



Effect of Trifluralin herbicide on emergence, growth and seed production of wild Oat (*Avena fatua* L.) under different depth

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Abstract

The experiment was applied during the agricultural season 2016-2017 to evaluate the growth and production of seeds for wild oats (*Avena fatua* L.) under the influence of the difference in the depth of seed presence in the soil (2, 4 and 8 cm) when using the Trifluralin herbicide concentrate with a concentration of (1,248) cm³ a.i /h Compared to the comparison treatment, Plastic pots 30 cm in diameter and 30 cm in depth were used and filled with loamly soil , The seeds were planted at 10 seed / pot rate and the treatment was treated with a pesticide and a thin layer of soil was placed after spraying the herbicide to prevent evaporation and photolysis. The experiment was applied in a global experimental manner with complete random design and three replicates. The results showed that the superiority of the Trifluralin herbicide treatment in the depths (2, 8) The seeds did not appear, which was reflected in the rest of the studied traits as the degree of vulnerability to these depths (10) degrees, which is very affected compared to the comparison , The effect of the depth was the seeds located in the depth (4) cm, the lowest proportion of the emergence of 66.67% and the low degree of vulnerability (4,16) and increase in the other studied traits is the height of the plant and number of plants / plant and number of leaves / plant and dry weight and the number of seeds / Plant (38.66, 2.00, 8.83, 6.56 and 19.50), respectively.

Keywords: wild oat, Trifluralin herbicide, deep planting, *Avena fatua* L

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INTRODUCTION

The wild oat (*Avena fatua* L.) is one of the winter annual weed found in winter wheat crop areas such as wheat and barley, and is prevalent in these areas (Cousens 2003), causing a decreasing crop in about a 30% and affecting for wheat or barley during harvesting (Jabran et al. 2010). The wild oat seeds fall immediately after maturity to the ground near the mother plant, and may be transmitted by wind and animal to other areas, and the seed yield is between 100-150 seeds / plant, and when the competition for the crop of wild oats is severe, 30 seeds / plants (William 2003).

Mc Gillion and Storrie (2006), reported that the number of seeds produced for wild oat depends on its density as well as the density of the crop in which the broiler is present. Although pesticides are available to control this plant, the dormancy phenomenon in its seeds is why it remains in the fields for a long time (Zhu and Li 2002). Wild oats are relatively short, especially for seeds that are on or near the surface of the soil. These seeds remain dormant for a long period of up to 10 years if buried deep in the soil. Tillage breaks dormancy and begins to grow (Benvenuti et al. 2001). As well as, the

development of resistance to pesticides among scrubland species (Heap 2008). The emergence of resistance in plant plants for herbicides is the result of the use of herbicides and high concentrations in control (Heap 2011), as well as the use of herbicides after germination and for a long time, which led to the emergence of this resistance in the jungle communities (Llewellyn and Powle 2001).

The emergence of this resistance to herbicides in scrubland plants makes it difficult to control grain fields, including wheat (Jones et al. 2005). Therefore, the turfand herbicide of the dinitroaniline herbicides, which is added to the soil before or during cultivation, has become a widely used herbicide in wheat fields to control the weeds, especially in the conservation farming system (Chauhan et al. 2006). The seeds of the weed differ in their response to germination with varying depth of burial and softness of surface soil minutes and climatic conditions close to the soil surface (Cassida et al. 2000).

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Table 1. Effect of Turfland on the studied characters

characters	Emergence (%)	Degree of vulnerability (0-10)	Plant height (cm)	Number of Tillers .plant ⁻¹	Leaves .plant ⁻¹	Dry weight (g)	Number of seed .plant ⁻¹
Treatments							
Control (without herbicide)	47.78 a	4.22 b	44.11 a	1.88 a	7.55 a	5.44 a	17.22 a
Trifluralin herbicide (650 ml)	0.00 b	10.00 a	0.00 b	0.00 b	0.00 b	0.00 b	0.00 b

*Similar letters indicate no significant differences

Chauhan et al. (2002), showed that most of the newly produced seeds are close to the surface layer of the soil while older seeds are increasing in number with increasing depth. Therefore, the cultivation process of the wheat crop is less stirring Soil in a conservation farming system is important in keeping the seeds of wild oats on the soil surface (Unger 1994). The present paper aims to validate the efficiency of turfland in the control of wild oat when the depth of the presence of seed in the soil is different.

MATERIALS AND METHODS

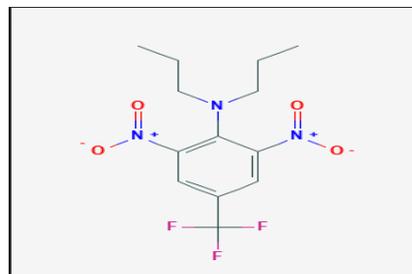
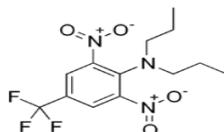
Our knowledge of this work is largely based on very limited data. Therefore, the experiment was carried out in the wire canopy of the Field Crops Department / College of Agriculture and Forestry / University of Mosul during the agricultural season 2016 - 2017. The experiment included the following factors:

There is a considerable factor of the trflan herbicide with a concentration of (1,248) cm³ effective material compared to the comparison treatment. Wild oats in the soil (2, 4, 8) cm. Seeds were planted at 10 seed /plastic pots for 30 cm diameter, 30 cm deep and filled with mixed soil were used.

The pesticide is then placed in a light layer of soil after spraying the herbicide to prevent it from evaporation and photolysis, in addition to a new methodology is described in this study. At the end of the season, the following characteristics were studied:

Pest rate (%) and degree of vulnerability (0 to 10 degrees where zero is not affected and 10 is highly affected) (Hyali, 2015), plant height and number of plants / plant and number of leaves / plant and dry weight / Production / Plant. This experiment was carried out in the style of universal experiments with full random design (CRD) and three replicates (Al-Rawi and Khalaf Allah, 1980). The data from the experiment were analyzed using the computer and under the SAS program, using the Duncan (1955) test to compare the averages so that the averages were significantly different from each other at a 5% probability level in different alphabets.

Chemical Structure of turfland derivatives is in below:



Trfland is a group of dinitroaniline compounds. This group is characterized by a low melting point in the water, volatile and a mixture of soil before planting. It is a bright yellow orange color and most of it is electrically made either in the form of concentrated liquid or granular form. The common name of treflan is Trifluralin. Its commercial is treflan, Trim and Trifcan (Hayawi 2015).

RESULTS AND DISCUSSION

Effect of Trifluralin Herbicide

It is sprayed on soil before planting as well as mixed with it to prevent its exposure to photosynthesis or volatilization and thus decrease its effectiveness on the target weeds. The results of (**Table 1**) was showed that there are significant differences Among the treatments in which the Trefland herbicide was used compared to the treatment of the witness was affected by ten degrees of non-emergence of seeds that were planted in the pots and this reflected on all the characteristics studied, (Chauhan et al. 2006).

Effect of Deep Soil Presence in Soil

Table 2 is interesting in several ways and there are significant differences in all studied characters of wild oat when the depth of the presence of seeds in the soil was significantly different when the seeds were significantly higher when their seeds were found above the surface of the soil and at a depth of 2 cm below the surface of the soil. The presence of the seeds in depth (4 and 8) cm. It was also observed that there was no plantation of the seeds when the seeds were found at a depth of 8 cm. The reason is that either germination occurred inside the soil but the nutrients stored in the endosperm were all burned in the soil. The thickness of the soil layer (8 cm) is large and the rosette can not penetrate it, in addition many sources pointed to the possibility of the emergence of many plant plants and even some crops when they are located in the depths of the extent necessary for emergence, there is a kind of proportion between the size of the seed and the depth of its existence and its relationship with soil tissue (Benvenuti et al. 2001, Cassida et al. 2000).

Table 2. Effect of the depth of the presence of oats seeds in the soil on the studied characters

Characters Depth (cm)	Emergence (%)	Degree of vulnerability (0-10)	Plant height (cm)	Number of Tillers .plant ⁻¹	Leaves .plant ⁻¹	Dry weight (g)	Number of seed .plant ⁻¹
2	73.33 a	6.16 b	36.33 a	1.16 b	3.66 b	2.16 b	9.50 b
4	66.67 a	4.16 c	38.66 a	2.00 a	8.83 a	6.56 a	19.50 a
8	0.00 b	10.00 a	0.00 b	0.00 c	0.00 c	0.00 c	0.00 c

*Similar letters indicate no significant differences

We believe that we have found that the seeds found on the surface of the soil was germination less than 100%, indicating that some of the seeds (10) seeds did not occur where germination even if it had the conditions suitable for germination, which makes it enter the dormancy for a period of time (Harper 1977), which increases the rate of seed storage in soil so as to escape the different control methods. Some investigators pointed out that the degree of dormancy of seeds varies according to their location in al-Nora and the date of maturity of the seed that was on the mother plant (Obeidi 2004).

The growth of plants that appeared above the surface of the soil was different and affected by the depth of the presence of seeds in the soil. The results showed that the plants that grew from seeds on the surface of the soil were weak with the degree of vulnerability to (6) degrees, which was reflected on the other qualities while the plants that appeared Of the seeds buried at a depth of 4 cm gave the growth of vegetables and a good growth rate where the degree of vulnerability (4) degrees, and we infer from these results that the high rate of emergence of plants growing from the seeds of a depth of zero or (2 cm) in the soil does not mean continued growth during the growth season well.

But the plants that grew from seeds buried at a depth of 4 cm gave good growth and this was observed by studying the vegetative qualities of plants. The reason for the presence of plants that are weak in growth at 2 cm from the surface of the soil may be due to the evaporation of water (moisture) from the surface of the soil so that these plants may suffer from water stress, which reflected the rate of growth while the plants growing from seeds buried at a depth of 4 cm have sufficient quantity of the appropriate moisture not only at the stage of germination but also in the other stages of plant growth and this result is consistent with many paper conducted on the difference in humidity and its relationship to germination and growth of many seeds of crops or weed seeds (Baskin 1989). The results indicate that the height of the plant varies depending on the depth of the seeds' presence in the soil. The growing plants from the seeds buried at a depth of 4 cm gave the highest plant height of 38.66 cm, which did not differ significantly from the height of the plants at a depth of 4 cm. This factor may be the main reason for the growth of some plants well.

Many investigators pointed out that in the growth of carpentry plants, especially in different rained areas, to rain-fed areas, there is a difference in plant height of one species according to the availability of moisture during its growing season (Ahmad and Ahmad 1987, Obeidi 2004). The number of seedlings / plant also differed as the number of seedlings reached 2.00 sloughs for growing plants from deep seeds (4 cm) compared with the number of seedlings for growing plants from seeds located at a depth of 2 cm where the proportion reached 84% Very in terms of growth rate. The presence or emergence of streptococci early in plant growth will reflect this on its production of seeds as well. In general, a gradient was observed in the number of seedlings per plant when the seed depth was increased except for the seeds at a depth of 8 cm. Some studies indicate that the number of seedlings in the plant increased when they did not suffer from the lack of soil moisture at all stages. The number of saplings increased when appropriate moisture was present in the early stages of plant growth to the elongation phase (Al-Fakhri 1979, Ahmad and Ahmad 1987).

This quality has been positively reflected on the number of leaves in the plant, as the number of leaves reached (8) leaves of the plant, which contains 2,00 pieces of the origin of the plants growing from seeds that are 4 cm deep, where the average rate of seclusion on (4) leaves while Compared with the number of leaves of the growing plant at a depth of (2) cm, although the number of straying 1,16 segments, the number of papers also decreased and that affects the one segment at a rate of 3.15 sheets and this means that the lack of number of leaves is the result not only of the lack of moisture in the soil but also due to the small number of stools in the plant. Some paper has indicated that the number of leaves and even the paper area is small when the plant during its growth stages is exposed to water tension (Al-Rawi 1985).

The main objective of this study was not only to measure the growth rate of wild oats under different parameters, but also to know the amount of production of one plant of seeds, which is the only means of reproduction The table indicated a gradient in the production of seeds according to depths except depth 8 cm and the best rate To produce seeds from plants growing from seeds located at a depth of 4 cm and of 19.50 seeds / plant compared to growing plants of seeds located at a depth of (2 cm) and of the 950 seeds / plant. The increase or abundance of seed production per plant

Table 3. Effect of the interaction between the Turfland pesticide and the presence of oat grain seeds in the soil on the studied characters

Characters		Emergence (%)	Degree of vulnerability (0-10)	Plant height (cm)	Number of Tillers .plant ⁻¹	Leaves .plant ⁻¹	Dry weight (g)	Number of seed .plant ⁻¹
Herbicide x Depth								
Control (without herbicide)	2	73.33 a	2.33 c	72.66 a	2.33 b	7.33 b	4.33 b	19.00 b
	4	70.00 a	0.33 d	59.6 b	3.33 a	15.33 a	12.00 a	32.6 a
	8	0.00 b	10. a	0.00 d	0.00 c	0.00 d	0.00 c	0.00 d
Trifluralin herbicide (650 ml)	2	0.00 b	10.00 a	0.00 d	0.00 c	0.00 d	0.00 c	0.00 d
	4	5.00 b	8.00 b	17.6 c	0.67 c	2.33 c	1.13 c	6.33 c
	8	0.00 b	10.00 a	0.00 d	0.00 c	0.00 d	0.00 c	0.00 d

*Similar letters indicate no significant differences

may be due to the availability of appropriate moisture, which led to increased growth rates through growth attributes. We conclude from this that when there is no planting and planting the seeds of the crop without tillage, many of the seeds of the plants that fell from the mother plant on the surface of the soil are encouraged to control them indirectly by reducing the seed production of the plant and the double growth rate (Chauhan et al. 2006), as well as reducing the storage of weed seeds in the soil (Dawit and Stoltenberg 1997, Roberts and Feast 1972).

The dry weight of the plant was significantly higher than the dry weight of the growing plants from the seeds at a depth of 2 cm from the surface of the soil. The result of this difference is that there is a significant difference in the growth rate between depth (2 and 4 cm). This is in fact dependent on the soil moisture rate, the size of the seeds and the soil tissue, despite the difference in their rate of emergence. This difference may be due to the difference in the plant density of the unit area and its relation to moisture. As the plant density increases, its need for moisture increases, but when moisture is limited, the lack of moisture in the plant will affect the rate of growth measured by dry weight (Ahmad and Ahmed 1987, Obeidi 2004).

Effect of the Interaction between the Trifluralin Herbicide and the Seeds in the Soil

Table 3 indicates that there are significant differences for both treatments (without precipitation and depth) and the depth of the depth (4 cm) in the treatment (without precipitation depth) for all studied characters. There are significant differences between them. This was shown at depth (8) cm where there was no germination ratio, which was reflected on the other studied characters (Ahmed and Ahmed 1987, Obeidi 2004). The results of **Table 3** showed that oat seeds did not rise at depth (2) cm where the degree of impact was (10) degrees (very affected). The effect on the surface was significantly affected by the herbicide, which was reflected on the other studied characters. The effect of the pesticide was less than 4 cm, where the effect of the herbicide and the lack of moisture required for germination decreased. Some seeds emerged, which affected the rest of the studied characters. The number of leaves / plant increased (2.33) as well as the increase in dry weight reached (1.13) and therefore the increase in the number of seeds / plant reached (6, 33) In depth (8) cm did not appear seedlings to increase the depth of burial and low humidity in this depth may be exposed to the herbicide leaching, which affects the seeds in depth (8) cm (Chauhan et al. 2006) and Roberts (1972) and Dawit and Stoltenberg (1997).

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