https://doi.org/10.26682/ajuod.2022.25.2.12
Journal of University of Duhok., Vol. 25, No.2 (Agri. and Vet. Sciences), Pp 133-143, 2022

EFFECT OF SOME METHODS OF WEED CONTROL ON GROWTH, YIELD AND YIELD COMPONENTS OF TWO CULTIVARS OF BROAD BEAN (*VICIA FABA* L.) AND ASSOCIATED WEEDS UNDER RAIN FED CONDITION.

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(Received: September 4, 2022; Accepted for Publication: October 17, 2022)

ABSTRACT

The present study was conducted at Collage of Agricultural Engineering Sciences University of Duhok (Sumel) and Zakho Research Center (Zakho), Kurdistan Region, Iraq, during the growing season 2021-2022 to investigate the effect of different factors includes broad bean cultivars (Aguadulce & Lunga Delle Cascine), herbicide treatments (Control, Basagran 300mL.100L^{-1}, Gallant super 375mL.100L^{-1}, Basagran + Gallant super and Hand weeding) and locations (Sumel and Zakho). The results showed that the Basagran herbicide completely eliminated broad–leaved weeds and Gallant super completely eliminated narrow leaved-weeds. According to study results the best cultivar for Sumel location was Lunga Delle Cascine and Aguadulce for Zakho location. The treatment of Hand weeding in Sumel location and treatment of Gallant super in Zakho location lead to increase all studied parameter.

KEYWORDS: Herbicides, Hand weeding, Weeds, Broad bean

INTRODUCTION

Broad bean (*Vicia faba* L.) is a cultivated species, belonging to the wild pea genus (*Vicia*), of the family Fabaceae (**Hawtin *et al.*, 1974**).The Near East is considered a center of origin for broad bean (**Cubero, 1974**), while China seems to be a secondary center of broad bean genetic diversity (**Zong *et al*., 2009, 2010**). The total world production in 2019 was approximately 4.5 million tons on an area of 2.5 million hectares (**FAOSTATE 2020**). As for Iraq, the cultivation of beans spreads in the governorates of Nineveh, Tamim, Babil and Baghdad, its cultivated area occupies about 5,000 hectares, with a production rate of approximately 2.8 tons per hectare (**Ministry of Agriculture 2012**). Despite this, the productivity of beans is considered low in Iraq and only covers a small percentage of the total domestic consumption (**Kamal *et al*. 2016**). Broad bean (*Vicia faba* L.) is one of the oldest crops and ranks the Sixth in production among the different legumes grown in the world after soybean, peanut, beans, peas, and chickpeas. Broad bean is popular legume food with high yield capacity and high nutritional value. It is widely used in the Mediterranean region as source of protein in both human and animal nutrition. And it is popular breakfast food and also used as vegetable green or fresh canned.

The damages of weeds to broad bean crop: The winter weeds, with its two types, narrow and broad-leaved weeds, which accompany the broad bean crop, are the most important problems faced by farmers in the world, as the crop competes for the growth requirements of nutrients, water and light. **Rao, 2000 and Halford *et al*., 2001, Sahar and Shehata, 2005, Kavalialskait and Bobias, 2006 and Obiadalla *et al*., 2015**). Weeds are a main reason that controls the dry matter yield and seed yield, so the control of weeds provides good opportunities for the crop to invest water, light, mineral nutrients, and even the place (**Al-Baldawi and Al-Naqeeb, 2011**).

- Chemical control is represented by the use of herbicides, as it is one of the most important means in the control programs, and it ranked first because of the quick and positive results that can be obtained compared to other control methods, as the amount consumed three million tons of herbicides are produced annually in the world in various agricultural systems, to limit the spread of the weeds (**Stephenson, 2000**). The objective of this experiment were to Increasing yield production, studying the

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efficacy of Basagran and Galant super herbicides in control of weed and finding the best broad bean cultivar.

MATERIALS AND METHODS

The field experiment was carried out during growing season 2021- 2022 in two locations, the first at farm of the college of Agriculture Engineering Science, University of Duhok, and the second in the Zakho Research Center, Dohuk Governorate, Kurdistan Region – Iraq respectively. The experiment was applied according to the Split-Split Plot, within RCBD design. Where locations occupied main plots, cultivars sub plots and herbicide treatments sub sub plots. The experiment involved three factors; the first factor was tow cultivars of Broad bean (Aguadullce and Lunga Dell Casene),

Table (1): properties of cultivars

No.	Character	Aguadulce	Lunga delle cascine
1	Purity	99%	99%
2	Germination	85%	87%
3	Inert	1%	1%
4	Origin	Spain	Italy
5	Treatment	Biostim protection	Treated thiram
6	Production	06/2020	2019/2020

Second factor was five treatments of herbicides (Control, Basagran 300mL.100L^{-1}, Galant super 375mL.100L^{-1}, Basagran + Galant super and Hand weeding) in recommended doses and third factor was locations (Sumel and Zakho location). However, the experiment contains 10 treatments with 3 replications, five treatments for each cultivar and 80 plants per experimental units, distance between plants to plant 25cm and line to line 40cm. The field was irrigated five times until the plants germinate, four times in November and one time in December. After 50 days of spraying herbicides the data were recorded, that includes (weed number for both narrow and broad-leaved weeds and their dry weight). At the end of season the data of crop recorded that includes (number of pods.plant^{-1}, number of seed.pod^{-1} and weight of 100 seeds(g)).The statistical analysis of data with means comparison was done by the use of Duncan's Multiple Ranges Test under 5% probability (SAS, 2003).

Table (2): weeds type found in the field.

a-Broad Leaf Weed			
Botanical name	**English name**	**Family**	**Location**
Silybum marianum L.	Milk thistle	Asteraceae	Sumel & Zakho
Lactuca serriola L.	Prickly lettuce	Asteraceae	Sumel & Zakho
Sentaurea solstitialis	Yellow star-thistle	Asteraceae	Zakho
Sinapis arvensis	Wild mustard	Brassicaceae	Sumel & Zakho
Gallium aparine L.	Catchweed bedstraw	Rubiaceae	Sumel & Zakho
Melilotus indicus L.	Sweet clover	Fabaceae	Sumel & Zakho
Medicago polymorpha L.	Burr medic	Fabaceae	Sumel & Zakho
b-Narrow Leaf Weed			
Botanical name	**English name**	**Family**	**Location**
Avena fatua	Common wild oat	Poaceae	Sumel & Zakho
Lolium rigidum	Rigid ryegrass	Poaceae	Zakho
Hordeum glaucum L.	Barley grasses	Poaceae	Sumel & Zakho

Table (3): the average rate of humidity, temperature and rainfall during the experiment period.

Months	Sumel				Zakho			
	Relative humidity % average	Temperature (ºC) Max.	Temperature (ºC) Min.	Rainfall (mm) (average)	Relative humidity % average	Temperature (ºC) Max.	Temperature (ºC) Min.	Rainfall (mm) (average)
November 2021	45.6	23.15	7.49	0	43	22.9	11.3	3.5
December 2021	66.94	15.30	3.27	63.3	56.0	15.7	6.7	44.0
January 2022	78.90	10.15	1.43	50.3	67.4	10.4	3.2	63.7
February 2022	66.25	17.24	3.25	14.8	48.8	17.3	7.1	14.5
March2022	66.90	16.14	2.95	34.5	54.1	15.2	6.1	63.1
April 2022	55.04	27.97	10.98	18	31.1	27.8	15.0	23.2
May 2022	45.37	30.81	14.32	49.8	34.1	29.8	17.3	50.1
June 2022	26.68	40.37	27.07	0	17.0	39.4	25.2	0.1
Total Rainfall (mm)				230.7				262.2

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RESULTS

Weed characteristics

1. Effect of studied cultivars, Herbicide and locations on the number of broad- leaved weeds:

The data in Table (4) indicate that there was a significant difference between cultivars in their effect on the number of broad-leaved weeds; in the Sumel location the Lunga Dell Casine cultivar superior the Aguadolce cultivar. As for Zakho location, the Aguadolce cultivar surpassed the Lunga Dell Casine cultivar in recording the largest percentage reduction in broad-leaved weeds.

The results of Table (4) also indicates that there were significant differences among the herbicide treatments in their effect on reducing the number of broad-leaved weeds growing in the field of broad bean, in the both locations of experiment. In the both locations of experiment the second treatment by using Basagran herbicide surpassed the rest of other treatments, while the weeds number in this treatment was zero broad-leaved weeds per m^2 compared to the control treatment.

The same table shows that the interaction between cultivars and the herbicide treatments had a significant effect on the number of broad-leaved weeds, as all of them surpassed the control treatment. The highest rate of reduction in the number of broad-leaved weeds when using of Basagran herbicide in the second treatments with both cultivars in both locations, while the comparison treatment recorded the largest number of weeds per square meter.

Table (4) also indicates that there was significant difference between locations in their effect on the number of broad-leaved weeds. According to the results Zakho location surpassed Sumel location in their effect on the number of weed.

Table (4): Effect of cultivars, Herbicides and Locations on the number of broad leaved weed.

Location	Cultivar	Treatments					Cultivar effect	Location
		Control	Basagran	Gallant super	Basagran + gallant super	Hand weeding		
Sumel	Aguadulce	53.67a	0.00e	52.67a	36.33b	12.00d	30.93a	26.00a
	Lunga delle cascine	33.33bc	0.00e	31.00bc	27.00c	10.00d	21.07b	
	Herbicide effect	43.5a	0.00d	41.83a	31.67b	11.00c		
Zakho	Aguadulce	31.00b	0.00e	27.00bc	24.67b	8.67d	18.27a	19.70b
	Lunga delle cascine	44.00a	0.00e	23.33c	27.33bc	11.00d	21.13a	
	Herbicide effect	37.5a	0.00d	25.17b	26.00b	9.83c		

The values followed by the same letters do not differ significantly from each other at 5%

2. Effect of cultivars, Herbicides and Locations on the dry weight of broad leaved weeds (g):

The results in the table (5) show that there was significant difference between cultivars in their effect on the dry weight of broad-leaved weeds; in Sumel location the Lunga Delle Casine cultivar were superior compared to the Aguadulce cultivar. As for the Zakho location, the Aguadulce cultivar significantly was better than the Lunga Delle Casine cultivar in reduction of dry weight of this weed.

Similarly, the data of table (5) shows that there were significant differences among the herbicide treatments in their effect on reducing the dry weight of broad-leaved weeds growing in the field of Broad bean, in both locations of experiment. At the both locations of the experiment, the second treatment by using Basagran herbicide surpassed the rest of other treatments, while the dry weight of weeds in this treatment was zero gram per m^2 compared to the control treatment.

The same table shows that the interaction between cultivars and the herbicide treatments had a significant effect on the dry weight of broad-leaved weeds. The highest rate of reduction in the dry weight of broad-leaved weed when using of Basagran herbicide in the second treatments with both cultivars in both locations, while the comparison treatment recorded the highest rate of dry weight of weeds per square meter.

Also the table (5) indicates that there was a significant difference between locations in their effect on the dry weight of broad leaved weed. According to the data obtained, Zakho location surpassed Sumel location in their effect on the dry weight of broad-leaved weed.

Table (5): Effect of cultivars, Herbicides and Locations on the dry weight of broad leaved weeds (g).

Location	Cultivar	Treatments					Cultivar effect	Location
		Control	Basagran	Gallant super	Basagran + Gallant super	Hand weeding		
Sumel	Aguadulce	72.84a	0.00e	58.51b	31.36cd	27.41d	38.02a	35.09a
	Lunga delle cascine	58.30b	0.00e	41.41c	33.74cd	27.31d	32.15a	
	Herbicide effect	65.57a	0.00d	49.96b	32.55c	27.36c		
Zakho	Aguadulce	29.77a	0.00d	20.41bc	24.59abc	15.42c	15.50b	18.19b
	Lunga delle cascine	30.16a	0.00d	25.72ab	17.10bc	18.75bc	20.88a	
	Herbicide effect	29.97a	0.00d	23.06b	20.85b	17.08c		

The values followed by the same letters do not differ significantly from each other at 5%

3. Effect of cultivars, Herbicides and Locations on the number of narrow leaved weeds:

The results in the table (**6**) indicate that there was a significant difference between the cultivars in their effect on the characteristics of the number of narrow-leaved weeds accompanying the bean crop, as the Lunga delle cascine cultivar outperformed the Aguadulce cultivar in reducing the number of narrow-leaved weeds in the Sumel location, but in the Zakho location there was not any significant differences between the cultivars in their effect on the number of narrow leaved weed.

The results in the table (6) in studied locations Sumel and Zakho indicates that there were significant effects among herbicide treatments used in the experiment in the decreasing the number of narrow-leaved weeds, compared to the comparison treatment in the both locations, but when using Gallant Super herbicide in the third treatment, as well as using it with the herbicide Basgran in The fourth treatment gave the best results, as it completely eliminated the narrow-leaved weeds.

Table (6) results reveal that there were significant differences in the interaction of cultivars and herbicides in the experiment. This interaction had a significant effect on the number

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of narrow-leaved weeds, as all treatments surpassed the comparison treatment in reducing the number of narrow-leaved weeds in both experiment locations (Sumel & Zakho) with both cultivars used in the experiment, with a sharp decrease in the number of narrow-leaved weeds when using both cultivars with the treatment of the herbicide Gallant Super, as well as the treatment of the herbicide Gallant Super + herbicide Basagran, as the number of the narrow-leaved weed in the two treatments was zero weed per square meter in both locations.

And, the table also show that there was a significant difference between locations in their effect on the number of narrow leaved weed.it is indicates that the Zakho location outperformed the Sumel location in reduction the number of narrow leaved weeds.

Table (6): Effect of cultivars, Herbicides and Locations on the number of narrow leaved weed**.**

Location	Cultivar	Treatments					Cultivar effect	Location
		Control	Basagran	Gallant super	Basagran + Gallant super	Hand weeding		
Sumel	Aguadulce	127.67a	111.33b	0.00e	0.00e	47.33d	57.27a	54.20a
	Lunga delle cascine	126.00a	87.00c	0.00e	0.00e	42.67d	51.13b	
	Herbicide effect	126.83a	99.17b	0.00d	0.00d	45.00c		
Zakho	Aguadulce	128.33a	63.33c	0.00e	0.00e	36.67d	45.67a	47.50b
	Lunga delle cascine	109.67b	103.33b	0.00e	0.00e	33.67d	49.33a	
	Herbicide effect	119.00a	83.33b	0.00d	0.00d	35.17c		

The values followed by the same letters do not differ significantly from each other at 5%

4. Effect of cultivars, Herbicides and Locations on the dry weight of narrow leaved weed (g.m^{-2}):

According to Table (7), there was no statistically significant difference between cultivars in their influence on the dry weight of the narrow-leaved weeds in the first experimental location (Sumel). But for the Zakho location, there were a significant differences between cultivars in their effect on the dry weight of narrow leaved weed, the Agudulce cultivar outperformed the Lunga delle cascine cultivar in reducing the dry weight of the narrow-leaved weeds, compared to the comparison treatment, which recorded the highest dry weight of the narrow-leaved weeds.

Also, Table (7) indicates that there were significant differences among the herbicide treatments used in reducing the dry weight of the narrow-leaved weeds of the two locations of experiment (Sumel and Zakho). In the two locations (Sumel and Zakho), all treatments outperformed the control treatment, which recorded the highest dry weight of narrow-leaved weeds, but the highest percentage of dry weight reduction of weeds was when treated with Gallant Super and also when treated with Gallant Super + Basgran compared to the control treatment where These two treatments completely eliminated the narrow-leaved weeds, so there was no dry weight for the weeds in these two treatments.

The interaction among cultivars and the herbicides spraying treatments had a significant effect on the dry weight of the narrow-leaved weeds, and as shown in Table (7), as the spraying with Gallant Super and the spraying with Gallant Super + Basagran excelled in reducing the dry weight of the narrow-leaved weeds, regardless of the cultivars.

According to the data in same table there was a significant difference between locations in their effects on the dry weight of narrow leaved weed; from the results obtained the Zakho location outperformed the Sumel location in reduction of dry weight of narrow leaved weeds.

Table (7): Effect of cultivars, Herbicides and Locations on the dry weight of narrow leaved weed ($g.m^{-2}$).

Location	Cultivar	Treatments					Cultivar effect	Location
		Control	Basagran	Gallant super	Basagran + Gallant super	Hand weeding		
Sumel	Aguadulce	155.10a	74.81c	0.00e	0.00e	39.65d	53.91a	49.26a
	Lunga delle cascine	100.22b	79.44c	0.00e	0.00e	43.39d	44.61a	
	Herbicide effect	127.66a	77.13b	0.00d	0.00d	41.52c		
Zakho	Aguadulce	67.76c	64.84c	0.00e	0.00e	33.09d	33.14b	36.58b
	Lunga delle cascine	86.86a	80.10b	0.00e	0.00e	33.15d	40.02a	
	Herbicide effect	77.31a	72.47b	0.00d	0.00d	33.12c		

The values followed by the same letters do not differ significantly from each other at 5%

Crop characteristics

1. Effect of Cultivars, Herbicides and Locations on the number of pods.plant^{1-}:

The result in the table (8) indicates that there were not any significant differences between cultivars in their effect on the number of pods.plant^{-1} for the Sumel location. As for the Zakho location there was a significant difference between cultivars in their effect on the number of pods.plant^{-1} trait, where the Agudulce cultivar was the superior compared to (Lunga delle cascine) cultivar.

The results in table (8) show that there were no significant variations in the number of pods.plant^{-1} produced by cultivars for the Sumel location. In the Zakho location, cultivars had a substantial impact on the number of pods.Plant^{-1} characteristic, in which the Aguadulce cultivar outperformed the Lunga delle cascine cultivar.

The data of same table shows that there were significant differences among herbicide treatments in the Sumel location where the fifth treatment exceeds other treatments. Where in the Zakho location there were significant differences among herbicide treatments in their effect on the number of pods.plant^{-1}, the third treatment which was the use of Gallant super herbicide exceed other treatments.

The results of the table (8) indicate that there were significant differences among interactions of herbicide treatments and cultivars in their effect on the number of pod.plant^{-1} compared with control treatment. In the Sumel location interactions between hand weeding and Lunga delle cascine cultivar surpassed the rest of other interactions. As for the Zakho location interactions between third treatment (Gallant super) and Aguadulce cultivar surpassed the other interactions.

As for locations the table (8) data shows that there was a significant difference between locations in their effect on the number of pods.plant^{-1}, where the Sumel location exceeds the Zakho location in their effect on the above trait.

Table (8): Effect of Cultivars, Herbicides and Locations on the number of pods.plant^{-1}.

Location	Cultivar	Treatments					Cultivar effect	Location
		Control	Basagran	Gallant super	Basagran + Gallant super	Hand weeding		
Sumel	Aguadulce	2.89cd	2.33d	5.09abcd	5.11abcd	6.33abcd	4.35a	5.08a
	Lunga delle cascine	3.44bcd	3.45bcd	6.67abc	7.33ab	8.11a	5.80a	
	Herbicide effect	3.17b	2.89b	5.88a	6.22a	7.22a		
Zakho	Aguadulce	2.17d	3.83c	6.50a	6.17a	4.84b	4.70a	4.22b
	Lunga delle cascine	1.50d	2.34d	5.17b	4.84b	4.84b	3.74b	
	Herbicide effect	1.83c	3.08c	5.83a	5.50a	4.84b		

The values followed by the same letters do not differ significantly from each other at 5%

2. Effect of Cultivars, Herbicides and Locations on the number of seed.pod^{-1}:

The results in the table (9) indicate that there was no significant difference between cultivars in their effect on the number of seed.pod^{-1} as for the Sumel location. But in the Zakho location there was a significant difference between cultivars in their effect on the number of seed.pod^{-1} trait, where the Aguadulce cultivar outperformed the Lunga delle cascine cultivar.

The data of same table shows that there were no significant differences among herbicide treatments as for the Sumel location. Where in the Zakho location there were significant differences among herbicide treatments in their effect on the number of seed.pod^{-1}, the third treatment which was the use of Gallant super herbicide exceed other treatments.

The results of the table (9) indicate that there were significant differences among interactions of herbicide treatments and cultivars in their effect on the number of seed.pod^{-1} compared with control treatment. In the Sumel location interactions between fifth treatment (hand weeding) and Aguadulce cultivar outperformed the rest of other interactions. As for the Zakho location interactions between third treatment (Gallant super) and Lunga delle cascine cultivar exceed the other interactions.

As for locations the table (9) data shows that there was a significant difference between locations in their effect on the number of seed.pod^{-1}, where the Sumel location surpassed the Zakho location in their effect on the number of seed.pod^{1-} trait.

Table (9): Effect of Cultivars, Herbicides and Locations on the number of seed.pod^{-1}.

Location	Cultivar	Treatments					Cultivar effect	Location
		Control	Basagran	Gallant super	Basagran + Gallant super	Hand weeding		
Sumel	Aguadulce	3.10c	3.00c	5.90ab	5.60ab	6.60a	4.84a	5.12a
	Lunga delle cascine	4.80b	5.70ab	5.30b	5.53ab	5.67ab	5.40a	
	Herbicide effect	3.95b	4.35b	5.60a	5.57a	6.13a		
Zakho	Aguadulce	3.90de	4.20de	6.30ab	5.80ab	5.90ab	5.22a	4.83b
	Lunga delle cascine	2.40f	3.30e	6.40a	5.37bc	4.70cd	4.43b	
	Herbicide effect	3.15c	3.75c	6.35a	5.5b	5.30b		

The values followed by the same letters do not differ significantly from each other at 5%

3. Effect of Cultivars, Herbicides and Locations on the dry weight of 100 seed (g):

The data of table (10) shows that there was a significant variance between cultivars in their effect on the dry weight of 100 seeds (g). In the Sumel location, as Lunga delle cascine cultivar exceeds the Aguadulce cultivar in their effect on the dry weight of 100 seeds (g). But in the Zakho location there was not significant variance between cultivars in their effect on the dry weight of 100 seeds.

The same table shows that there were significant differences among herbicide treatments used in the experiment in their effect on the dry weight of 100 seeds (g) for the Sumel location of experiment where the fifth treatment (hand weeding) exceed other treatments. But in the Zakho location the third treatment (gallant super) exceed other treatments in their effect on the dry weight of 100 seeds (g) characteristic.

From the results in the table (10) appear that there were significant differences among the interactions of cultivars and herbicide treatments in their effect on the dry weight of 100 seeds characteristic. As for the Sumel location, the result shows that the interaction between second treatment (Basagran herbicide) with Lunga delle cascine cultivar exceed other interactions in their effect on the dry weight of 100 seeds (g) trait. But in the Zakho location the third treatment (Galant super) with Lunga delle cascine cultivar exceed other interactions in their effect on the dry weight of 100 seeds (g) trait.

As for the locations, the results in the table (10) shows that there was a significant difference between locations in their effect on the dry weight of 100 seeds (g), from the results obtained the Sumel location exceed the Zakho location in in their influence on the dry weight of 100 seeds (g).

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Table (10): Effect of Cultivars, Herbicides and Locations on the dry weight of 100 seed (g).

Location	Cultivar	Treatments					Cultivar effect	Location
		Control	Basagran	Gallant super	Basagran + Gallant super	Hand weeding		
Sumel	Aguadulce	123.27g	119.64h	126.81ef	128.69cde	130.39bc	125.76b	128.54a
	Lunga delle cascine	125.50fg	141.47a	127.56def	129.67cd	132.37b	131.31a	
	Herbicide effect	124.38c	130.56ab	127.18c	129.18b	131.38a		
Zakho	Aguadulce	105.78f	113.66de	138.56b	109.30ef	116.78d	116.81a	121.20b
	Lunga delle cascine	104.79f	107.41f	147.66a	135.53bc	132.59c	125.59a	
	Herbicide effect	105.29d	110.53c	143.11a	122.41b	124.68b		

The values followed by the same letters do not differ significantly from each other at 5%

DISCUSSION

1. Effect of cultivars, Herbicides and locations on the characteristic of weeds:

Result indicates that herbicides used led to reducing the number of weed and reducing their size, which was reflected on the decrease in their dry weight with all herbicides, as the herbicide killed living tissues based in the process of photosynthesis and this leads to the superiority of the demolition process over the construction process Within the plant tissues, and consequently, the decrease in the accumulation of dry matter, and this was reflected on the dry weight of the weeds, and this result is consistent with what was mentioned by **Al-Kadhim (2013)** who found that the use of Basgrane herbicide at a rate of 3000 $cm^3.ha^{-1}$ and Fusilide at a rate of 2000 $cm^3.ha^{-1}$ led to a significant reduction in the percentage of weeds accompanying the bean crop. **Al-Hasawi and Al-Jubouri, 1982 and Sultan and Salem, 2005** confirmed that the use of chemical herbicides gives effective and efficient results in combating weeds, especially broad-leaved weeds. **Also, Shaban (2013)** explained that application of herbicide Bentazone to the bean crop led to a decrease in the number of broad-leaved weeds, and the percentage decrease in their numbers was 63.54%. Similarly, **El-Dabaa *et al.* (2019)** demonstrated that the use of Clethodim herbicide at a concentration of 2.38 $liters.ha^{-1}$ led to a reduction in the dry matter of the weeds growing in the bean fields.

2. Effect of cultivars, Herbicides and locations on the characteristics of broad bean:

From the results obtained Number of $pod.plant^{-1}$ increased as a result of reducing the number of weed the reason for this may be attributed to the high effectiveness of the herbicide in reducing the role and competition of the weeds, and this in turn leads to less competition for the crop, which gives it the opportunity to optimally exploit the elements of growth, which increases the efficiency of photosynthesis and the broad bean plant encourage to produce the largest number of pods per plant, these result matches with results of **Sultan and Anter (2008)** who found an increase in the number of $pods.Plant^{-1}$, when using Basgran and Glyphosate to control the weed accompanying the bean, compared to the control treatment (without herbicide). In a study by **Al-Owaisi (2019)** on the bean crop, the number of pods increased during spraying of the herbicide Basgran at the recommended concentration.

It is observed from the above mentioned results that the number of $seed.pod^{-1}$ increased by eliminating the weed grew in the field of bean. This is confirmed by **Al-Khalidi (2016)** in a study on the bean, it was found that the weed control treatments had a significant effect on the number of seeds in the pod, as the treatment of the addition of Trifluralin at the rate of adding 2.4 $liters.ha^{-1}$ achieved the highest average number of seeds per pod, which amounted to 5.67 $seeds.Pods^{-1}$.

The result obtained from mentioned above results shown that any reducing in weed led to an increase in the weight of 100 seed and the reason behind increasing the weight of 100 seeds , may be due to the effectiveness of herbicide in eliminating narrow and broad leaved weeds, which reduces competition between weed plants and crop for the necessary elements for the growth of bean plants, and this

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results match with **Sultan and Anter (2008) Kavurmaci *et al*. (2010) Al-Kadhim (2014) Aboali and Saeedipour (2015) El-Metwally and Dawood (2016) Al-Khalidi (2016) Al-Owaisi (2019)** results were they indicated that when they used herbicide to eliminate the growing of weed in the bean fields, there was an increase in the weight of 100 seeds.

CONCLUSIONS

In conclusions, according to study results the best cultivar for Sumel location was Lunga delle cascineand and Aguadulce for Zakho location. Whereas for herbicides which significantly reduced weed number was Basagran for broad-leaved weed and Gallant super for narrow-leaved weed which were completely eliminated weeds. According to study results all treatments lead to increase the studied characteristic of crop, in the Sumel location hand weeding and in Zakho location Gallant super exceed other treatments in increasing number of pods.plant^{-1} (7.22, 5.83), number of seeds.pod^{-1} (6.13, 6.35) and weight of 100 seed (131.38g, 147.66g) respectively. Whereas for locations Zakho location significantly outperformed Sumel location in reducing number of weeds; And for studied parameters of crop the Sumel location surpassed Zakho location.

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پوختە

ئەڤ ڤەکولینە هاتە ئەنجامدان ل ناڤا زەڤیێن کولیژا زانستێن ئەندازیاریا چاندنێ زانکویا دهوك و زەڤیا سەنتەرێ ڤەکولینێت جاندنی ل زاخو –هەریما کوردستانێ – عراق ل سالا (2021 – 2022). ژبو دیارکرنا جەند فاکترین جوراوجور ژوان دوو توخمێن باقلکێ (Aguadulce, Lunga delle cascine) ، بکارئینانا ریکین ژناڤبرنا کژ وگیایی وقرکەرین کیمیایی (بی قرکەر، باسجران 300 سم3. 100لتر-1 ، کالانت سوبر 375 سم3. 100لتر-1 ، باسجران +کالانت سوبر و ژناڤبرنا بدەست) و دەڤەر (سیمیل و زاخو). ل دیڤ ئەنجامێت ڤەکولینێ قرکەری باسجران بو ئەگەری ژناڤبرنا گژ وگیایی بەلك پەحن ب ئیك جاری هەر هوسا قرکەری کالانت سوبر بو ئەگەری ژنافبرنا گژ وگیایی بەلك زراف ب ئیك جاری. هەر هوسا ژ ئەنجامێن فەکولینێ دیاربو کو باشترییں توخم بو دەڤرا سیمیل Lunga delle cascine بو هەر هوسا بو زاخو سنفی Aguadulce . ئەنجامین فەکولینی دا دیارگرن کو ژناڤبرنا بدەستی بو گژ وگیایی لسیمیلی و قرکەری کالانت سوبر ل زاخو بونە ئەگری زیدەگرنەکا بەرجاف بو هەمی ساخلەتین ڤەکولینێ.

پەیڤێن دەستپیکی: قرکەرین کیمیایی، ژناڤبرنا گژ وگیایی بدەست، گژ وگیا، باقلك (Vicia faba L.).

الخلاصة

أجريت الدراسة في كلية علوم الهندسة الزراعية - جامعة دهوك (سميل) ومركز أبحاث زاخو (زاخو) ، إقليم كردستان - العراق ، خلال موسم النمو 2021-2022 لبحث تأثير عوامل مختلفة على الادغال وحاصل و نمو الباقلاء حيث اشتملت التجربة أصناف الباقلاء (Aguadulce & Lunga Delle Cascine) ، طرق مكافحة الادغال (معاملة المقارنة ، باسجران 300 سم^3. 100لتر$^{-1}$ ، كالانت سوبر 375 سم^3/100 لتر ، باسجران + كالانت سوبر المكافحة اليدوية) والمواقع (سميل وزاخو). أوضحت النتائج أن مبيد الباسجران قضى بشكل نهائي على الادغال عريضة الأوراق وأن مبيد جالانت سوبر قضى تمامًا على الحشائش ذات الأوراق الرفيعة. وفقًا لنتائج الدراسة ، كان أفضل صنف لموقع سميل هو Lunga Delle Cascine و Aguadulce لموقع زاخو. أدت جميع المعاملات الى زيادة معنوية للصفات المدروسة ولكن معاملة المكافحة اليدوية في موقع سميل ومعاملة الكالانت سوبر في موقع زاخو تفوقا على المعاملات الاخرى وادت إلى زيادة معنوية لجميع الصفات المدروسة.

الكلمات المفتاحية: مبيدات الأدغال ، المكافحة اليدوية، الادغال ، الباقلاء (Vicia faba L.)