

استجابة لأدغال المرافقة للأشجار الخوخ للمكافحة الكيميائية مرة او مرتين وأثر زيادة على النمو ونوعية الخوخ

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الخلاصة

أجريت تجربة حقلية في محافظة السليمانية خلال فصل الخريف لعام ٢٠٢١ لدراسة تأثير تكرار إضافة مبيدات الادغال في الصفات النوعية والحاصل لمحصول الخوخ والادغال المرافقة. العامل الأول هو عدد مرات استخدام مبيدات الادغال (مرة ، مرتين) والعامل الثاني هو معاملات المكافحة الخمسة (المقارنة ، الكلايفوسيت ١٥٠٠ مل / دونم ، تركيز مبيد الكلايفوسيت ١٠٠٠ مل / دونم + مغنطة محلول الرش ، مبيد باراكوات تركيز ٥٠٠ مل / دونم ، ومبيد باراكوات ٢٥٠ مل / دونم + مغنطة محلول الرش). أشارت النتائج إلى أن تكرار المكافحة أعطت تأثيراً معنوياً في الوزن الرطب والجاف لجذور الادغال بصورة عامة بعد ٤٠ و ٦٠ يوماً من المكافحة حيث حققت وزن (١٦١.٥٤ ، ١٣٦.١٨) غم /م^٢ وزن الرطب و(٦٦.٣٩ ، ٤٨.٢٣) غم/م^٢ وزن الجاف. . حققت المعاملة الكلايفوسيت + مغنطة محلول الرش أقل وزن جاف ورطب بلغ ٢٣.٦٨٢ غم/م^٢ بعد ٦٠ يوماً مقارنة مع معاملة المقارنة ، أما بالنسبة لتأثيرات التداخل فقد أعطت معاملة الكلايفوسيت + مغنطة محلول الرش ، أقل وزن جاف. ١٩.٤٩٣ غم/م^٢ بعد ٦٠ يوماً ، وحققت معاملة الباراكوات أعلى معدل حاصل /شجر بلغ ١٧.٩١٧ كغم/شجرة ، وحاصل وزن ثمرة الخوخ الواحدة كان ١٣٥.٧٣٩ غم وحجم الخوخ ١١٨.٣٣ سم^٣ ، وحققت معاملة الكلايفوسيت + مغنطة محلول الرش أعلى نسبة مكافحة كانت ٨٧.٣% ، اما اقل نسبة مكافحة كانت ٤٤.٠% في معاملة الباراكوات بالتركيز الأول . استنتج من هذه التجربة أن مبيدات الادغال أثرت بشكل إيجابي بالحد من نمو الادغال المرافقة لمحصول الخوخ وبالتالي زيادة الحاصل وتحسين النوعية .

الكلمات المفتاحية: مبيدات الادغال ،تكرار المكافحة الكيميائية ، الادغال المرافقة لمحصول الخوخ ، مبيد الكلايفوسيت ، مبيد الباراكوات ، الخوخ.

Response of the weeds accompanying the peach trees to chemical control once or twice and the effect of increasing the growth and quality of the peach

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Abstract

A field trial was carried out in Sulaymaniyah Governorate during the autumn season of 2021 to study the effect of the number of Repeat herbicides the effect on weed accompanying peach trees yield and fruit quality characteristics. The first factor is the number of applications of herbicides (once, twice) and the second factor is the five control treatments (control, glyphosate 1500 ml/dunam herbicide concentration, glyphosate1000 ml/dunam herbicide concentration + magnetization of the spray solution, paraquat herbicide concentration 500 ml/dunam, and paraquat herbicide concentration 250 ml/dunam+ magnetization of the spray solution). The results indicated that repeat control times gave a significant effect on the wet and dry weight of the weed roots 40 and 60 days after control gave a weight of (161.54, 136.18) gm of wet weight a (66.39, 48.23) mg of dry weight. The treatment of glyphosate + magnetization of the spray solution achieved the lowest wet and dry weight after 23.682 mg 60 days after control, as for the effects of interaction tow applications with the treatment of glyphosate + magnetization of the spray solution, the lowest dry weight was reached 19.493 g after 60 days for control. Paraquat treatment achieved the highest yield/tree rate of 17.917 kg, and one of peach 135.739 g and size of peach 118.33 cm³, the treatment of glyphosate + magnetization of the spray solution achieved the highest control rate of 87.3%, and the lowest control rate was 44.0, which was achieved with Paraquat. Concluded from this

trial that the herbicides affected controlling the weeds associated with peach Increasing yield and quality.

Keywords: herbicides, repeat chemical control, weeds, peaches.

Introduction

The peach's scientific name is [*Prunus persica* (L.) Batsch] is one of the fruit trees that belong to the Rosaceae family and peach is a temperate tree fruit that originated in China and has been cultivated for at least 4,000 years (Lewter, 2020).

Peach is the third most cultivated temperate tree fruit in the world, after apple and pear, with a world production of approximately 24.6 million tons (Food and Agricultural Organization of the United Nations (FAO), 2018) (Linge *et al.*, 2021). The peach peel is deliberately divided into two types, the smooth peach, and the woolly peach, which contains fluff, and Peach seedlings may begin producing fruit as early as the second or third year of growth. Although peach trees can survive up to 30 years, they will typically continue commercial fruit production for only 12 to 15 years. The roots may reach up to 60 cm in depth (Lewter, 2020). Although the main production areas for the peach are located between 30 and 45° latitude, production is also found throughout the subtropics and tropical regions (Badenes and Byrne, 2012). Its cultivation extends towards the equator to bear the temperatures, and economically important fruit species in temperate regions with a net value of over \$13.6 billion in 2016 (FAO) (Li and Wang, 2020), and its cultivation is spread in Iraq, especially the northern region, with an area of 380 hectares with a production rate of 2004 tons (Central Statistics Agency). Peach fruit is of high nutritional value because they contain a high percentage of carbohydrates, fats, salts, a rich source of minerals, vitamins and contain a good amount of sugar (Lebaka *et al.*, 2018). Fruit trees are poor competitors because of their low root density per unit of soil compared to weeds. Therefore, proper weed management is vital in the fruit orchard to minimize weeds competition against fruit trees, for water and nutrients assuring quality fruit yields (Mia, Massetani, Murri, Facchi, *et al.*, 2020). Also, various orchard floor weed management practices have significant effects on tree growth. The chemical weed control resulted in greater tree growth when compared with mechanical soil cultivation (Belding *et al.*, 2004). The best herbicides used to control weeds in orchards are glyphosate and paraquat (Harma and Ingh, 2006, Singh *et al.*, 2011). the use of

magnetized water may increase the efficiency of lower application rates of herbicides which may lead to reduced the cost of this herbicide and the environmental pollution (Hamed and Faek 2013). Accordingly, the research aimed to determine the best concentrations of the herbicide glyphosate and gramoxone and the magnetization of the spray solution in combating the weed accompanying the peach crop and its reflection on the yield and quality characteristics of the peach fruits.

Materials and Methods

A field experiment was carried out in one of fields of Sulaymaniyah Governorate. Decon baba Ali of Sulaimani, (latitude 35° 30' 21" N, longitude 45° 19' 03" E, altitude 848 masl) in Field. During the autumn season of 2021. To know the effect of the repeat chemical control, in combating the weeds accompanied by peach trees and their effect on

Table 1: The trade name and concentration and ingredient active.

Cod	Treatment	Ingredient active herbicide use
T ₀	Control	Control
T ₁	Glyphosate Ultra	<i>N</i> -(phosphonomethyl)glycine)
T ₂	Glyphosate Ultra + Magnetic water	<i>N</i> -(phosphonomethyl)glycine)
T ₃	Paraquat Dichloride	1, 1'-dimethyl-4,4'-bipyridylum dichloride
T ₄	Paraquat Dichloride + Magnetic water	1, 1'-dimethyl-4,4'-bipyridylum dichloride

the yield and quality of peach fruits. RCBD was used in a randomized complete block design, the study included two factors, the first is the repeat control (once, twice) and the second factor is the control treatments, which are five (control, glyphosate with a concentration, glyphosate with a concentration + magnetization of the herbicide solution with a strength of 400 gauss, paraquat with a concentration, and paraquat with a concentration + Magnetization of the pesticide solution with a strength of 400 gauss (Table 1). The area of one experimental unit (state the area around the tree) so that each experimental unit contains one peach tree, separated from one treatment by another, with an area of 1 m. The date of the first application was on the (9 May) and (29 May) the time of the second control. using a KnapSack sprayer to applicant glyphosate and Parquet and according to the concentration recommended by the manufacturer. The water was magnetized using a 400-gauss device, and the soil was analyzed in Table 2.

Data from the weed:

- 1- The weed spread in the peach orchard was diagnosed (Table 3).
- 2- the wet and dry weight of weed roots after 40,60 days of control.
- 3- The rate of inhibition of the weed, depending on the dry weight, after 60 days of control, the following equation was calculated:

$$\text{WCE} = \frac{\text{DMC} - \text{DMT}}{\text{DMC}} \times 100$$

Where:

WCE = weed control efficiency based on dry matter.

DMC = weed dry matter in a comparison treatment (without control).

DMT = weed dry matter in weed control treatments (Al-Wagaa *et al.*, 2018).

Table (2): Some physical and chemical properties of the studied soil in Orchards Decon baba Ali.

Characteristics	Measuring units	Decon baba Ali
Ec	dsm ⁻¹	0.0001502
PH		7.96
Sand	g kg ⁻¹	81
Silt		17.4
Clay		1.4
Texture		Loamy sand
N	mg km ⁻¹	44
P		10
K		206
O.M	Percentage%	0.75
CaCO ₃		7.9

These analyses were done by Galla agriculture laboratory. in Baziazn Sulaimani

Table 3: The English, Arabic, scientific, and family names of the major weed species spreader at the experiment location.

English Name	Growth time	Arabic Name	Life cycle	Leave type	Scientific Name	Family
Wild mustard	شتوي	خردل البري	Annual	Broad leaves	<i>Brassica napus</i>	Brassicaceae
Barnyard grass	صيفي	الذنبية	Annual	Broad below, narrow top	<i>Echinochloa crus-galli</i>	Gramineae
Hoary cress	شتوي	قتيرة	Perennial	Broad leaves	<i>Cardaria drapa</i>	Cruciferae
Tatarian eorche	صيفي	الرغل	Annual	Narrow leaves	<i>Atriplex tataricum</i>	Chenopodiaceae
Milk thistle	شتوي	كلغان	Biennial	Narrow leaves	<i>Silybum marianum</i>	Asteraceae
Marvel grass	صيفي	الزمزوم	Perennial	Broad leaves	<i>Dichanthium annulatum</i>	Poaceae
Bishop flower	شتوي	زند العروس	Annual	Narrow leaves	<i>Ammi majus</i>	Apiaceae
Petty spurge	شتوي	الفرح	Annual		<i>Euphorbia peplus</i>	Euphorbiaceae
Johnson grass	صيفي	السفرندة	Perennial	Narrow laeves	<i>Sorghum halepense</i>	Poaceae

Parameters measurements**Yield and Components:**

1. Total yield peach tree (kg peach⁻¹): Harvesting of fruits was done after the fruits reached the ripening stage, and was calculated in each replicate.
2. Average fruit size (cm³): The volume of peach fruits was measured using the water displacement method.

Statistical Analysis: A factorial (RCBD) was conducted. Two factors with three replicates comparisons were statistically analyzed according to the XLSTAT 2016, and the significant differences in the treatment means were compared with an LSD test at < 0.05.

Results and Discussions:

Effect of control treatments, number of applications, and interaction between them on the wet and dry weight of roots of weed plants after different periods of control.

It appears from the results of the control treatments in Table (4) that the treatment of glyphosate + magnetization of the spray solution achieved the highest rate of effectiveness in reducing the wet and dry root weight of the weed after 40 and 60 days of

application, which gave 60.192 and 78.435 g/m² respectively for wet weight and 82.177 and 23.682 g/m² respectively for dry weight compared to the comparison treatment and paraquat, and this is due to the action of the systemic glyphosate, as it is transmitted to the roots of the plant, which causes inhibition of the photosynthesis process and thus stops growth, which is reflected in reducing the weight of the weed roots and this result agrees with (Baylis, 2000).

Table 4. Effect of control treatments on the wet and dry weight of weed roots after different periods of control.

Treatment	Fresh weight of root weed (gm)		Dry weight of root weed (gm)	
	After 40 days	After 60 days	After 40 days	After 60 days
Control	320.067	217.308	179.135	85.025
Glyphosate Ultra	123.027	99.058	133.190	38.333
Glyphosate Ultra+ Magnetic water	60.192	78.435	82.177	23.682
Paraquat Dichloride	275.757	140.768	60.957	53.512
Paraquat Dichloride+ Magnetic water	182.913	123.768	25.608	43.593
L.S. D	3.318	17.307	5.91	9.154

As it is clear from the results in Table (5) that the repeated application of the different control treatments had a higher significant effect in reducing the wet and dry weight of the roots of the weed compared to the application once after different periods of the addition of two times after 40 days was superior in reducing the wet and dry weight, which gave Weight reached 161.540 and 66,392 g/m² respectively compared with the one-time addition which was 223.242 and 126,035 g/m² respectively. This is because the re-control plants were more affected and could not re-grow compared to the one-time control and this result agree with (Martinelli *et al.*, 2022).

Table 5. The number of Applications to the wet and dry weight of roots of weed plants after different periods of control.

N. of application	Fresh weight of root weed (gm)		Dry weight of root weed (gm)	
	After 40 days	After 60 days	After 40 days	After 60 days
One application	223.242	127.549	126.035	49.425
Tow application	161.540	136.186	66.392	48.233
L.S. D	2.099	10.946	3.738	5.789

As for the interaction between the different control treatments × the number of times of application and their effect on the wet and dry weight of the weed roots, it is noted from the results in Table 6 that the treatment of glyphosate + magnetization of the spray solution added once gave the lowest wet weight of the bush roots after 40 days of application, which amounted to 48,483 g/m² and the lowest wet weight of weed roots after 60 days was 63.07 g/m² when added twice. Also, the superiority of this treatment continued in achieving the lowest dry weight of bush roots after 40 and 60 days of addition when added twice over the rest of the other treatments and the comparison treatment where gave The dry weight of the roots of the weed was 21,367 and 19.493 g/m², respectively, which confirms the importance of the repetition of the control and the magnetization of the spray solution in increasing the effectiveness of the effect of the herbicide in impeding the photosynthesis process and depleting the food stock represented by carbohydrates that the plant needs in the growth habit.

Table 6: The effect of the interaction between the control treatments and the number of additions on the wet and dry weight of the roots of bush plants after different periods of control.

N. of application	Treatment	Fresh weight of root weed (gm)		Dry weight of root weed (gm)	
		After 40 days	After 60 days	After 40 days	After 60 days
One application	T0	278.940	235.997	105.100	87.513
	T1	95.347	109.550	51.107	39.180
	T2	48.483	93.800	29.850	27.870
	T3	234.573	128.093	86.083	46.900
	T4	150.357	113.490	59.820	39.700
Tow application	T0	361.193	198.620	253.170	82.537
	T1	150.707	88.567	70.807	37.487
	T2	71.900	63.07	21.367	19.493
	T3	316.940	153.443	180.297	60.123
	T4	215.470	134.047	104.533	47.487
L.S. D		4.693	24.476	8.359	12.946
T0: Just spray water, T1: Glyphosate Ultra, T2: Glyphosate Ultra, T3: Paraquat Dichloride, T4: Paraquat Dichloride + Magnetic water.					

Effect of control treatments, number of applications, and the interaction between them on yield/tree, fruit weight, and size after different periods of control.

the results of control treatments Table (7) that the control treatments had a significant effect on the total yield/tree, fruit weight/gm, and fruit size/cm, where the paraquat treatment gave the highest yield/tree that reached 17.917 g, the largest fruit weight was

135,739 g and the largest fruit size reached 118.33 cm compared with the comparison treatment and the rest of the control treatments, and this is due to the effect of the paraquat herbicide in killing the weed and reducing the proportion of competition between the weed and peach trees, which was positively reflected on the yield and its components (Buckelew *et al.*, 2018 and Hussain *et al.*, 2018).

Table 7. Effect of control treatments on yield/tree, fruit weight, and size.

Treatment	Total Yield Peach Tree (Kg Peach-1)	weight of one peach	Size of (one peach cm3)
Control	16.450	82.772	83.333
Glyphosate Ultra	11.533	44.403	75.000
Glyphosate Ultra + Magnetic water	13.833	66.787	71.669
Paraquat Dichloride	17.917	135.739	118.33
Paraquat Dichloride + Magnetic water	16.250	117.612	86.667
L.SD	1.728	5.47	6.392

As it is clear from the results in Table (8) that adding the control treatments once had a significant effect in increasing the weight and size of the fruit, as it gave the fruit weight of 94.104 g and a volume of 99.334 cm compared to adding the control treatments twice, which were 84,821 g and 74.667 cm, respectively. The reason is that the amount of benefit achieved from repeating the control and its impact on limiting the growth and spread of the weed, although it was greater in increasing the percentage of control in the weed, what the control achieved once in reducing the rate of competition for the elements of growth between the weed and peach trees was greater than the amount achieved of repeat anti (Khaliq *et al.*, 2011).

Table 8. The effect of the number of times of control on the yield/tree and the weight and size of the fruit.

N. of application	Total Yield Peach Tree (Kg Peach-1)	weight of one peach	Size of (one peach cm3)
One application	15.927	94.104	99.334
Two applications (After 20 days from H1)	14.467	84.821	74.667
L.S. D	1.093	3.466	4.043

the interaction between the different control treatments × the number of times of application and their effect on the yield/tree, weight, and size of the fruit, it is noted from the results in Table (9) that the treatment of paraquat herbicide + magnetization of the

spray solution added once gave the highest yield/tree of 18.733 kg, and it gave the paraquat treatment without magnetization. Added twice for the largest fruit weight amounted to 164.778 g/fruit and the best fruit size amounted to 156,667 cm compared with the control treatment and other control treatments. This result shows the importance of control and reducing competition with the jungle in increasing the yield and its components.

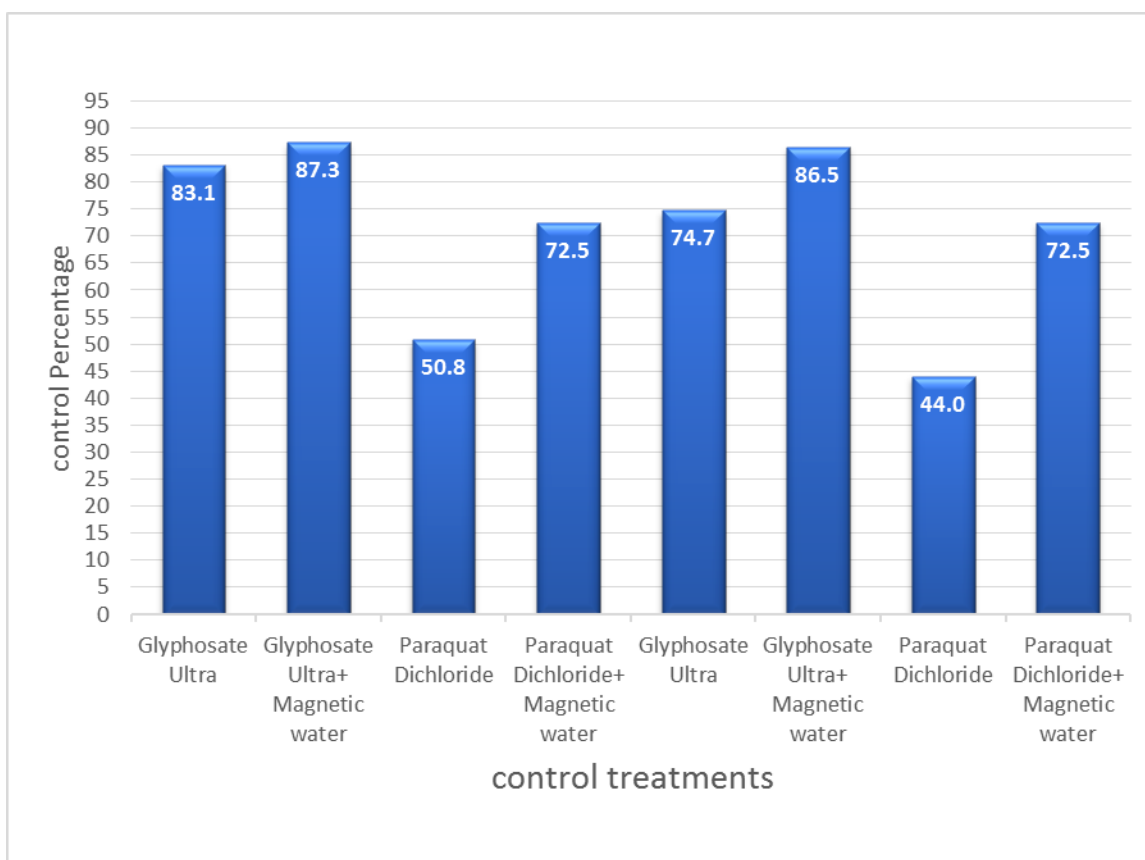
Table 9. Effect of the number of times of control on yield/tree, fruit weight, and size.

N. of application	Treatments	Total Yield Peach Tree (Kg Peach-1)	weight Of one peach	Size of (one peach cm ³)
One application	T0	14.167	31.707	33.333
	T1	11.833	59.087	130.000
	T2	16.567	101.518	113.339
	T3	17.167	106.701	80.000
	T4	19.900	171.508	140.000
Tow application	T0	18.733	133.837	133.333
	T1	11.233	29.720	20.000
	T2	11.100	32.056	30.000
	T3	18.667	164.778	156.667
	T4	12.600	63.716	33.333
LSD.		2.444	7.749	9.04
T0: Control, T1: Glyphosate Ultra, T2: Glyphosate Ultra, T3: Paraquat Dichloride, T4: Paraquat Dichloride + Magnetic water, (H1: One application, H2: Two applications (After 20 days from H1)).				

Effect of control treatments, number of additions, and interaction between them on the percentage of weed control after 60 days.

Measuring the percentage of inhibition is evidence that confirms to the researcher the efficiency and effectiveness of the herbicide used in killing the target weed in the control process. This characteristic depends on the amount of reduction in the dry weight of the plant due to the influence of the control treatments used compared to the comparison treatment without control. It appears from Figure (3.2) that there are clear differences in the percentage of control as a result of using the glyphosate herbicide with the magnetization of the spray solution added once or twice, as it achieved the highest control percentage of 87.1% and 86.5%, respectively, and this effect lasted up to 60 days of addition, and it is noted that the herbicide was superior to Glyphosate alone or with the magnetization of the spray solution on the paraquat herbicide added alone or with the magnetization of the spray solution when added once or twice, if the difference between the highest anti-bacterial ratio between them is 14.8%, and this ratio is considered high in the fight against the weed and this may be due to the concentration used of the herbicide

The magnetization of the spray solution was appropriate in reducing the growth of the weeds accompanying the peach trees. In general, it is noted that the magnetization coefficients are superior, and this has a role in reducing environmental pollution due to the possibility of reducing the concentrations used of chemical herbicides, and it is noted that one-time control gave a better effect than re-control and this can be explained To the weak ability of the plant to give new growth and the death of most of the sluggish weeds located under the surface of the earth due to the weakness of the photosynthesis process as a result of the action of the herbicide, which caused a depletion of stored nutrients that are represented A and transforming them into living cells as a result of damage to the vegetative system, or that the herbicide works to inhibit some enzymes in the weed plants and causes the photosynthesis process to stop, and this is consistent with what (Al-wagaa and Mohammed, 2020).



Figur 2 The effect of treatment control on the percentage of control weed based on weed dry weight after 60-day application.

Conclusions:

The results of the research showed that the Repeated control achieved good results in killing the bush on the one hand and increasing the yield of the tree and the weight and size of the fruit, on the other hand, There was no negative effect as a result of the use of the glyphosate and paraquat on peach trees and there was no negative impact of the control treatments on peach trees, and a reduction in the used concentrations of pesticides could be achieved due to the magnetization of the spray solution, thus reducing the cost of control and environmental pollution.

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