The effect of planting date and applications herbicide on the population, weed dry matter and grain yield of chintzy beans

El efecto de la fecha de siembra y las aplicaciones de herbicida en la población, la maleza y el rendimiento de granos de fríjol

Efeito da data de plantio e aplicação de herbicida na população, na produção de matéria seca de plantas daninhas e no rendimento de grãos de feijão-rei

Samira Hajikhani[1*], Amir Hossein Shirani Rad [2], Mehdi Taheri[3] , Mohammad Vali Taghaddosi[3] , and Saeid Saif Zadeh[4]
[1]Department of Agronomy, College of Agriculture Takestan Branch, Islamic Azad University, Takestan, Iran
[2]Scientific Member, Seed and Plant Improvement Institute, Karaj, Iran
[3]Faculty of Agriculture and Natural Resources Research Center of Zanjan province, Zanjan, Iran
[4]Faculty of Agriculture, Takestan Branch, Islamic Azad University, Takestan, Iran

ABSTRACT

In this study the effect of different planting dates and method of combating weed on the population, weed dry matter of yield and chintzy beans were investigated. This study experiment a split block (strip plots) based on a randomized complete block with 4 replications for two years from 2012 Kheirabad research was conducted at the station. The main factor of 4 levels of planting date (a1=10 may, a2=26 may, a3=10 June and a4=26 June) and subplot in 4 levels of herbicide application (b1=Pursuit, b2=Trflan, b3=Hand b4=Weeding weeds and Control) and the sub-subplot Chintzy bean cultivars, two levels of (c1=Talash and c2=COS-16), respectively. During the different stages of sampling at the time of the study, 24 species were identified. It seems that the delay in planting date (late June to early July), reduced weed density and dry the beans. By examining the results of this study concluded that the application of herbicide Pursuit t decreased dry matter and density of weeds beans and the highest yield in the cultivar Talash and planting dates thirds (19 June) and second (4 June months), respectively. In both years, it was observed that the fourth planting date (4 June) due to the cold of early autumn leading to reduced growth period is not suitable for dry bean planting the cultivars. In the end, it is recommended that Cultivar Talash best and most suitable planting dates chintzy beans the perfect weeding grass-weeds, planting dates thirds (10

*Corresponding Author: Department of Agronomy, College of Agriculture Takestan Branch, Islamic Azad University, Takestan, Iran, E-Mail: haji.sa60@yahoo.com, Tel: +98916424731

June) and second (26 May) is. Given the impossibility of complete weeding weeds in beans, chintzy beans, Cultivar best treatment for harvesting the maximum yield in cultivar Talash, application herbicide Pursuit the third planting date (10 June) and second (26 May) is. The results obtained from varieties of Talash can also be fitted in the case of varieties of generalized COS-16 said.

Keywords: Planting date, Pursuit Herbicide, Trflan Herbicide, Grain yield.

Resumen

En este estudio se investigó el efecto de las diferentes fechas de siembra y el método de combatir malezas en la población, la materia seca de rendimiento de malezas y los frijoles chintzy. Este estudio experimento un bloque dividido (parcelas) basado en un bloque aleatorio completo con 4 repeticiones durante dos años a partir de 2012 La investigación de Kheirabad se realizó en la estación. El factor principal de 4 niveles de fecha de siembra (a1 = 10 mayo, a2 = 26 puede, a3 = 10 junio y a4 = 26 junio) y subparcela en 4 niveles de aplicación de herbicida (b1 = Persecución, b2 = Trflan, b3 = Mano b4 = Malezas y control de malezas) y los cultivares de frijol Chintzy sub-subparcela, dos niveles de (c1 = Talash y c2 = COS-16), respectivamente. Durante las diferentes etapas de muestreo en el momento del estudio, se identificaron 24 especies. Parece que el retraso en la fecha de siembra (de finales de junio a principios de julio), redujo la densidad de malezas y secaron los frijoles. Al examinar los resultados de este estudio se concluyó que la aplicación del herbicida Periodo t disminuyó la materia seca y la densidad de malas hierbas y el mayor rendimiento en el cultivar Talash y las fechas de siembra tres (19 de junio) y segundo (4 de junio), respectivamente. En ambos años, se observó que la cuarta fecha de siembra (4 de junio) debido al frío de principios de otoño que conduce a un período de crecimiento reducido no es adecuada para la siembra de frijol en los cultivares. Al final, se recomienda que Cultivar Talash mejores y más adecuadas fechas de siembra de judías tiernas, la hierba de malezas perfecta, fechas de siembra tres (10 de junio) y una segunda (26 de mayo). Dada la imposibilidad de desherbar completamente las malas hierbas en frijoles, frijoles chintzy, cultivar el mejor tratamiento para cosechar el rendimiento máximo en el cultivar Talash, herbicida de aplicación Perseguir la tercera fecha de siembra (10 de junio) y la segunda (26 de mayo) es. Los resultados obtenidos de las variedades de Talash también se pueden ajustar en el caso de las variedades de COS-16 generalizadas.

Palabras clave: fecha de siembra, herbicida de persecución, herbicida Trflan, rendimiento de grano.

ABSTRATO

Neste estudo, investigou-se o efeito de diferentes épocas de plantio e métodos de combate à planta daninha na população, matéria seca de produção de plantas daninhas e feijão-de-arroz. Este estudo fez um experimento com um bloco dividido (parcelas em tiras) baseado em um bloco completo randomizado com 4 repetições durante dois anos a partir de 2012. A pesquisa de Kheirabad foi conduzida na estação. O principal fator de 4 níveis de plantio (a1 = 10 maio, a2 = 26 maio, a3 = 10 junho e a4 = 26 de junho) e subtrair em 4 níveis de aplicação de herbicida (b1 = Perseguição, b2 = Trflan,

b3 = Mão b4 = Ervas Daninhas e Controle) e as cultivares de subintena de feijão, dois níveis de (c1 = Talash e c2 = COS-16), respectivamente. Durante as diferentes etapas da amostragem no momento do estudo, foram identificadas 24 espécies. Parece que o atraso na data de plantio (final de junho a início de julho) reduziu a densidade de plantas daninhas e secou os grãos. Ao examinar os resultados deste estudo conclui-se que a aplicação do herbicida T diminuiu a massa seca e a densidade de plantas daninhas e a maior produtividade na cultivar Talash e as épocas de plantio em terços (19 de junho) e segundo (4 meses de junho), respectivamente. Nos dois anos, observou-se que a quarta data de plantio (4 de junho), devido ao frio do início do outono, levando a um período de crescimento reduzido, não é adequada para o plantio de feijão seco. No final, recomenda-se que Cultivar Talash melhor e mais adequado datas de plantio de feijão de folhagem a erva daninha perfeita ervas daninhas, datas de plantio terças (10 de junho) e segundo (26 de maio) é. Dada a impossibilidade de capina completa de plantas daninhas em feijão, feijão, Cultivar melhor tratamento para a colheita o máximo rendimento em cultivar Talash, aplicação herbicida Pursuit a terceira data de plantio (10 de junho) e segundo (26 de maio) é. Os resultados obtidos a partir de variedades de Talash também podem ser ajustados no caso de variedades generalizadas de COS-16.

Palavras-chave: Plantio, Herbicida Pursuit, Herbicida Trflan, Rendimento de Grãos

INTRODUCTION

Cereals after wheat and rice, consumption of the world's major agricultural products are to reach is an important part of the protein needed to provide (Majnoon Hosseini, 1996). Inappropriate planting date and weeds are the most important factors that greatly reduce bean yield (Badawy et al., 2006). The main problems bean growers in the region, the growth of weeds and their control is in the field. Because the existence of weeds in addition to the quantity of the product, its quality, the cost of harvesting and the diversity and abundance of pests and beneficial insects to significantly affect the price. For each year of the farmers use herbicides to control weeds in bean fields, large quantities are causing environmental problems and weed resistance to Herbicide (Ghanbari Motlahg et al., 2011). In recent years, increasing weed density and increased use of pesticides and herbicides in soil and reduce consumption of bean plant causes loss plant beans and ultimately reducing the yield (Avarseji & Rashed

INTRODUCCIÓN

Los cereales después del trigo y el arroz, el consumo de los principales productos agrícolas del mundo deben alcanzar es una parte importante de la proteína necesaria para proporcionar (Majnoon Hosseini, 1996). La fecha de siembra inadecuada y las malezas son los factores más importantes que reducen en gran medida el rendimiento del frijol (Badawy et al., 2006). Los principales problemas que enfrentan los productores de frijol en la región, el crecimiento de malezas y su control es en el campo. Debido a la existencia de malas hierbas, además de la cantidad del producto, su calidad, el costo de la recolección y la diversidad y abundancia de plagas e insectos beneficiosos para afectar significativamente el precio. Para cada año de los agricultores usan herbicidas para controlar las malas hierbas en los campos de frijol, grandes cantidades están causando problemas ambientales y la resistencia de las malezas al herbicida (Ghanbari Motlahg et al., 2011). En los últimos años, el aumen

mohasel, 2006). According to some experiments, weeds can reduce more than 75% of the bean crop (Blackshaw and Brandt , 2008). Pigweed, Purslane, nightshade, claw crow, barnyard grass, foxtail, Johnson grass, Bermuda grass and weeds Nut grass bean fields are important Critical period of weed competition with the crop is between 10 to 30 or 40 days after germination. In addition, the quality and quantity of beans affected by twining weeds in the late period of vegetative or reproductive growth stage of the plant sprouts are likely affected (Rashed mohasel et al., 2001). According to the above, the effect of planting date and method of combating weed populations, weed dry matter and yield chintzy beans were studied.

MATERIAL AND METHODS

Because of the high amount of weed plant, so the plan was carried out under conditions of natural infection. Seedbed preparation, including plowing and disk harrows for crushing clod and leveling the ground with a leveler. To implement the plan, 10 days before the date listed separately in each of tillage operations were conducted. After preparing substrates indicated to the cultivation and spraying on land.

Population and density of weeds

In the first year of study, during different stages of sampling 24 species were identified. Weed species of nightshade (Solanum nigrum), red amaranth (Amaranthus retroflexus), barnyardgrass (Echiochola crusgali), white pigweed (Amaranthus albus), Salamah (Chenopodium album), wild millet (Setaria viridis) and wild artichoke (Cirsium arvensis) respectively 17.37, 15.69, 12.27, 11.11, 8.92, 7.38 and 5.42

to de la densidad de malezas y el mayor uso de pesticidas y herbicidas en el suelo y la reducción del consumo de plantas de frijol causa la pérdida de frijol y finalmente la reducción del rendimiento (Avarseji & Rashed mohasel, 2006). Según algunos experimentos, las malezas pueden reducir más del 75% de la cosecha de frijol (Blackshaw y Brandt, 2008). Pigweed, Purslane, solanáceas, garra, hierba de corral, cola de zorra, Johnson grass, hierba de Bermuda y malezas Los campos de frijol de nuez son importantes El período crítico de competencia de malezas con el cultivo es entre 10 a 30 o 40 días después de la germinación. Además, la calidad y cantidad de frijoles afectados por el enrollamiento de malas hierbas en el último período de la etapa de crecimiento vegetativo o reproductivo de los brotes de la planta probablemente se vean afectados (Rashed mohasel et al., 2001). De acuerdo con lo anterior, se estudió el efecto de la fecha de siembra y el método de combatir las poblaciones de malezas, la materia seca de malezas y el rendimiento de frijoles cimotos.

percent of the weed species were dominant. During the different stages of sampling in 1392, 20 species were identified. Weed species of nightshade (Solanum nigrum), Salamah (Chenopodium album), pigweed (Amaranthus blitoides), field bindweed (Conovolvulus arvensis), wild millet (Setaria viridis), Knotgrass (Polygonium aviculare) and red amaranth (Amaranthus retroflexus) with an average of 13.76, 13.49, 10.10, 7.26, 7.09, 6.85 and 6.62 percent of the weed species are dominant.

Statical analysis

SAS software were used for statistical analysis. Combined variance analysis

was performed after Bartlet Test for checking uniformity of data variance (p=0.05) on targeted traits. Duncan multiple range tests were used to determine the significance of differences between treatment means at 0.05 levels.

RESULST AND DISCUSSION

Weed density

The results of the combined analysis of variance, density and weed dry matter in beans (Table 1) showed that the application of different planting dates on weed density in the third trifoliate leaf emergence, flowering and maturity beans at 50% probability level. 1% and the dry weeds in the first trifoliate leaf stage at 5%, and 50% flowering and maturity traits were significant at 1% level. Interaction between planting date × herbicides were significant in all stages of notes. Cultivars were significant differences in any of the stages on weed density there. Interaction between Herbicides × Cultivar in the first trifoliate leaf stage and 50% flowering, respectively, at 1 and 5%, respectively.

Analysis of variance weeds in the table (Table 1), observed that the tripartite interactions in all three stages of the weed density is significant. According to Figure 1, Mean comparison between planting date × herbicides × cultivar on weed density bean was observed that the highest density of the third trifoliate leaf stage of weeds in beans, respectively from the first planting date (20 May) + control + Talash and the first planting date (20 May) + control + COS-16 and the first planting date (20 May) + herbicide Pursuit + was the COS-16. And the lowest density of weeds at this stage respectively third planting date (19 June) + herbicide Pursuit + the COS-16 and third planting date (19 June) + herbicide Pursuit + cultivar Talash and second sowing date (4 June) + herbicide Pursuit + COS-16 is. According to Figure 2, at 50% flowering weed density, respectively, of the second planting date (4 June) + control + the COS-16 and the third planting date (19 June) + control + cultivar Talash of third planting dates (19 June) + control + is the COS-16.

And the lowest weed density at this stage to arrange for the fourth planting date (4 July) + herbicide Pursuit + Cultivar COS-16 and the fourth planting date (4 July) + herbicide Pursuit + Talash and the fourth planting date (4 July) + Herbicide Treflan + is Cultivar COS-16. According to Figure 3, the highest density of weeds at physiological maturity respectively planting date (20 May) + control + Cultivar COS-16 and the fourth planting date (4 July) + + Control + Cultivar Talash and third planting date + Control + Cultivar Talash, and the lowest density of weeds at this stage respectively third planting date (19 June) + Herbicide Pursuit + Cultivar COS-16 and second planting date (4 July) + Herbicide Treflan + Cultivar COS-16 and third planting Date (19 June) + Herbicide Treflan + is Cultivar Talash. As the result will be determined Pursuit herbicide application in the third planting date caused a severe reduction of weed density is sent and the C.O.S-16 in the presence of the herbicide in the ratio, the better able to control the weeds.

Weed dry matter

According to Table 1, the date of planting on weed dry matter in all three stages of sampling there is a significant difference and between treatments were significant differences in the level of 1% probability sampling at all stages of there. Interaction planting date at 50% flowering and maturity in herbicides on weeds dry matter was significant at 1% level.

. Significant differences between the cultivars of 5% was observed in 50% flowering stage. According to Table 1, herbicides × planting date × Cultivar interaction at all stages of weed dry matter was significant. According to Table 2, it was observed that in the third trifoliate leaf stage, the maximum amount of weed dry matter related to the first planting date (20 May) + control + Talash and the cultivare is C.O.S-16. The lowest percentage of dry matter of weeds at this stage of the third planting date (19 June) + Herbicide Pursuit + the COS-16 and second planting date (4 June) + Herbicide Pursuit + the COS-16 and the fourth planting date (4 july) + Herbicide Pursuit + cultivar is Talash.

Most flowering weeds at 50% dry matter related to the second planting date (June 4) + Control + Cultivars Talash and C.OS-16, and the lowest percentage of dry matter of weeds in the fourth planting date (4 June) + Herbicide Pursuit + Cultivars were Talash and C.OS-16. In the second stage (maturity), the highest percentage of dry matter grass planting date (20 May) + control + figures Talash and C.OS-16 was allocated the lowest percentage of dry matter of weeds is also the third planting date and fourth (19 June-4 july) + herbicide Pursuit + Cultivars COS-16 and Talash, respectively. The results show that the herbicide Pursuit able to have fine control over weeds dry matter and the C.O.S-16 managed to compete well against weeds show and dry matter to significantly reduce weeds. Delay in planting date in spring weeds can be controlled much. Culture delay that a greater number of weeds in spring green. And thus can be used with mechanical control methods before planting, to eliminate them and thus reduce the weed seed bank in the soil helped the population (Defelic and kendig, 1994).

The disadvantage of this method is that it may be delayed in planting, reduced grain yield but if this yield reduction is lower than the damage uncontrolled weeds, cost-effective and long-term weed management program will benefit (Zand et al., 2004). In the present experiment in the third planting date (19 June) and fourth (4 July) lowest density and weed biomass can see that the above is confirmed.

Grain yield

According to the analysis of variance (Table 3) showed that the effect of Year × Grin yield was significant at the 5% level that the reason for this is due to climatic fluctuations over the past two years. According to the results of analysis of variance table chintzy bean seed yield (Tables 4 and 5) were observed in the first year of planting date caused significant effect on yield at 5% and in the second year at 1 percent. Effect of treatments on grain yield in both years was significant at the 1% level. The main effect in the first year the cultivar was 5%. Interaction sowing date × herbicides in both years resulted in significant differences in grain yield was 5%. The highest grain yield in the first year of the second planting date (4 June) + Weeding and second planting date (4 June) + was Herbicide Pursuit.

The least amount of grain yield in the fourth planting date (4 July) + Control treatment, respectively. The second year highest grain yield related to the third planting date (19 June) + Herbicide Pursuit and weeding, and the lowest grin yield in the fourth planting date (June 4) + Control, respectively (Figure 4).

One of the most important early planting operations achieve maximum yield in pea and broad bean. At low temperatures, early sowing, germina

tion will increase during the period, the percentage of emerged seedlings is low.

The positive effect of low temperature on the yield usually compensates for this loss. If higher temperatures delayed planting and germination is faster and more accurate, but often there is a risk of water shortages. Given that cereals are sprouting need lots of water, possibly incomplete emergence of the drought. According to Fosiman (1977), the late planting reduced the number of bean plants and thus reduce yield as well as late sowing, increasing the risk of diseases and insects, thus reducing the yield of the plant. The results of the present test results, match. Koocheki and Banaian Aval (1994) reported that interspecific competition is often a problem with weeds, reduces the number of plants. Most species of climbing beans have a good competitive ability against weeds, but bushes varieties usually have its relatively poor capacity to compete with weeds.

In the present experiment also Talash cultivar due to being driven could reduce weed density and weed biomass is also low. Koocheki and Banaian Aval (1994) stated that the invasion of weeds reduces all yield factors (number of plants, number of branches, number of pods and seeds and 100-seed weight and Grin yield) is. These results confirmed the test results are present. The results show that overall yield is more than Talash to cultivar C.O.S-16. Also in terms of weed due to the Talash of progressive and slow growth more than the C.O.S-16 more competitive ability with weeds and grain yield is more. Ghanbari and Taheri-Mazandarani (2003) The effect of planting date on chintzy bean cultivars (local Khomein, Talash an COS-16) in three planting date (4 June, 19 June, 3 July) observed that delay in planting increases yield has found its highest level of 2235 kg per hectare from planting date was July 3. The main reason for these results is the reduction of damage caused by diseases on the farm at a later date. In the present experiment also cultivar Talash in the third planting date, the highest grain yield is allocated to, which confirms the above results.

CONCLUSION

The study sampled during various stages of the research station Kheirabad Agriculture and Natural Resources Research Center of Zanjan province for two years to be implemented from 1391. A total of 24 species were identified. Bean plant that high competitive ability against weeds of confusion and the most competitive with weeds beans until after flowering stage and the adult stage has been fully deployed and is able to compete with weeds. Regarding the implementation of the project (irrigation in each planting date 10 days before planting and as culture medium) to 10 July, the majority of green summer weeds and the seed bed preparing almost all of them were controlled. So in the fourth planting date (4 July) or weed competition did not exist or were very small and the product it will be possible to deal with delays on crop (late June to early July) significantly decreased density and dry matter were weeds.

The results showed that the highest density and weed dry matter of planting date (20 May), respectively. However, in the third planting date (19 June) and second planting date (4 June) weed density and dry matter compared to the fourth planting date (4 July) was, however, enough time for growing beans and managed high yield have. Despite the low density and low dry matter of weeds and high dry matter and bean leaf area

in the fourth planting date, its yield for lack of sufficient time for completion of plant growth (especially at physiological maturity beans) and cold early autumn of the rest have been less planting dates. Pursuit herbicide application, the weeds dry beans significantly reduced. The dry matter loss weeds helped to plant soy to grow faster and develop, resulting in increased product yield. Herbicides Pursuit in terms of the impact on dry matter and leaf area weeding beans completely identical and in some cases even better than it was. In fact, herbicides Pursuit able to have optimal control weeds and eliminates the competition between weeds and bean products Which results in increased dry matter content of beans per unit area and thus increase the crop yield.

According to different growth habits chintzy bean cultivars tested, and that cultivar stood COS-16-type growth, and in terms of medium growth period (during the growing season 100-95 days), and growth is limited and the Talash that figure progressive and late (during the growing season of 110 days) and growth is unlimited as long as weather conditions are favorable and the growth of flowers and pods and therefore the highest seed yield of dry bean cultivars tested in this Talash. On the other hand, although the bean cultivars on weed density and dry matter were not significantly affected, but the bean leaf area at all stages of notes, planing the superiority of bean varieties was Talash to cultivar C.O.S-16. Finally, as regards the fourth planting date (4 July) because of early cold winter and a sharp decline during the growing season and ultimately reduce the yield is not suitable for bean varieties. Therefore, best and most suitable planting date bean cultivar Talash, for weed weeds in the third planting dates (19 June) and second (4 June) is proposed, In addition, due to the impossibility of Weeding Full weeds in beans, the best treatment for harvesting grain yield in Talash bean varieties with Pursuit herbicide application in the third planting date (19 June) and second (4 June) is. The results of the Talash figure can be generalized about the C.O.S-16.

REFERENCE

Avarseji, Z., & Rashed mohasel, M. H. 2006. Proceedings of the Third Conference of Weed Science. 28 and 29 Bahman 2013. Page 369-378.

Badawy MI, Montaser Y, Ghaly MY. 2006. Advanced oxidation processes for the removal of organophosphorus pesticides from wastewater. J Desalination. 194: 166–175.

Blackshaw, RE., and Brandt RN. 2008. Nitrogen fertilizer rate effect on weed competitiveness is species dependent. Weed Sci. 56 (5): 743-747.

Defelice M, Kendig A. 1994. Using reduced herbicide rates for weed control in soybeans. University Extension MP686, University of Missouri, Columbia 5: 834-840.

Fosiman, L. 1977. Some aspects of yield formation in the horse bean. Abronik AF –VSZ v Praze, pp.58-68.

Ghanbari Motlahg M, Rastgoo M, Poor Yousef M, Ebrahimi M. 17 to 19 February 2011. Abstracts of the Fourth Conference of Weed Science.

Ghanbari, AA., and Taheri-Mazandarani. M. 2003. Effects of sowing date and plant density on yield of spotted bean. Seed and Plant J. 19(4): 384-496.

Koocheki, A., and Banaian Aval. M. 1994. Physiology of Agricultural Crops Yield (Translated). Jihad Daneshgahi of Mashhad Press. 380 Pp.

Majnoon Hosseini, N. 1996. Bean in Iran.Tehran University Press jihad. Page 49-240.

Rashed mohasel M.H, Rahimiyan H,

Banaian Aval M. 2001. Weeds and their control. Press Mashhad Jahad Danesh-gahi. 576 pages.
Zand, a., C. RAHIMIAN, AS. Small. C. Khlqany, SA. .mvsvy Rolled and rolled. Of Ramadan. 2004. Ecology Hrz- weed management applications (translations). Publish Jihad Mashhad University.

Table 2 - Comparison interaction of Planting date × Herbicides × Cultivar on weeds dry matter chintzy beans (gr.m²) (20012-13).

Planting date	Herbicides	Cultivar	Dry matter 1	Dry matter 2	Dry matter 3
First(10 may)	Pursuit	Talash	51.71 c-h	195.85 bcd	408.94 a-d
		COS16	66.08 c-f	197.00 bcd	458.71 abc
	Trflan	Talash	77.79 b-e	141.60 cde	330.53 b-e
		COS16	78.07 c-e	200.08 bc	240.43 d-h
	Control	Talash	145.09 a	366.26 a	564.20 a
		COS16	109.85 ab	250.61 ab	498.47 ab
Second(26 may)	Pursuit	Talash	36.35 e-h	215.21 bc	208.75 fgh
		COS16	19.20 hi	185.92 bcd	150.98 hi
	Trflan	Talash	55.20 c-f	282.58 ab	132.85 ghi
		COS16	65.91 b-e	364.24 a	155.84 gh
	Control	Talash	85.20 bc	397.66 a	337.38 c-f
		COS16	114.22 ab	368.67 a	262.88 e-g
Third(10 June)	Pursuit	Talash	38.25 e-h	101.36 ef	153.27 gh
		COS16	8.66 i	53.88 f	64.89 i
	Trflan	Talash	39.46 d-h	214.22 bcd	258.48 e-h
		COS16	33.63 e-h	328.97 ab	415.63 abc
	Control	Talash	69.25 b-e	284.62 ab	423.41 abc
		COS16	62.59 b-f	265.40 ab	435.31 abc
Fourth(26 June)	Pursuit	Talash	19.85 ghi	53.39 f	136.53 hi
		COS16	29.61 f-i	54.15 f	196.86 e-h
	Trflan	Talash	54.61 c-g	158.73 cde	243.18 e-h
		COS16	46.60 e-h	58.96 f	196.99 fgh
	Control	Talash	77.97 bcd	99.48 def	238.44 e-h
		COS16	60.00 c-f	145.59 cde	227.60 e-h

Mean followed by similar letters in each column are not significantly different.

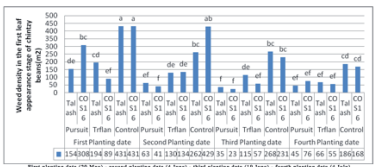

Figure 1 Comparison interaction of Planting date × Herbicides × ***Cultivar*** on weed density chintzy beans in the first trifoliate leaf appearance stage.

Table 3- Combined analysis of variance of grain yield chintzy beans (20012-13).

Sources of variation	df	Ms Grain yield
Year	1	4532374.88 *
First Experimental error	6	604627.26
Planting date	3	5351620.36 **
Year * Planting date	3	2663928.82 *
Second Experimental error	18	674631.11
Herbicides	3	6761575.84 **
Year * Herbicides	3	402990.42-
Third Experimental error	18	427412.68
Planting date * Herbicide	9	915753.59 **
Year * Planting date * Herbicides	9	282029.24-
Four Experimental error	53	224631.26
Cultivar	1	86711.84 *
Years Cultivar *	1	828270.63 *
Planting date * Cultivar	3	87820.14-
Planting date * Cultivar *Year	3	353205.62-
Herbicide * Cultivar	3	31061.25-
Year * Herbicide * Cultivar	3	236721.60-
Planting date * Herbicide * Cultivar	9	133066.67-
Year * Planting date * Herbicide * Cultivar	9	139433.92-
Experimental error	95	244123.7
Coefficient of variation (%)		24.50

Ns, * and **, respectively, non-significant and significant at the 5 and 1 percent levels.

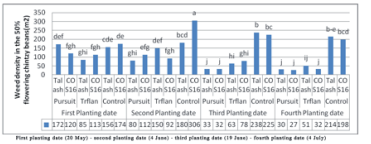

Figure 2- Comparison interaction of Planting date × Herbicides × Cultivar on weed density chintzy beans at 50% flowering stage.

Table 4- Analysis of variance for grain yield chintzy beans (20012).

Sources of variation	df	Ms Grain yield
Replication	3	1176824.73
Planting date	3	8450787.84 *
First experimental error	9	1773112.86
Herbicide	3	5608254.3 **
Second experimental error	9	705990.45
Planting date * Herbicide	9	1466904.13 *
Third experimental error	27	504000.0
Cultivar	1	1226070.34 *
Planting date * Cultivar	3	175654.46-
Herbicide * Cultivar	3	274038.52-
Planting date * Herbicide *Cultivar	9	301368.75-
Experimental error	48	384437.10
Coefficient of variation (%)		22.18

Ns, * and **, respectively, non-significant and significant at the 5 and 1 percent levels.

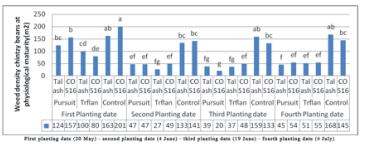

Figure 3- Comparison interaction of Planting date × Cultivar on weed density chintzy beans at physiological maturity stage.

Table 5- Analysis of variance for grain yield chintzy beans (20013).

Sources of variation	df	Ms Grain yield
Replication	3	7.853
Planting date	3	991.39**
First experimental error	9	3.523
Herbicide	3	233.62**
Second experimental error	9	8.051
Planting date * Herbicide	9	9.29.4*
Third experimental error	27	2.057
Cultivar	1	2.494-
Planting date * Cultivar	3	4.177-
Herbicide * Cultivar	3	2.336-
Planting date * Herbicide *Cultivar	9	1.161-
Experimental error	48	3.311
Coefficient of variation (%)		13.44

Ns, * and **, respectively, non-significant and significant at the 5 and 1 percent levels.

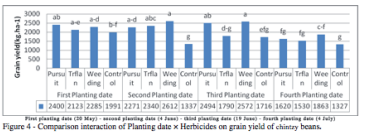

Figure 4 - Comparison interaction of Planting date × Herbicides on grain yield of chintzy beans.

Table 1. Combined analysis of variance density and weed dry matter in the chintzy beans (20012-13).

Sources of variation	df	Ms Density 1	Density 2	Density 3	Dry matter 1	Dry matter 2	Dry matter 3
Year	1	616.190 **	512.017 **	0.664-	0.184-	485.077 **	0.606
First Experimental error	6	40.551	36.109	16.721	45.365	35.327	114.700
Planting date	3	301.898 **	130.305 **	125.049 **	57.364 *	530.111 **	375.350 **
Year * Planting date	3	182.658 **	23.895-	4.438-	14.544-	179.543 **	377.982 **
Second Experimental error	18	21.597	22.033	5.383	17.355	17.863	18.236
Herbicides	2	1343.728 **	748.535 **	539.741 **	281.477 **	501.557 **	644.804 **
Year * Herbicides	2	47.547 *	51.443-	27.249 **	6.541-	36.795-	61.482 *
Third Experimental error	12	16.037	42.852	3.185	6.281	13.833	21.867
Planting date * Herbicide	6	66.612 *	39.333 *	18.687 **	5.925-	52.446 **	103.842 **
Year * Planting date * Herbicides	6	187.047 **	94.781 **	68.252 **	22.846 **	55.162 **	108.016 **
Four Experimental error	36	21.783	16.238	4.752	5.662	13.633	17.429
Cultivar	1	8.85-	2.210-	1.227-	14.029 *	0.845-	9.183-
Cultivar * Years	1	6.07 ns	3.287-	9.306 *	0.015	1.027-	39.213 *
Planting date * Cultivar	3	13.038-	7.310-	3.729-	4.767-	5.752-	4.990-
Planting date * Cultivar *Year	3	12.849-	5.617-	0.208-	5.514-	13.096-	26.194-
Herbicide * Cultivar	2	37.637 **	10.215 *	0.401-	0.585-	10.250-	5.641-
Year * Herbicide * Cultivar	2	21.671 *	4.450-	5.835 *	6.596-	12.401-	24.808-
Planting date * Herbicide * Cultivar	6	29.297 **	11.867 *	8.016 **	10.039 **	38.341 **	37.232 *
Year * Planting date * Herbicide * Cultivar	6	17.494 *	6.712-	2.140-	7.581 *	4.173-	16.248-
Experimental error	72	7.092	4.117	1.901	3.376	6.514	13.036
Coefficient of variation (%)		24.19	20.27	15.46	26.06	19.21	23.20

Ns, * and **, respectively, non-significant and significant at the 5 and 1 percent levels.