect of density, weed control and Cultivar in Total Number of broadleaf and of narrow leaf -1

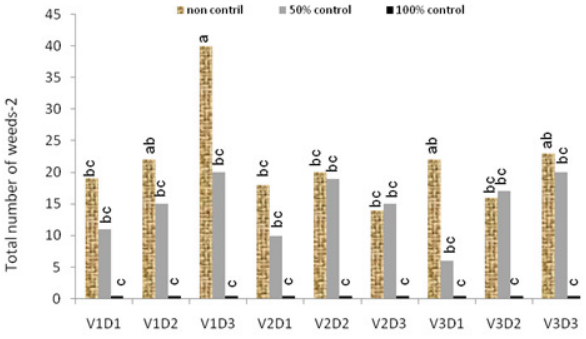

Fig. 8: Effect of density, weed control and Cultivar in Total Number of broadleaf and of narrow leaf -2

So that the highest number of narrow leaf and broadleaf weeds was obtained 23.77 mean plant of broadleaf and narrow leaf per square meter under condition density of 14 plants. The results showed

that this attitude was highly significant by affect of different levels of weed removal on five sampling stages. The comparisons of the main effects showed, in the first sampling stage, the highest number of narrow-leaf and broadleaf weeds was obtained a mean of 28.89 weed plants per square meter with 50% weed removal, in the second stage without weed control, 21.56 weed plants per square meter and in the third, fourth and fifth stages, the means was obtained 13.89, 10.11 and 11.33, respectively, without weed control.

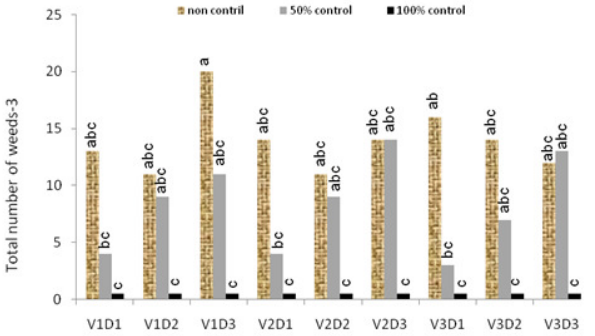

Fig. 9: Effect of density, weed control and Cultivar in Total Number of broadleaf and of narrow leaf -3

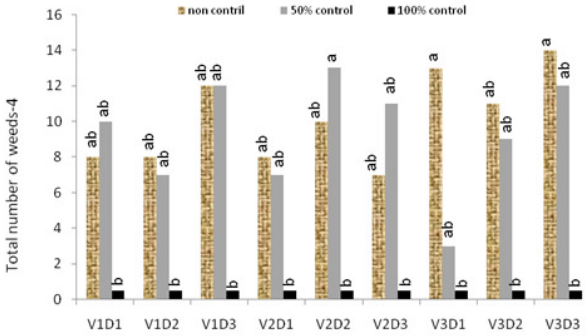

Fig. 10: Effect of density, weed control and Cultivar in Total Number of broadleaf and of narrow leaf -4

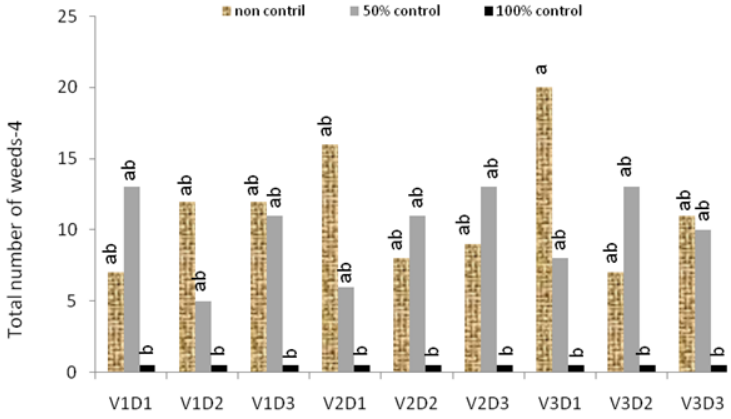

Fig. 11: Effect of density, weed control and Cultivar in Total Number of broadleaf and of narrow leaf -5

The results showed narrow leaf and broadleaf weeds on five sampling stages were not affected by the interaction of cultivars and plant density (Tables 1,2,3). Also this attitude, in five sampling stages, was significant at the 5 % level of significance, statistically, affected by interaction of cultivar and weed removal. The result of mean comparisons of interaction and weed removal indicates, in the first sampling stage, the highest number of narrow leaf and broadleaf weed was observed in conditions of without weed control and in the Saraziri cultivar. This means that in the presence of high densities of weed, Saraziri cultivar has less ability of competition than the other two cultivars on control of weed. On the second and third stages of sampling, the highest number of weeds was obtained with means of 27 and 14.67 in Barakat cultivar, respectively. On the fourth and fifth stages, the highest number of weeds was obtained with mean of 12.67 weed plants per square meter in local cultivar and without weed control.

The results showed the total of narrow leaf and broadleaf weeds in five sampling stages were significantly affected by the interaction of plant density and weed removal (Tables 1,2,3). The mean comparisons of interaction and weed removal indicates, the highest number of weeds on the first, second and third stages were obtained with means of 35.67, 25.67 and 15.33, respectively, under condition of without weed control and the density of 14 plants per square meter. on the fourth stage, the highest number of broadleaf and narrow leaf was obtained with a mean of 11.67 under condition of 50% weed removal and density of 14 plants per square meter and on fifth stage, was obtained with a mean of 14.33 of broadleaf and narrow leaf per square meter under condition of 50% weed removal and density of 7 plants per square meter.

The results showed the total of narrow leaf and broadleaf weeds in five stages is affected by triple interaction of cultivar, plant density and weed removal (Tables 1,2,3). Figure 7 shows the highest number of weeds in the first stage of sampling was obtained under condition of without weed control and density of 14 plants per square meter in Barakat cultivar. Figure 8 shows the total of narrow leaf and broadleaf weeds on second stage of sampling was obtained under condition of density of 14 plants per square meter in the Barakat cultivar and in treatments without weed control.

Figure 9 shows the highest number of narrow leaf and broadleaf weeds on third stage was obtained under condition with density of 14 plants per square

meter of crop on Barakat cultivar and treatment without weed control. Also, this figure show local cultivar under condition with 50% weed removal in both densities of 7 and 11 plants per square meter could compete better than the other cultivar with narrow leaf and broadleaf weeds and it is decrease their numbers.

Figure 10 shows the highest number of broadleaf and narrow leaf weeds on fourth stage was obtained under condition of without weed control in the local cultivar and density of 14 plants per square meter. The lowest number narrow leaf and broadleaf weeds was obtained in the treatment with 50% weed removal under conditions with density of 7 plants per square meter and in the local cultivar. This means the local cultivar on fourth stage under control better than the other cultivars condition with 50% weed removal. Figure 11 shows the highest number of broadleaf and narrow leaf weeds on fifth stage was obtained in the local cultivar affected by the triple interaction under condition of without weed control and the lowest density. In the most of studies, the effect of a single species or several species of weeds has been investigated on reducing performance, individually. While in the field, there is a mixture of various weeds, how their competition with each other is different from single state (Chaichi and Ehteshami, 2001). Therefore results of this study cannot is generalized for all weeds. Thus due to the results of these experiment and the results of Cousteau et al (2007); Kavurmac et al (2010) and Mandany et al (2007) found that combination of weed species in each region is changed.

References

Agegnehu G, Fessehaie R (2006). Response of Faba Bean to Phosphate Fertilizer and Weed Control on Nitisols of Ethiopian Highlands. *Ital. J. Agron.. Riv. Agron*. 1:281-291.

Aryan-Nia N, ENayat Gholi-Zadeh MR, Sharafi-Zadeh M, and Mousavi SH (2012). Response of yield and yield Components of Black-Eyed Pea to Plant Density and Planting Date in Safi-abad Region. *Scientific Research Journal of Agricultural Plants. The special edition* of 2012.

Aryannia N, Enayatgholizadeh MR, and Sharafizadeh M (2011). Morphological characteristics affected by hybrid and plant density on Corn competition with natural weeds population. *Advances in Environmental Biology*, 5 (11): 3444-3449.

Aryannia N, Enayatgholizadeh MR,and Sharafizadeh M (2011). Morphological characteristics affected by hybrid and plant density on Corn competition with natural weeds population. *Advances in Environmental Biology,* 5 (11): 3444-3449.

Ayeneh-Band A, (2006). To Study the Effect of Previous Plant Type and Weeding Time on Weed Communities in Forage Sorghum. *Scientific-Agricultural Journal of Ahwaz.* 29(3): p.p. 51-60.

Castro Coelho J, and Aguiarpinto p (1989). plant density effects on the growth and development of winter faba bean (*Vicia faba.* Var. minor). *FABIS-Newsletter*. 25: 26-31.

Dwyer LM, Tollenar M, and Stwart DW (1991). Changes in plant density dependence of leaf photosynthesis of maize (*Zea mays*) hybrids. *Can. G. Plant Sci.* 71: 1-11.

EnayatGholizadeh MR, Alamisaeid KH, Bakhshandeh AM, Dehghanshoar M, Gharineh MH, and Sharafizadeh M (2011). Response of the Morphologic characteristics of S.C704 maize affected by the source and seed size in Khuzestan. *Australian Journal of Basic and Applied Sciences.* 5(11): 369-374.

EnayatGholizadeh MR, GHARINEH MH, BAKHSHANDEH AM, ALAMI SAEID KH, and SIADAT SA (2013). Response of the seedling characters of New Hybrid seeds of corn in laboratory conditions using standard Germination Test. *Advances in Environmental Biology*, 7(1): 141-146, 2013.

FAO. State. 2010. http:..www.fao.org..

Fernandez ON, Vignolio OR, and Requsesns EC (2002). Competition betweencorn (Zea mays) and bermudagrass (*Cynodon dactylon*) in relation to the cropplant arrangement. *Agronomie* 22: 293-305.

Hamidi A, and Dabagh Mohammadi Nasab A (2001). To Study the Effects of Plant Density and Different Levels of Nitrogen on Phonology of Two Medium-Maturity Corn Hybrids. *Iranian Journal of Agricultural Sciences.* 32: p.p. 857-74.

Idris AL (2008). Effect of Seed Size and plant Spxcing on Yield and Yield Components of Faba Bean (Vicia faba L.). *Res. J. Agric & Biol Sci.* 4 (2): 146-148.

Jahansooz MR, Naghavie MR, and Tale,ie AR (2006). To Determine Relationships of Different Characteristics in Cultivars of Black- Eyed Pea. *Journal of Agricultural Sciences.* 12(1): p.p. 143-49.

James KT, Rahman A, and Mellsop J (2000). Weed competition in maize crop under different timing for post – emergence weed control. New control. *New Zealand plant protect.* 53: 269-272.

Khajeh-Pour MR (2008). Principles and Basics of Agronomy. *Jahad Daneshgahi Publications Center of Industrial Branch of Isfahan*. 412 pages.

Kostov T, and Pacanoski Z (2007). Weeds with major economic impact on agriculture in republic of Macedonia. Pak. *Weeds Sci. Res.* 13(3-4): 227-239.

Kuchaki A, and Nasiri Mahallati M (1995). Ecology of Agricultural Plants. Jahad Daneshgahi Publications of Mashad. P 378.

Lemma G, Worku W, and Woldemichael A (2009). Moisture and plant density intractions affect productivity in growth Cowpea (Vigna unguiculata). *Journal of Agronomy.* 8(4): 117-123.

Majnoon Hossenini N (2008). Production and Agronomy of legumes. *Jahad Daneshgahi Publications*. 283 pages.

Mathews PW, Armstrong EL, Lisle CJ, Menz ID, Shephard PL, and Armstrong BC (2008). The effect of faba bean plant population on yield, seed quality and plant architecture under irrigation in southern NSW. *Proceeding of the 14th Australian Agronomy Conference*. September, Adelaide South Australia. WWW. Agronomy. Org. au.

Mathews PW, Armstrong EL, Lisle CJ, Menz ID, Shephard PL, and Armstrong BC (2008). The effect of faba bean plant population on yield, seed quality and plant architecture under irrigation in southern NSW. Proceeding of the 14th Australian Agronomy Conference. September, Adelaide South Australia. WWW. Agronomy. Org. au.

Mousavi SH, Siadat A, Moshtata A, and Inayat Gholi-Zadeh MR (2010). The Effects of Distance between and on planting rows on Yield and Yield Components of Faba Bean in Ahwaz Region. *Scientific Research of Crop Improvement.* 2(4): p.p. 1-7.

Russell MP, Wilhelm WW, Olson RA, and Power JF (1984). Growth analysis based on degree dry. *Crop Science.* 14: 28-32.

Sharafizadeh M, EnayatGholizadeh MR, Aryannia N, and Razaz M (2012). Effect of planting date and planting pattern on quality and quantity yield of canola hybrid seed (Hayola 401). *Advances in Environmental Biology.* 6 (7): 2184-2189.

Shirtlif SJ, and Johnston AM (2002). Yield density relationships and optimum plant populations in two cultivars of solid-seeding dry bean grown in Saskatchewan. *Can. J. Plant Sci.* 82: 521-529.

Shirtlif SJ, and Johnston AM (2002). Yield density relationships and optimum plant populations in two cultivars of solid-seeding dry bean grown in Saskatchewan. *Can. J. Plant Sci*. 82: 521-529.

Tawaha AM, Turk MA (2001). Crop – weed competition studies in faba bean (*Vicia faba L.*)under rainfed conditions. *J. Acta Agronomica Hungarica* 49(3): 299-303.

Ya,ghoubi SR, Pirdashti HA, Habibi Savad Kuhi HM, and Ghadamyari S (2009). The Effects of Weed Control Rounds on Structure and Distribution of Leaf Surface in Different Layers of Plant Coverage of Corn. *Iranian Agriculture Journal.* 11(1) p.p. 15-24.