



REGULAR ARTICLE

EVALUATION OF HERBICIDAL POTENTIAL OF COMMERCIAL HERBICIDES IN WHEAT (*TRITICUM AESTIVUM* L.) CULTIVATION

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ABSTRACT

A field experiment was conducted in Kanan region, province of Diyala, Iraq during the winter season 2016-2017 to screen herbicides for wheat cultivation. Six herbicides viz., Salix, Cronus, Pallas, Granstar, Topic and Atlantis were sprayed as post-emergence with second irrigation 54 d after crop sowing. Wheat growth parameters viz Crop height, Spike length and number of grains per spike were a higher in GranstarandTopic (105.2 cm, 12.6 cm, 51.4) respectively, 1000 grain weight were noted with Atlantis (40.9 g). followed by GranstarandTopic (39.2 g), Number of plants/m² was a higher in Atlantis (430), Grain yield g \ acre was significantly increased in GranstarandTopic (1848 g). weeds growth parameters like Number of weeds/m², Dry weight of weeds g, weed control % and weeds inhibition % were lower in Salixandcronos (0.0, 0.0 g, 100%, 100%) respectively.

Keywords: Salix, Cronus, Pallas, Granstar, Topic and Atlantis

INTRODUCTION

Wheat (*Triticum aestivum* L.) is one of the most important cereal throughout the world and ranks first among the grain crops of the world, the globally yield reduction in wheat due to weeds was estimated 13.1% [9, 14]. Weeds limit the potential of wheat yield due to they compete with wheat plants on soil moisture, water and light and result to increase of evapotranspiration and lead to a reduction in grain yield or crop failure [8, 2]. Management of weed through mechanical and physical means involves labors, animals and implements costs, making them more expensive [11].

Herbicides offer means of effective, practical, ideal and economical for reducing weed competition and crop losses. So, a chemical method for controlling weeds is most efficient besides time-saving [3]. Chemical weed control enables farmers to obtain higher yields per unit area with lower production cost. The effectiveness of herbicides is affected by time, rate and method of application [15]. The objective of this study was to evaluate the effectiveness of different herbicides against weeds of wheat.

Materials and methods

A field experiment was conducted at research area of Kanan region, province of Diyala, Iraq during 2016-2017.

Six herbicides viz. Salix, Cronus, Pallas, Granstar, Tobic and Atlantis (table 1) were used after emerging after 2nd irrigation 54 d after sowing of seeds in rate 30 kg/acre whereas treatment of control was sprayed with water only. The experiment was laid out in a randomized complete block design (RCBD) with three replications. Wheat variety Iba 99 was used as a test crop. A net plot size was kept 10 × 10 m². The crop was sown on 10th December 2016. Urea and Dap (diammonium phosphate) were applied in different plant stages at the rate of 65 and 30 kg/acre, respectively.

Data on different weed species and wheat growth parameters were recorded near crop maturity at 150 DAS (Days after sowing) by using the quadrat measuring 1m x 1m. Weeds were identified and counted (table 2) whereas dry weight of weeds (gm) was taken after 12 d of drying under the sun. For the determination wheat growth parameters, 10 plants were randomly selected in each plot. Data were recorded on plant height (cm), spike length (cm), number of grains per spike, 1000-grain weight (g), number of plants/m², grain yield (ton ha⁻¹), number of weeds/m² and dry weight of weeds (g). Weed control Efficiency % and dry weeds inhibition % were calculated according to the following formulas.

The weed control efficiency% (WCE) was calculated by using standard methods [4].

Received 11 November 2017; Accepted 29 December 2017

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Table 1: Tested herbicides

Trade name	Active ingredients	Dose
Salix SL	Sodium 2, 4 Dichlorophenoxyacetate monohydrate	1.5 L/Acre
Cronus 10 EC	Clodinafop-propargyl+Cloquintocet mexyl	1–1.5 L/Acre
Pallas	Pyroxsulam	125 ml/100 L
Granstar 75 DF	Tribenuron-methyl	15g/ha
Topic 15 WP	Clodinafop-propargyl	250 ml/100 L
Atlantis	Mesosulfuron methyl+ideosulfuron-methyl sodium+Mefenpyrdiethyl	80 g/100L

Table 2: Weeds of wheat

Name of weeds species	Scientific name	Family	Life span
Milk thistle	<i>Silybum marianum</i> L.	Compositae	Annual
Dwarf mallow	<i>Malva praviflora</i> L.	Malvaceae	Annual
Wild oats	<i>Avena fatua</i> L.	Poaceae	Annual
lady's lace	<i>Ammi majus</i>	Umbiliferae	Annual
wild radish	<i>Raphanus raphanistrum</i>	Cruciferae	Annual
annual beard-grass	<i>Polyogon monspeliensis</i>	Poaceae	Annual

RESULTS AND DISCUSSION

Components of wheat growth and yield

There were significant differences among the treatments in crop height (table 3). The study of the means showed that maximum crop height (105.2 cm) was achieved in a combination of Granstar and Tobic whereas minimum crop height was obtained from control (82.2 cm). Maximum spike length was recorded at a combination of Granstar and Tobic (12.6 cm) with significant differences from other treatments, minimum spike length was recorded at Atlantis and control (9.5 and 9.6 cm) respectively, while no significant differences among the treatments in number of grains per spike. Maximum weight of 1000 grain was recorded at application of Atlantis followed by combination of Granstar and Tobic which is the mean of (40.9 and 39.2 g) respectively with significant differences from other treatments, minimum weight of 1000 grain was recorded at Pallas and control

(32.4 and 34 g) respectively. A higher number of plants/m² (430) was recorded with Atlantis whereas lower number of plants/m²(313) was recorded in control. All treatments showed that highly significant differences among them in grain yield g \ Acres, maximum of grain yield was recorded with Granstar and Tobic (1848 g) while minimum of grain yield was recorded at control (985 g).

Weeds growth parameters

Data arranged in table 4 showed that a number of weeds/m² and dry weight of weeds were significantly among various treatments, the highest value for these parameters of weeds was found in the control (11.6,120 g) respectively while a minimum value was in Salixandcronos (0.0). Data analysis showed that different herbicides significantly affected on the weeds, the maximum value of control and inhibition of weed (100 %) was recorded with Salixandcronos while the minimum value (0.0%) was recorded in control, all herbicides reduced the weeds.

Table 3: Components of wheat growth and yield as influenced by various weed control treatments

Treatments	Crop height cm	Spike length cm	Number of grains per spike	1000-grain weight g	Number of plants/m ²	Grain yield g \ Acre
Control	82.2	9.6	36.8	34.0	313	985
SalixandCronus	91.3	11.1	44.0	34.5	388	1474
Pallas	86.4	8.4	33.8	32.4	395	1086
GranstarandTopic	105.2	12.6	51.4	39.2	366	1848
Atlantis	94.2	9.5	39.6	40.9	430	1741
CD 0.05	6.7	1.7	N. S	2.0	4.7	0.8

Table 4: Main effect of herbicides on weeds growth parameters

Treatments	Number of weeds/m ²	Dry weight of weeds g	Weeds control %	Weeds inhibition %
Control	11.6	120.0	0.0	0.0
Salixandcronos	0.0	0.0	100	100
Pallas	0.3	17.5	97.2	85.4
GranstarandTopic	1.0	10.0	88.8	91.6
Atlantis	3.3	27.5	71.4	77
CD 0.05	0.6	4.6	6.7	1.031

The result agrees with earlier findings of [6], who found maximum plant height of wheat in the treatment of chemical control of weed as compared with control, while [12] who studied weight of 1000 kernels, the highest record was found with the use of Topic herbicides. [5] reported that topic herbicide having more controlling effect in destroying grass in wheat farms from Atlantis herbicide. [7, 1] reported that highest grain yield in chemical control of weed as compared to the weedy check (control). The lowest weed biomass in chemical weed control was due to the activity of herbicides that reduced weed density by killing both broadleaf and narrow leaf weeds and suppressing the growth of remained grasses in the field [13].

CONCLUSION

The findings demonstrated that management of weeds by combined herbicide was essential for future to control both broad leaf and narrow leaf weeds. Combinations of herbicides were significant value to increase the yield of wheat as compared to the control. Application of Granstar and Tobic was effective to increase the yield of wheat followed by Atlantis. A combination of Salix and Cronos was also effective to weed control.

ACKNOWLEDGEMENT

Authors wish to express their sincere gratitude and appreciation to Directorate of Diyala Agriculture, Ministry of Agriculture, Iraq for awarding the opportunity to accomplish this work

AUTHORS CONTRIBUTIONS

HAS planned and coordinated the research, participated in setting up, analysis and data interpretation and wrote the article, AAA, HAK, AST and SFD participated in carried out the field experiment, collected data.

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