

Survey effects of different doses of Pursuit herbicides on weed control and yield and yield components of two cultivars of cowpea in climatic conditions Ahvaz

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ABSTRACT: To survey the Effect of different doses of Pursuit herbicides on weed control and yield components of two cultivars of cowpea, an experiment was conducted in the summer of 2012 in Ahvaz climatic conditions. This experiment as factorial based on randomized complete block design with three replications with two cultivars (Mashhadi, Baghdadi) and herbicides was conducted. Herbicide treatments included of three levels of herbicides Pursuit 0.5, 0.75, 1 liters per hectare and two control treatments without weed (Full weeding) and with weed (interference control) was used, To determine the yield and yield components from two rows of 3 and 4 by observing 1 (m) a marginal effects, 4 square meters of harvest and number of pods per plant, number of seeds per pod, 100 seed weight, biological yield, seed yield and harvest index were measured. ANOVA showed that the cultivars in the study, except for 100 seed weight and number of pods per plant, respectively non significant and significant at the 5% probability level. Other traits were significant differences in the probability level %1. Also interaction dose × Cultivars for all traits had significant 1% level indicated that different doses of herbicides has a huge impact on cultivars. also according to the mean comparison table, the highest seed yield and biological yield in full weeding cultivar treatment in order to cultivars Mashhadi with 3894 and 8693 kg per hectare were observed. And finally the best treatment after complete weeding treatment, Pursuit 1 liter treatments per hectare to for pre-emergence It is recommended

Keywords: cowpea, weed, herbicide, yield and yield components.

INTRODUCTION

cowpea yield loss due to weed interference was reported up to 96 percent. This indicates the importance of weed management of this product (Amador-Ramirez et al., 2001). of course decrease in yield depending on the weed species, weed density and weed growth is different (Chikoye et al., 1995). also (Blackshaw, 1991) reported that the cowpea is sensitive to competition from weeds. 2 and 100 plants per square meter density (solanum nigrum) plant, causes to decrease the cowpea yield between 13 and 77 percent. and also losses of cowpea yield compete with the (solanum nigrum) 30 to 40 percent estimated (Fennimore et al., 1994).

researchers also estimated that for every 2/9 kg of weed biomass, seed production of one kg of cowpea is reduced. (Wilson et al., 1980) in the another study, they found that for every 100 kg dry weight of weeds, cowpea yield was reduced by about 208 kg ha correlation coefficient between these two variables, 0/93, respectively. despite some environmental problems that have been reported for herbicides, these compounds are still an important component of integrated weed management (Zimdahl, 1999). herbicides are essential inputs in agricultural systems of developed countries and a significant portion of crop yield is the consumption of these countries (Powel et al., 1997). in Iran so far, seven more herbicide (Trifluralin, Ethalfluralin, *lasso*, *dactyl*, *Eradicane*, Bazagran and Gallant) are registered for the cowpea (Zand et al., 2007). The lack of an effective way to control weeds during the entire growing season for the crop cowpea has led to the introduction of herbicide Imazethapyr. using mixed with the soil before planting emergence growth before or after Imidazolinone

Imazethapyr of herbicides to effectively control the narrow leaf and broad leaf weeds In the soybeans and other crops grown pod holders family(Arnold et al., 1993).

In another evaluation of Imazethapyr with Metolachlor, *pendi*- methalin, *Fla- Verlin* or *Eptam* good cause to provide weed control(Arnold et al., 1996). In assessing the efficiency of black beans that have been grown Imazethapyr In the use of prior to planting and growing Imazethapyr alone or in combination with S- Metolachlor need serious care to avoid overlap of sprayed in some circumstances, is the cause of the possibility of large amounts of herbicide damage to crops (Soltani et al., 2004). treatments including the use of Imazethapyr had the greater role in (*Xanthium strumarium*) control (Johnson et al., 1998). Imazethapyr herbicide is from the group of Imidazolinone that is able to control (*Cyperus rotundus*) and Some species of annual elongated leaves. before or after usage of emergence growth of *Imazethapyr* effectively control the problem with many species of broadleaf (Klingman et al., 1992; Nelson & Renner, 2002). soybeans and peanuts tolerant compared with the weed species sensitive to Imazethapyr has been attributed to metabolism rapid (Cole et al., 1989).

Study the Efficacy usage of cultivar and Imazethapyr herbicide with different levels of weed control in beans, including objectives of this study.

MATERIALS AND METHODS

This experiment in the summer of 2012 in the city of Ahvaz with longitude 48 degrees 40 minutes east and latitude 31 degrees, 20 minutes north From sea level was 18 meters. In terms of climate, arid and semi-arid area with long and hot summers and with short and mild,Winters the average of annual temperature 31/2 ° C and the average rainfall is 213 mm. clay loam soil texture, with Ph=6/9 , 0/96 percent organic matter and Ec=3/1 is.

Factorial experiment in a randomized complete block design with two cultivars and herbicides was performed Cultivar used in this study consisted of Mashhad and Baghdad. Herbicide treatments consisted of three levels From herbicide Pursuit 0/5, 0/75, and 1 liter per ha with two without weed control treatments (weeding complete) with weed control (interaction) was used. The experiment consisted of three replicates of 30 plot.

After the preparation and implementation of the project plan, the planting of cowpea seeds by hand at a depth of 5 to 7 cm in rows to dry the work was done, and immediately the field was irrigated. each plot From 6 row length of 4 m. and a distance of 50 cm and the distance between plot consists of two stacks From each plant was considered.

One day after planting, before the germination of beans and weeds, herbicides used in these experiment, Pursuit, using with motorized backpack sprayer calibration accuracy, the plots were sprayed. harvesting operation was also when the yellow pods and seeds were dried inside it was performed on 10.11.2012

To measure yield and its components two rows 3 and 4 with respect to 1 m a marginal effects, 4 square meters of harvest and seed pods, seeds per pod, 100 seed weight, biological yield, seed yield and harvest index were measured, in other cases, to analyze statistical data Mstac and Excel softwares and Duncan's test for comparison of data at the level of 5% was used.

RESULTS AND DISCUSSION

The results of the analysis of variance table showed that except for 100seed weight and number of pods per plant in cultivar treatment which non significant and significant respectively in 5% probability level was, remaining traits became significant in the 1% level (Table 1).

Table 1. Analysis of variance mean squares for yield and yield components of cowpea

S.O.V	df	Number of pods per plant	Number of seeds per pod	100 seed weight (gr)	Seed Yield (Kg/ha)	Biological Yield (Kg/ha)	HI
Replication	2	147.282	2.100	37.281	33552.300	135025.200	1.010
Cultivar	1	163.543*	4.800**	0.385 ^{ns}	592781.265**	4776030.000**	101.200**
Herbicide Dose	4	487.238*	11.417**	119.292**	12349404.533**	84313642.533**	57.832**
Herbicide Dose* Cultivar	4	541.371**	15.50**	208.83**	54307.667**	57375333.333**	24.346**
Error	18	21.612	0.507	20.823	15667.448	128364.163	0.956
CV%		9.76	5.94	19.28	5.43	5.24	3.00

ns, * and **: Non- significant, significant at 5% and 1% probability levels, respectively.

Number of pods per plant

Although the highest number of pods per plant with 59/67 number in full weeding treatment Mashhadi and minimal interference with the control pod number 31 in Baghdad cultivar was reached. but From statistically between complete weeding treatments in both cultivars and cultivar Pursuit 1 liter per hectare in Mashhadi was not observed significantly different at 5% level (Table 2) Figure (1& 2).

Table 2. Mean comparison cultivar interactions and control methods on yield and yield components of cowpea.

Herbicide Dose	Cultivar	Number of pods per plant	Number of seeds per pod	100 seed weight (gr)	Seed Yield (Kg/ha)	Biological Yield (Kg/ha)	HI
0	Mashhadi	36.67 ef	10.67 cd	18.87 bc	1152 fg	3128 e	36.83 e
	Baghdadi	31 f	9.66 d	17.33 c	1026 g	2856 e	35.92 f
0.5 L/ha	Mashhadi	41.67 cde	11.67 bc	22.47 bc	1624 e	4273 d	38.01 d
	Baghdadi	37.33 def	11 c	21 bc	1355 f	3661 de	37.01 e
0.75 L/ha	Mashhadi	46.33 bcd	12.67 ab	24.03 bc	2759 d	6782 c	40.68 c
	Baghdadi	43 cde	11 c	22.6 bc	1595 e	4179 d	38.17 d
1 L/ha	Mashhadi	53.33 ab	13.33 a	25.67 abc	3382 b	7976 ab	42.40 b
	Baghdadi	49.67 bc	12.67 ab	24.33 bc	2866 d	7112 bc	40.30 c
Control	Mashhadi	59.67 a	13.67 a	33.67 a	3894 a	8693 a	44.79 a
	Baghdadi	53.67 ab	13.67 a	26.77 ab	3198 c	7456 b	42.89 b

Means with some letters are not significantly different at $\alpha=0.05$ by Duncan's Multiple Range.

Figure 1. Mean comparison of yield and yield components of cowpea varieties

Cultivar	Number of pods per plant	Number of seeds per pod	100 seed weight (gr)	Seed Yield (Kg/ha)	Biological Yield (Kg/ha)	HI
Mashhadi	48 a	12.4 a	24.9 a	2562.2 a	6170.4 a	40.54 a
Baghdadi	43 b	11.6 b	22.4 a	2008 b	5052.8 b	38/86 b

Statement: Means with some letters are not significantly different at $\alpha=0.05$ by Duncan's Multiple Range.

Figure 2. Mean comparison of control methods on yield and yield components of cowpea

Herbicide Dose	Number of pods per plant	Number of seeds per pod	100 seed weight (gr)	Seed Yield (Kg/ha)	Biological Yield (Kg/ha)	HI
0	33.83 c	10.17 c	18.1 c	1089 e	2992 d	36.38 d
0.5 L/ha	39.5 bc	11.33 b	21.73 bc	1489.5 d	3967 c	31.51 d
0.75 L/ha	46.67 b	11.83 b	23.32 bc	2177 c	5480.5 b	39.42 c
1 L/ha	51.5 a	13 a	25 ab	3124 b	7544 a	41.35 b
Control	56.67 a	13.67 a	30.22 a	3546 a	8074.5 a	43.84 a

Means with some letters are not significantly different at $\alpha=0.05$ by Duncan's Multiple Range.

Paudel and etc (2008) showed that average number of pods affected by different treatments against weeds in canola plants have a significant difference most of the number of pods before the herbicide is growth. Results obtained with the results of Mousavi and etc (2010) Reported that Imazethapyr herbicide effect on bean pods is significant, was consistent. Mirshekari surveys (1999) also the presence of weeds effective Factor in Reducing Number of pods in bean plant showed, so, with increasing competition of weeds with beans the decrease in the trait have been reported.

Number of seeds in pods

Maximum number of weed seeds in pods treatment dose full 13/67 in both the number and the least amount of interference in control 9/66 varieties Baghdadi was obtained the number of seeds (Table 2)., Also between treatments full weeding and Pursuit 1 liter per hectare in both varieties and Pursuit 0/75 liters per hectare in varieties Mashhadi statistically significant difference was not observed in 5% level (Table 2). Arnold et al (1996) reported that weeds can severely affect the performance of the bean,so that the yield loss due to weed interference was reported as 60 to 66 percent (Figure 1& 2).

100 seed weight

The maximum weight of 100 seeds in Full weeding treatment in Mashhadi variety amount of 33/67 grams and the lowest total weed in variety Baghdadi respectively (Table 2). Also between treatments Pursuit zero, 0/5, 0/75 and 1 liter per hectare in both varieties of beans was not observed statistically significant difference at 5% level (Table 2). Rodrigo and etc (1972) beans 100 seed weight has been important in determining its yield. Mohammadi et al (2004) Increased duration of weed interference in chickpea associated with reduced dry matter to seed production considered this issue could be due to the adverse impact of weeds and yield fruitful branches findings,in particular, the number of pods per plant and seed weight per plant is due (Figure 1& 2).

Seed yield

The highest seed yield amount of 3894 kg per hectare after treatment full weeding, treatment Pursuit 1 liter per hectare to 3382 kg per hectare of variety Mashhadi was obtained (Table 2). And the lowest seed yield related to treatment complete Interference in Baghdadi variety is 1,026 kilograms per hectare (Table 2). burnside et al (1998) report also emphasized that careful management of bean weeds Beans yield due to specific competition from weeds from 2230 kg per hectare to 820 kg per hectare declined. They also reported that for every 2/9 kilograms dry weight of weeds seed production rate one kilogram is reduced (Figure 1 & 2).

Blackshaw (2000) stated that the weeds for moisture, nutrients, light and space are competing with crops. increase production and ease of harvesting of beans significantly affected by weeds interference . according to some experiments weeds are able to reduce more than 75% of of beans crop.

Biological yield

According to Table 2 of mean comparison,between complete weeding treatments and Pursuit 1 liter per hectare in Mashhadi variety there is no significant difference at 5% level,and also control treatments in both cultivars and treatment interaction Pursuit 0/5 liters per hectare in Baghdadi variety not seen significant difference at 5% level. the highest dry matter production between treatments

was related to full weeding treatment in variety Mashhadi 8693 kilograms per ha,and the lowest rate of 2856 kg per ha was related to interference control treatment in Baghdadi variety (Table 2). reason for this increase can be attributed to the reasonable control of weeds was reduce weeds competition with crop and This proper growth and dry matter accumulation in cowpea. Patterson and etc (1985) reported in canopy consists of crop and weed in compared with the only crop canopy or just weed has growth of dry matter storage and crop yield are both affected.

Harvest index

According to Table (2) The highest Harvest index related to full weeding treatment in Mashhadi variety 44/79 percent , and the lowest interference control in Baghdad, variety was 35/92 percent. Treatments that are able to properly control ,reduce weed competition with cowpea ,more References put at the disposal of beans and they brought the syrup to produce more seed to allocate ,but significantly also spent to chlorophyll and biomass of total plant growth and the course is devoted to the more seed. Soltani et al (2005) reported that Harvest index increases with increasing seed production. and also results obtained with the results of Mousavi and etc (2010) reported that the effect of Imazethapyr herbicides on two types of beans In harvest index of beans was significant, matches.

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