

SHORT ARTICLE / INVESTIGACIÓN

Effect of different rates of Axial herbicide on growth vegetative of Barley and associated weed

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Abstract: In the herbicide field, attention has become focused on using effective and low-concentration pesticides to control weeds, in addition to the effect of those pesticides on economic crops. So this study aimed to evaluate the low concentration doses of Axial herbicide on the growth vegetative of Barley and associated weed. The results of the study showed The significant effect of Axial herbicide concentrations on the growth vegetative of Barley were recorded in the Length of plant height (cm), flag leaf area (cm²), number of branches, and percentage of chlorophyll 89.41, 17.500, 131.33 and 44.70 respectively at Recommended concentration 100% of Axial herbicide compared with 99.41, 19.567, 125.00 and 50.27 respectively in the control treatment. Also, The results Findings activity of Axial herbicide concentrations in the percentage of control dermal weed were recorded at 72.84, 93.24 and 95.87% after 30, 60 and 90 days of treatment at Recommended concentration compared with 0.00,0.00 and 0.00 in the control treatment.

Key words: Axial herbicide, Barley, Darnel weed.

Introduction

Barley (*Hordeum vulgare* L.) is consumed as feed for livestock and food and consider the fourth most crucial annual cereal crop from the family of Poaceae in the world after wheat, rice, and maize. Barley grains were used as currency by the Sumerian and Babylonian cultures¹. stresses biotic such as weed, insect, fungal, viral and other organisms². It is one of the most critical challenges for the growth and production of Barley. It caucuses the loss after the harvest of Barley And thus leads to significant damage to animal production, Consequently on the living conditions of farmers³. The growth of Barley accompanies many types of weeds, such as broadleaf and narrow-leaved weeds, which have a highly competitive ability of the barley crop to obtain the resources available for growth; one of the essential weeds is darnel weed⁴. Recently, many natural weed herbicides have been tested, showing some effectiveness in controlling weeds. Still, reliance on chemical herbicides remains the best option to control high effectiveness, speed, and ease of use⁵. Recently, to reduce the dangerous effects of weeds in barley fields, Several pesticides have been produced as an effective way to avoid the evolution of resistance to weeds. So, The study aimed to test different concentrations of Axial herbicide on the growth vegetative of Barley and associated weed.

Materials and methods

A field experiment was conducted at the Field Crops Research Alghalibia Station, Diyala Governorate, Iraq, during the winter season of 2021-2022. The Axial herbicide was obtained from the Agricultural Research Department,

Ministry of Agriculture, Iraq. The experiment field was prepared for the cultivation of Barley and the associated weed; The field was divided into three replicates, the distance between the replicate and another 3 m, and the distance between the experimental units was 50 cm². The process of planting Barley was carried out on November 17 on lines with a distance between one line and another of 20 cm, at a rate of 10 lines in the experimental unit, with a seed quantity of 120 kg per h . At a rate of 48 g, the experimental unit was served with fertilizer and irrigation, according to the recommendations. The types and density of the weed were recorded after 30,60 and 90 days of control, as well as counting the weed before carrying out the control process by diagnosing and calculating the number of weeds in a wooden box measuring 50 * 50 ie a quarter of a square meter that was randomly dropped in the experimental unit. After the cultivation of Barley was completed and after the plant had grown and the bush reached the stage of (5 - 2 leaves) and on 1/2/2022, specifically after 45 days of planting, the cultivated experimental units were treated with the concentrations of Axial herbicide Recommended concentration 100 %and reduced doses included 76 and 50 %in addition to the control treatment, which represents spraying with distilled water only. The data were taken after 30 days after on vegetative growth of Barley, Length of plant height (cm), flag leaf area (cm²), number of branches, and percentage of chlorophyll as well as the effect on associated weed of Barley Which represented a dernal weed through an account in the percentage of control dermal weed.

Statistical analysis

The data was analyzed statistically by using GenStat package 3 (3rd edition) using Randomized Complete Block

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Design with one and two factors. The treatment means were compared by least significant difference (LSD) at 5% level of significance ($P \leq 0.05$).

Results

The effect of Axial herbicide concentrations on Barley's growth vegetative to determine if the herbicides affect the economic yield is shown in Table 1. The data indicated that Through the statistical analysis, the emergence of significance in the analysis where recorded at 89.41, 17.500, 131.33 and 44.70 at high concentrations of 100% compared with 99.41, 19.567, 125.00 and 50.27 in the control treatment of Length of plant height, Flag leaf area, Number of branches and Percentage of chlorophyll respectively. The results also showed the effectiveness of the recommended concentration of 100% over the rest of the concentrations. These results agree with (6,7), who reported that the activity of Pinoxaden is considered an Active Substance in Axial herbicide in Barley and associated weeds.

Table 2 shows that All three concentrations of Axial herbicide significantly increased the percentage of controlling Darnel weed during different periods, where recorded at 72.84 % at a concentration of 100% after 30 days from treatment, while the lowest concentration was 50% recorded at 65.06 % at the same the period. The control percentage increased after 60 days from treatment to reach 87.11, 90.23 and 93.24 of 50,75 and 100%, While it increased by a little after 90 days from treatment to recorded 89.33, 92.12 and 95.87% compared with 0.00 % in the control treatment. Our results are similar to (8), who found that Pinoxaden, considered Active Substances in Axial herbicide, is selective in barley crop and can effectively control weed infestation. As well as the application of pinoxaden in wheat and Barley resulted in significantly lower total weed density and weed weight^{9,10}.

Discussion

Pinoxaden (Axial® 50 EC, Production from Syngenta Crop) is a herbicide of a cereal selective post-emergent

graminicide belonging to the Group A mode of action (acetyl-CoA-carboxylase inhibitor) in the phenylpyrazalin chemical family. The first symptoms of The effect of the herbicide on weeds appear within the first week, such as incipient chlorosis^{11,12}, followed by the death of rapidly growing meristematic tissue. A time period of two to three weeks is usually required for complete control of sensitive species for herbicide^{13,14}. Axial safety herbicide was evaluated to control weeds in the wheat and barley crop and appeared very effective in controlling¹⁵.

Conclusions

We concluded that concentrations of herbicides Axial had an effect in controlling Darnel weed; based on this study, herbicides Axial can be recommended for better control of weeds for obtaining higher growth vegetative and yield of barley production in Iraq.

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Concentration	Length of plant height (cm)	Flag leaf area (cm ²)	Number of branches	Percentage of chlorophyll
0	99.41	19.567	125.00	50.27
50	92.74	16.667	127.00	46.13
75	91.18	16.833	128.33	45.10
100	89.41	17.500	131.33	44.70
L.S.D ≤ 0.05	0.062	0.0065	0.036	0.031

Table 1. Effect of concentration of Axial herbicide on growth vegetative of Barley.

Concentration	Time periods/Days			Mean
	30	60	90	
0	0.00	0.00	0.00	0.00
50	65.06	87.11	89.33	80.50
75	67.97	90.23	92.12	83.44
100	72.84	93.24	95.87	87.32
Mean	51.47	67.64	69.33	
L.S.D ≤ 0.05	Con. 0.88, T. periods 0.76, Con. \times T. periods 1.52			

Table 2. Effect of concentration of Axial herbicide in percentage of controlling Darnel weed during different time periods.

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