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EFFECT OF TRIFLORALIN HERBICIDE IN THE EMERGENCE, GROWTH AND PRODUCTION OF SEEDS FOR WILD RADISH (*RAPHANUS RAPHANISTRUM* L.) WEED IN DIFFERENT TYPES OF SOILS

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Abstract

An experiment was conducted during the 2018-2019 winter planting season to evaluate the growth and production of seed of the bush (*Raphanus raphanistrum*) under the influence of different concentrations of Trifloralin (0, 864, 1,248, 1,440) cm^3 a.i / ha in two types of soils (clay and loom). The results showed that the increased concentration of Trifloralin herbicide caused a gradual significant decrease in all studied traits. There was a significant decrease in loom soil compared with clay soil and for all studied traits. The concentration of 1,440 cm^3 a.i / ha in clay soils, and the concentrations (1,248, 1,440) cm^3 a.i / ha in loom soil caused the killing of all bush plants.

Key words : Trifloralin, Wild radish plant, clay soil, loom soil.

Introduction

The weed plants are one of the most important agricultural pests affecting agricultural production in the world, causing significant losses in the production process and economic returns (Agarwal and Rao, 2000). The prevalence of different types of bush in the agricultural fields and their intense competition for crops is one of the main reasons for the decline in production quantitatively and qualitatively. This competition has been adopted by specialists as one of the main factors to reduce production in crops as well as the effects caused by its chemicals, to the medium in which they live. They may affect crops grown with them or subsequently grown in the same location in terms of growth and productivity (AL-Shamma, 2002). The wild radish is one of the wide bushes belonging to the Crusader family Brassicaceae and dicotyledons. Depends on the density of the bush and yield (Reeves *et al.,* 1981).

The seeds of wild radish can be spread through the residues of livestock and agricultural birds, and the cutting or mowing of radish plants does not prevent re-growth, in addition to the root total of rudders have the ability to resist moisture tension (Cheam and Code, 1995), and soil moisture is a factor that Grass seeds stimulate germination, water-washing increases seed germination due to loss of inhibitors that hinder germination, and early-growing seeds produce a high proportion of static seeds (Cheam, 1986). It is found in clay sandy soils and favors nutrient-rich mixtures and is widespread in both agricultural and non-agricultural lands (Bond *et al.,* 2007). The use of pesticides to control wheat weeds in large parts of the world has increased production by more than 50%.. Ozhan (2005) reported that the increase in the density of grassland bush caused a decrease in wheat yield and that the use of the pesticide 2,4-D in the control of broad-leaved bushes had a significant effect on the decrease in the number of broad-leaved weeds / m^2.

The continued use of herbicides after germination and for a long time and widespread led to the emergence of resistance of the weed communities of these herbicides, and the emergence of resistance to herbicides in the weed plants is the result of their use in high concentrations in the control, and the emergence of this resistance to herbicides in the weed plants makes it difficult to control in the fields of grain crops, including wheat. So, herbicides,

including Trifloralin, have become widespread in the bush control and are now one of the most widely used herbicides used in chemical control in a conservative farming system. Grover *et al*., (1997) reported that Trifloralin decomposes When it is on the surface of the soil and in order to be effective Trifloralin must be mixed in the soil. It may be adsorbed by the presence of organic matter in the soil (Kengga, 1980), as well as the effect of Trifloralin herbicide is reduced in the weeds and quickly due to high temperatures and low soil moisture and different soil texture. In sandy soils with a light tissue, the effect of Trifloralin herbicide is reduced compared to heavy clay soils (Gallaher and Mueller, 1996). The aim of this research is to study the efficacy of the Trifloralin herbicide in the control of wild radish weed in the fields of grain crops at different types of soils.

Materials and Methods

The experiment was carried out in the wire canopy of the Field Crops Department / Collage of Agriculture / University of Kirkuk on 15/11/2018 during the agricultural season 2018-2019. The experiment included the following factors: - The first factor was the concentration of the herbicide with four levels (zero, 0.864, 1,248 and 1,440 cm^3 a.i/ha) The second factor is two types of soil (clay and loom soils). And became the number of transactions ($4 \times 2 = 8$, used plastic anvils diameter of 30 cm and depth of 30 cm and filled with two types of soils (clay and Loom) planted seeds (taken from the plants of the previous season) at a depth of 4 cm and an average of (10) seeds / pot then add the herbicide in three concentrations were covered herbicide layer During the germination and growth phase, the following characteristics were taken:

The percentage of emergence (%) and the degree of vulnerability and the number of branches of the main stem / plant and at the end of the agricultural season (28/ 5/2019) were studied the following characteristics: - Dry weight / plant and the number of seeds produced / plant. This experiment was carried out in a global experimental method, complete random design (CRD) and three replicates (Al-Rawi and Khalaf Allah, 1980). The data from the experiment were analyzed using SAS software, and Duncan (1955) was used to compare averages so that averages that differed significantly at the 5% probability level were distinguished by different alphabets.

Results and Discussion

Emergence ratio%

The data in table 1 indicate that the increase in the concentration of Trifloralin herbicide achieved a significant decrease in the rate of emergence of the wild radish weed (*Raphanus raphanistrum* L.) The high concentration (1,440 cm^3 a.i / ha) resulted in the death of all plants compared to the rest of the concentrations, while the percentage of erosion decreased (68, 88 and 91.10% at concentrations (0.864 and 1,248 cm^3 a.i / ha) compared to the comparison, respectively. This may be due to the increase in the concentration of the pesticide in the soil caused the entry of more herbicide into the plants which led to The occurrence of physiological dysfunction was reflected in the emergence ratio (Hayawi, 2015). In this characteristic in the loom soil compared to clay soils where the rate of decline was 29.71%, and this may be because the loom soils lose moisture content quickly compared to clay soils that retain moisture for a longer time and thus increase the ratio of emergence.

This Result coincided with his result's (Hayawi, 2015). The interaction between the herbicide and the soil type, the data in the same table indicate that the high concentration (1,440 cm^3 a.i / ha) in clay soils as well as the concentrations (1,248 and 1,440 cm^3 a.i / ha) in the loom soil caused the death of all plants, as well as note that There is a significant decrease in this characteristic in the loom soil compared to the clay soil in the absence of the herbicide. This means that the weed plants in the loom soil suffer from the impact of moisture tensile in addition to the effect of the herbicide.

Degree of vulnerability

The results in table 1 indicate significant differences in the main factors and the interaction between the factors. The plants were significantly affected by increasing the concentration of the herbicide and the high concentration (1,440 cm^3 a.i / ha) caused the death of all plants, which indicates that the amount of herbicide absorbed by the plants led to a physiological defect in them and affected the root total and reflected on the vegetative total and what This result is consistent with a lot of research indicating that the use of the Trifloralin herbicide causes changes in the physiology of the plant, especially the Marstim cells of weeds (Strachen and Hess, 1983 and Hayawi, 2015).

As for the effect of soil type, the degree of vulnerability was significant in loom soils compared to clay soils. This may be due to soil texture and moisture content as clay soils retain moisture longer than loom soils (Bradford, 1990 and Hayawi, 2015). As for the interaction between the herbicide concentration and soil type, the concentration (1,440 cm^3 a.i / ha) in the weed plants was so high that it led to the death of all plants in the clay and loom soil compared with the comparison

treatment (without herbicide) as well as the concentration (1,248 cm^3) a.i / ha) in the loom soil also caused the death of all plants. And the plants in clay soils were not affected compared to the loom soil, which was affected by (3.34) degree in the treatment comparison, which shows that the impact of plants is different soil texture as well as the use of herbicide, because the lack of moisture in the loom soil compared with clay soils that retain More moisture for longer.

Number of Tillers / plant

Plants fleeing from the action of the herbicide but affected by it have decreased the number of tillers / plant at the concentrations used (Table 1). Absorbed by the plant is not enough to kill but led to a defect in the physiology of the plant and prevented the buds from forming the largest number of Tillers. It was also found that increasing concentration, especially at concentration (1,440 cm^3 a.i / ha.

It has the effect of decreasing the number of Tillers compared to the first and second concentrations of the herbicide since there were no Tillers / plant due to the absence of plants at this concentration. (Cudney, 1993 and Hayawi, 2015).

The same table also indicated that the loom soils reduced the number of tillers by 31.88% compared to the growing plants in the clay soils. Clay soils may contain nutrients in favor of the plant while those nutrients may be reduced in light soils and therefore plant growth is weak. Much research has indicated that this condition is reinforced when plants grow in soils with different tissues (Hayawi, 2015). The relationship between herbicide concentration and soil type resulted in concentrations (1,248 and 1,440 cm^3 a.i / ha) no plant branches due to lack of plants in loom soil and also when the concentration (1,440 cm^3 a.i / ha) in the clay soils. The herbicide has freedom of movement within the loom soil when watering the soil while the movement of the herbicide is reduced in clay soils, due to adsorption of the herbicide and the lack of entry to the plant reduced the number of tillers / plant. This reduction in the number of tillers / plant may be used in the fields by reducing the amount of seeds produced per plant as if it is to reduce plant reproduction.

Dry weight (g / plant)

(Table 1) indicates significant differences in the main factors in the study and their overlap. The results showed that the dry weight of fugitive plants decreased by (22,22 and 64,86)% of the concentrations (0.864 and 1,248 cm^3 a.i / ha), respectively compared to the comparison treatment.

This decrease in dry weight indicates that the plants are weak growth and that the small amount absorbed from the herbicide led to a defect in the physiology of the plant. The imbalance has reached photosynthesis so that food-made materials are very limited, which is reflected in the dry weight, The high concentration (1,440 cm^3 a.i / ha) caused the death of the weed plants so there was no dry weight. This result coincided with many research on the use of Trifloralin herbicide in reducing the dry weight of the weed associated with the wheat crop (Chauhan *et al.,* 2006 and Hayawi, 2015). The results in the same table also indicate the weak growth of the growing plants in the loom soils compared with the clay soils. The nutrients and moisture due to the spread of their roots, which eventually leads to the dry weight gain of the plant (Hayawi, 2015) The data in the same table also indicate the relationship between the concentration of the herbicide and the type of soil. While we note that the action when increasing the concentration to (1,440 cm^3 a.i / ha) in clay soils, and the reason not to kill plants at concentration (1,248 cm^3 a.i / ha) in clay soils may be due to adsorption of herbicide molecules on the surfaces of granules Clay and prevent it from reaching the absorption area by the plant (Accinelli *et al.,* 2001).

Number of seeds produced / plant

The main purpose of the application of the herbicide in the fields is to kill the weed, but the sensitivity of the bush to the Trifloralin herbicide varies from plant type to another plant type and even within one species may resist the plant when absorbing small amounts of the herbicide, but its growth is weak and then reflected on the amount produced One plant of seeds and this is the other goal of the use of the herbicide, especially for fugitive plants from the deadly act of the herbicide. (Table 1) indicates that there are significant differences between study factors and their interaction in this characteristic. When applied, the number of seeds produced decreased by 41.42% and 87.46% for the two concentrations (0.864 and 1,248 cm^3 a.i / ha) respectively, which is good in reducing the seed production of the wild radish weed.

The concentration (1,440 cm^3 a.i / ha) has killed all plants so there is no seed production, Some sources have indicated that the growth of fugitive plants from the herbicide killer is weak and that their seed production is limited (Strachan and Hess, 1983 and Hayawi, 2015). The table also indicated that there is a difference in seed production between the growing plants in clay and loom soils. The number of seeds produced in loom soils decreased by 42.38% compared to clay soils, possibly due to weak plant growth and low number of tillers (Hayawi, 2015). The table also indicated the interaction between the herbicide concentration and the soil type

Table 1: Effect of concentrations of Trifloralin herbicide and soil type and their interaction on some traits for wild radish weed.

Treatment		Emergece (%)	Degree of vulnerability	Number of Tiller/plant	Dry weight(g)	Number of seed/ plant
The concentration of the herbicide cm^3 / a.i / ha						
0		75.00 a	1.67 d	7.83 a	7.20 a	6.06 a
0.864		23.34 b	7.50 c	3.34 b	5.60 b	3.55 b
1.248		6.67 c	9.50 b	1.16 c	2.53 c	0.76 c
1.440		0.00 d	10.00 a	0.00 d	0.00 d	0.00 d
Soil typs						
Clay soil		30.83 a	6.67 b	3.67 a	3.16 a	4.86 a
Loom soil		21.67 b	7.67 a	2.50 b	2.07 b	2.80 b
Soil × concentration						
Clay soil	0	86.67 a	0.00 e	8.34 a	8.26 a	6.96 a
	0.864	23.34 c	7.67 c	4.00 c	6.13 b	3.96 c
	1.248	13.34 c	9.00 b	2.34 d	5.06 c	1.53 d
	1.440	0.00 d	10.00 a	0.00 e	0.00 d	0.00 e
Loom soil	0	63.34 b	3.34 d	7.34 b	6.14 b	5.16 b
	0.864	23.34 c	7.34 c	2.67 d	5.06 c	3.13 c
	1.248	0.00 d	10.00 a	0.00 e	0.00 d	0.00 e
	1.440	0.00 d	10.00 a	0.00 e	0.00 d	0.00 e

The values followed by the same letter were not significantly different at the 5% probability level of the study factors and their interaction.

(its texture). In the loom soil treated with concentrations (1,248 and 1,440 cm^3 a.i / ha), as well as clay soils treated with concentration (1,440 cm^3 a.i / ha), No seed production due to the herbicide efficiency in killing plants during their growth, and it was also observed that there was a significant decrease in the number of seeds produced from the comparative treatment of growing plants in the loom soils (5,16) seeds compared to the clay soils (6,96) seeds, which indicates that the rate of Plant growth in light soils is weak and this is indicated by the above qualities.

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