International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2016): 79.57 | Impact Factor (2017): 7.296

Evaluate the Effectiveness of the Weed Herbicide Pallas45 OD for Two Varieties of Wheat Iraqi and Associated Weed and its Impact on the Yield

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Abstract: ***A field experiment was carried out at Abu Ghraib Research Station , the Agricultural Research Department , Ministry of Agricultur,at seasons 2016-2017 to evaluate the response of cultivars wheat (Abu Ghraib 3 and Iba 99)to weed control by herbicide Pallas 45 OD .Randomized Complete Block Design (RCBD) was use in threereplication. The results could be summarized as following : Pallas with cultivar (Iba99) gave lowest number of weed at growth stage 30 , 60 and 90 days after applicationby 9.6 ,12.2 and 15.3 (plant .m^{-1}) respectively while weedy treatment gave highest value by 98.0 ,106.9 and 130.2(plant .m^{-1}) respectively ,so Pallas reduced number of weeds at these stage by 90.2% ,88.6% and 88.2%respectively according to weedy treatment ,the treatment of Pallas with cultivar (Abu Ghraib 3) caused reduction of number of weeds by 91.0% ,90.0% and 84.0% according to weedy treatment.Pallastreatment with cultivar (Abu Ghraib 3 and Iba 99) the same effected in dry weight of weeds ,so it caused inhibition by 88.0% and 88.4% according the weedy treatment . The wheat positively respond and gave high value at yield and components for the treatment of Pallas with the cultivar Abu Ghraib 3 (number of spikes per unit area, number grains of spike, weight of 1000 grain, grain yield and biological yield) by 57% , 29%, 63%, 48% respectively according to weedy treatment, for the treatment of Pallas with the cultivarIba 99 by 39%, 21% , 30% ,62% ,50% respectively according to weedy treatment .This results may be attributed to the genetic variation of nature for wheat classes.***

Keywords: Pallas, Weeds, Wheat, herbicide, ALS

1. Introduction

Wheat is cereal crop which it is very important to human food,and has rich of the most abundant sources of carbohydrates and protein and its increased production is essential for food security (4) . Wheat is essential food more than 1,5 billion people who live at 40 countries which is represent equal 35% of world population (3) .Weeds are competitionwith crops on material , water , light and Co_2so that effect on photo thesis of crop and caused reduced yield equal 50% (9) . Herbicides are widely used to help addressing this problem by controlling weeds (6) .Scientists used herbicides to control weeds andthey get good results in this respect but then they found some problem to human and environment by using these herbicide , those results made owner of companies of herbicide re thing to make new herbicide , that have high selective used by low rate and diminished quickly from environment as Pallas. Pallas 45 ODan Oil Dispersion is selective herbicide register in 2008 by Dow Agro Sciences (2), its standard material**Pyroxsulam**(N-(5,7-dimethoxy[1,2,4]tri-azolo[1,5-a]pyrimidin-2-y l) -2-methoxy- 4- (trifluoromethyl)-3-pyridinesulfonamide) are triazolopyrimidine sulfonamideherbicide (5) , used tocontrol weeds wheat at rate 500 ml.ha^{-1}(10) . It is a systemic herbicide mainly absorbed by leaves and translocated through both phloem and xylem to plant meristimatic regions. Pyroxsulam is a class of herbicides known to inhibit the plant enzyme acetolactate synthase enzyme (ALS), is a key enzyme in the synthesis of branchedchain amino acids (7). The aim of this research to evaluate or response wheat to control weeds wheat and effect on yield grain of wheat.

2. Materials and Methods

1) A field trial was conducted during winter seasons of 2016-2017 at Abu Ghraib Research Station , the Agricultural Research Department , Ministry of Agriculture . The experiment was laid out in Randomized Complet Block Desgin (RCBD) with three replicates, each experimental plot was 12 m^2(3m×4m) for each plot and was separated by irrigation channels.
2) Manually planted the wheat seeds cultivar (Iba 99 and Abu Ghraib 3) on the lines distance between them 20 cm ,rate seedingat(120 Kg .ha^{1-}) in 2016/11/15.
3) When the wheat at 2-3 leaf to jointing stage , were sprayed with Pallas herbicide in 2017/1/19.The treatment of research contained two factors ; tow cultivars of wheat (Iba 99 and Abu Ghraib 3) , second factor used herbicide Pallas (Pyroxsulam) at rate of application 500 ml.ha^{-1} .
4) Weeds were identified (Table 1) and calculated after 30, 60 and 90 days from spraying the herbicide bycutoff weeds from the surface level of the soil at each experimental unit and then placed in a perforated paper bag,they were placed in an electric oven under temperature 70c^o until the weight was stable (1) ,the dry weight of weeds were recorded .Calculated the efficiency of effect herbicide by used the following equation (1) :

$$\text{Efficiency \%} = \frac{\text{No.weeds at weedy treatment} - \text{No.weeds at herbicide}}{\text{No.weeds at weedy treatment}} * 100 \quad \ldots(1)$$

Also calculated reduction of dry weight of weeds by following equation (2):

Reduction dry weight of weeds = 100 - ($\frac{A}{B}$*100) … (2)

When A= dry weight of weeds at herbicide treatment.

B= dry weight of weeds at weedytreatment.

1) In order to calculate the yield and its components, a square meter at harvest time cut off from the center of each experimental unit to calculate the biological yield and number of spikes per unit of area,A10 spikes from each experimental unit were taken and showed their seeds for the calculating the number of grains per spike . Then, weighted of 1000 grain was then calculated using the sensitive electrical balance ,to calculate the index harvest used the following equation (3) :

Index harvest = $\frac{\text{weight of biological yield}}{\text{weight of grains}}$ * 100 …… (3)

2) The results were statistically analyzed using the gene stat and then compared to the arithmetic averages with the low significant difference (L.S.D) at probability level 5% (11).

Table 1: Type of weeds that found in the field experiment

English name	*Scientific name*	*Family*	*Degree of propagation*
Weeds that broad leaf			
Rigidrye grass	*Loliumrigidum Gaud*	Poaceae	**few**
Lesser canary	*Phalaris minor L.*	Poaceae	**few**
Wild oats	*Avenafatua L.*	Poaceae	**few**
Weeds that narrow leaf			
Melilot	*Melilotusindicus(L.)*	Leguminosae	**few**
Dwarf mallow	*Malvapraviflora L.*	Malvaceae	**dense**
Prickly lettuce	*Lactucascariola L.*	Compositae	**Very few**
Wild carrot	*Daucuscarota L.*	Umberlliferae	**Very few**
Sow bane	*Chenopodiummurale L.*	Chenopodiaceae	**few**
Hoary cross	*Cardoradroba*	Brasicaceae	**medium**
Wild beets	*Beta vulgaris L.*	Chenopodiaceae	**few**
Wild radish	*Raphanusraphanistrum*	Raphnusraphanistrum L.	**few**
Wild safflower	*Carthumusaxyacanthus M.B*	Compositae	**few**
Common sow	*Sonchusoleraceus L.*	Compositae	**few**
Milk thistle	*Silybummarianum(L).*	Compositae	**Very few**

3. Results and Discussion

(Table2) indicated to find significant differences of characteristic numbers of weeds and dry weight per meter square during growth stages of 30, 60 and 90 days after application of Pallas. Treatment of Pallas with the cultivar (Iba 99) gave lowest value of average number of weeds at stages of growth 30, 60 and 90 days after application of herbicide 9.6 ,12.2 ,15.3 (plant.m^{-2}) respectively ,while weedy treatment gave highest value of those characteristic at the same period of growth stage 98.0 ,106.9 and 130.2 (plant.m^{-2}) respectively , so it caused reduction number of weeds at these stage of growth by 90.2% , 88.6% and 88.2% respectively according to weedy treatment. The treatment of Pallas with the cultivar(Abu Ghraib 3) caused reduction of number of weeds at stages of growth 30, 60 and 90 days after application of Pallas by 91.0%, 90.0% and 84.0%according to weedy treatment.This results attributed to the efficacy of the Pallas, which is absorbed by the leaves and inhibits the formation of the enzyme Acetolactate Synthase Enzyme (ALS), thus preventing manufacturing amino acids, as well as to stopped cell division and growth which is leads to the death of the weeds . The result was reinforced by Shati(9) who explained, pointing out that the use of herbicide leads to the reduce of the number of weeds .

Pallas showed the same effect on the dry weight of weeds when used with the cultivar (Iba 99 and Abu Ghraib 3) , so it gave lowest value of dry weight of weeds 11.1 and 12.8 (gm.m^{-2}) respectively , while weedy treatment gave highest value 99.4 and 110.8 (gm.m^{-2}), it caused inhibition of dry weight of weeds by 88.4% and 88.0% according to weedy treatment.The dry weight of the weeds indicates the strength of competition between crop plants and weeds on growth requirements such as water, nutrients and CO_2 . This competition reflects the ability to accumulate dry matter . The low dry weight of weeds in the Pallas treatment indicates that the Pallas herbicide has killed the living tissue, which is the process of photosynthesis, that leads to the demolitions outweigh the construction process in the plant tissue . Thus reducing the accumulation of dry matter. The result was agreed with Shati (8) , who explained that the use of the herbicide leads to a decrease in the accumulation of dry matter.

(Table3) shows significant differences in grain yield and its components by effect Pallas and cultivars .Pallas with cultivar Abu Ghraib 3gave the highest value of number spike per square meter ,weight of 1000 grain , grain yield and biological yield by 482.5 (spike .m^{-2}) ,44.0 (gm) ,280.3 (gm . m^{-2}) , 683.1 gm . m^{-2}respectively , while treatment of Pallas with the cultivarIba 99 gave superior value at number grain per spike 52.5 grain and harvest index 42.2% . Weedy treatment gave lowest value of these characteristics as example weedy with Abu Ghraib 3 and Iba 99 gave biological yield 354.0 and 320.4 (gm . m^{-2}) respectively.

These results were attributed to the efficacy of Pallas herbicide in reducing the growth of the weeds also reducing their numbers and dry weights. This allows the crop to grow without any tension, which competition for the requirements of growth such as water, nutrients, light and CO_2, which increases the efficiency of the photosynthetic process and increase its output .The number of spikes is an important component in production, which is determined in the early growth periods in the formation of seedlings and the competition for the growth requirements between crop plants and weeds , which affects the photosynthesis process and reduces the chances of forming seedlings and reaching

the final stage . The seedlings who do not reach this stage may not find the opportunity to grow and fail to carry the spike ,thus reducing the number of spike as in the weedy treatment . The number of spike grains is a very sensitive component . This component is determined during the three weeks prior to the expulsion of the spike because the increase of the dry matter before the expulsion of the spike increases the number of grains in the spike . This result was reinforced what Shati(10) statement .The use of wheat herbicides provides a suitable environment for wheat plants without tension, which competition for the requirements of growth and thus improves the efficiency of photosynthesis, that reflected in the products of this process.

Table 2: Effect of Pallas herbicide in the number and dry weight of weeds

Treatment	Cultivar	Number of weeds during growth stages (day)			Percentage of control %			Dry weight of weeds ($gm.m^{-2}$)	Percentage of inhibition
		30	60	90	30	60	90		
Pallas	Abu Ghraib 3	11.7	13.5	16.6	91.0	90.0	84.0	12.8	**88.0**
	Iba 99	9.6	12.2	15.3	90.0	88.6	88.2	11.1	**88.4**
Control	Abu Ghraib 3	111.8	138.6	151.7	0.0	0.0	0.0	110.8	**0.0**
	Iba 99	98.0	106.9	130.2	0.0	0.0	0.0	99.4	**0.0**
0.05	L.S.D	7.3	5.8	3.0				4.4	

Table 3: Effect of Pallas herbicide on the yield and components

Treatment	Cultivar	number of spike (spike $.m^{-2}$)	number grain of spike (grain $.spike^{-1}$)	weight of 1000 grain (gm)	grain yield (gm. m^{-2})	biological yield (gm . m^{-2})	harvest index %
Pallas	Abu Ghraib 3	482.5	50.2	44.0	280.3	683.1	**41.0**
	Iba 99	403.8	52.5	41.7	271.4	643.3	**42.2**
Control	Abu Ghraib 3	205.5	41.2	31.4	104.8	354.0	**29.6**
	Iba 99	243.8	41.7	29.2	103.3	320.4	**32.2**
L.S.D	0.05	46.8	1.8	1.5	12.5	10.2	**2.0**

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