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Effect of Spraying with Alcoholic Plant Extracts of Water Hyacinth (*Eichhorinia crassipes*) and Silverleaf (*Solanum elaeagnifolium*) on Growth and Yield of Corn, *Zea mays* L.

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Abstract. A Field experiment was carried out at private field, Jazirah district, Al-Budhiyab, which is located at latitude 38.28° North and longitude 43.19° East, to study effect of different concentrations of water hyacinth and silverleaf extracts on three cultivars of corn. The experiment was applied using split-split plot arrangement within RCBD with three replicates. Main-plots were represented by the cultivars Sumer, Fajr and Maha, and sub-plots, were the spray concentrations included 0,5,15 and 25 mg L⁻¹. The results showed that the cultivar Fajr was superior in plant height, leaf area, number of rows per ear, and number of grains per row in the spring season, with averages of 253.63 cm, 4978 cm², 18.58 rows ear⁻¹, 45.54 grain per row⁻¹. While the Maha cultivar outperformed all the traits except for the number of grains in a row in the fall season with averages of 269.00 cm, 4841 cm², 16.12 row ear⁻¹ diameter of stem 24.77 mm and 19.15 mm (in the two seasons) and the yield of 4.21 ton ha⁻¹. In the spring season. And the weight of combined weeds decreased by 0.014 mg plant⁻¹ in the fall season. While the Sumer cultivar reduced the weight of combined weeds by 0.050 mg plant⁻¹ in the spring season and increased the number of grains in the row by 38.75 grain per row⁻¹ in the fall season and the weight of 500 grains was 106.80 and 87.65 g in the two seasons respectively, and the result was 2.83 ton ha⁻¹ (in the spring season). The concentration exceeded 25 mg L⁻¹ in plant height 267.70 cm and the concentration decreased by 15 mg L⁻¹ dry weeds weight in the two seasons 0.072 and 0.023 mg plant⁻¹ respectively, and the same concentration increased the number of rows of ear in the spring season 18.11 row ear⁻¹ and the number of grains 44.89 grain row⁻¹. The concentration of 5 mg L⁻¹ increased the weight of 500 grains in the spring season by 109.41 g. it could be concluded that 15 mg L⁻¹ was the best to improve growth and yield properties of *Zea mays*.

1. Introduction

Corn is the third most important food and economic crop in the world in terms of area and production after the wheat and rice crops. Its grains are used in human nutrition in some countries due to its content of some vitamins such as A, B1, B2, carbohydrates and fixed diets. It is also used to manufacture hydrogenated oils, starch and poultry feeding [1]. So, interest in it increased, as it entered into the manufacture of dyes and Biofuel [2]. Despite the importance of this crop, its production in Iraq is still low per unit area, as the cultivated area reached 128.736 thousand hectares, with a production rate of 2.6 ton ha⁻¹ [3]. The cultivated area in the world reached to 170.40 million hectares, with a productivity rate of 5.18 ton ha⁻¹ [3]. The water hyacinth (*Eichhorinia crassipes*) is a floating water weeds plant of the Pontindraceae family - it is one of the exotic weeds of Iraq - and it has spread in several areas of it. Despite the dangers of this plant, it has important uses, including the production of biodiesel fuel, and they are a way to combat it, if fuel is supplied with the same efficiency as biodiesel fuel in terms of efficiency and gas emissions [4]. Silverleaf nightshade (*Solanum elaeagnifolium*) is one of the dominant land weeds in the Iraqi environment and belongs to the Solanaceae family, as it was found in many areas of western Iraq [5]. Silverleaf has allelopathic effects that enable it to compete with certain field crops by inhibiting growth and development [6],[7]. Also, this plant may adversely affect the growth of some weeds associated with the wheat crop [8], and the reason for this plant's possession of allelopathic effects is due to its content of secondary



active compounds such as alkaloids [6][9] and flavonoid glucoside [10][11] and phenolic compounds such as galactic acid. And chlorogenic [12][13][14][15]. concentration of estrogenic compounds may increase by the effect of some mechanical stress, as it may be caused by an increase of caryophyllene [16]. Also, silverleaf may contain saponins and alkaloids glucosides compounds such as β -solamarine [17], and the *Solanum* genus to which the silverleaf plant may contain compounds Coumarin and Steroids and Terpenoids [18]. As for the allopathic effects resulting from water hyacinth, many studies have shown that this plant has effects against some algae and aquatic plants, the algae (*Microcystis arruginosa*) [19] may be affected, and the water hyacinth extracts may also have inhibitory allelopathic effects against the growth of cress Lettuce, alfalfa, timothy grass, and rye [20], as well as germination of wild oats and milk thistle seeds were also inhibited (21). reason why water hyacinth possesses these inhibitory properties may be attributed to inhibitory substances in the root system [19] such as loliolide [20] and some aromatic compounds that are produced from the shikimic acid pathway [22], anthraquinone [23], and N-phenyl-2-naphtylamine compound [24]. On the other hand, the water hyacinth may possess allelopathy properties that stimulate against seed germination, such as *Pinus roxpurghii* and *Bauhinia purpurea* [25]. Furthermost It may increase the yield of some crops due to its large biomass used in stimulating organic compounds [26]. Therefore, the water hyacinth may be a green manure for the manufacture of some effective compounds important to the plant [27][28], and converting them to energy at the lowest cost [5]. use of manufactured chemical compounds has caused environmental and health damage, as these substances affect the environmental balance and cause fatal diseases. Therefore, the demand for using sustainable agriculture and environmentally friendly alternatives has increased instead of manufactured chemical compounds. Therefore, agricultural allopathic antagonism is the successful alternative to using these pesticides in crop management. And control of weeds and reduce the excessive use of synthetic weeds pesticides or industrial growth regulators. Among the influences of allopathic antagonism that affect the synthesis of chlorophyll, inhibit cell division, production of plant hormones, and permeability of membranes. Therefore, so this study aimed to determine the negative or positive response of three corn cultivars to the plant extract of the water hyacinth plant and silverleaf and to determine the stimulating or inhibiting concentration in growth and outcome the crop, and the weeds accompanying it.

2. Materials and Methods

2.1. Field experiment

was carried out in one of the private fields in the Al-Budhiyab region – Jazeera al-Ramadi, which is located at latitude 38.28° North and longitude 43.19° East, and on the banks of the Euphrates River in the spring and fall seasons of 2020. To study the spraying of plant extract of the two weeds; the water hyacinth (*Eichhorinia crassipes*) and silverleaf (*Solanum elaeagnifolium*) and their effect on the growth and yield of three cultivars of corn and the associated weeds. The experiment was applied using complete randomized blocks RCBD with randomly distributed split-split plots arrangement. The main plots included three cultivars Sumer, Fajr, and Maha. weeds type, water hyacinth and silverleaf, represented the sub plots. The sub-sub plots involved concentrations with plant extract 0, 5, 15, 25 mg L⁻¹. These concentrations were prepared after drying each plant extracts via taken 5, 15 and 25 mg from dry extract and dissolved in 1000 ml distilled water, for each concentration, respectively. The number of experimental units 72 units resulting from the combination of study factors with three replicates. Several concentrations of the extract obtained from the two weeds were prepared at the concentrations specified in the study, which are 0, 5, 15 and 25 mg L⁻¹ and the symbol for water hyacinth (T1) and for the silverleaf plant (T2). The solution of each concentration was sprayed on the plants until the leaves of the plant were absorption in the early morning using a 16-liter sprayer, a diffuser (Dishwashing liquid) was added to the spray solution by 3 cm³ per 20 liters, to reduce the surface tension of water and to ensure complete wetness, as for its treatment. In comparison, it was sprayed with distilled water only, as the weed extract was sprayed at the stage of four leaves. Field study was attended by ploughing, levelling and smoothing, then it was divided into plots, the area of plots amounted to 3.5 * 2.5 m², each plot contained seven rows, the distance between each two rows 50 cm and between plants and each other 25 cm.

2.2. Extracts preparation

100 grams of aboveground parts were weighed for each weed and placed in an electric mixer, 200 ml of methanol was added to it and mixed with a shaker mixer, for 25 minutes, then the mixture was transferred to a beaker and tightly covered with plastic paper and then left for an hour in order to precipitate the extractant in it,

then separate the scent from the extract of the two weeds from the sediment material (marc) with a dull cloth and purify the scent extract again by passing through a filter paper (no:1) placed in the Buchner funnel. appropriate amount of the extract from each weed was prepared, resulting extract of 100% full-strength. The plant extracts were kept in $0\pm 2^{\circ}\text{C}$ to protect the extract and prevent microbial deterioration. The extraction process was repeated several times to prepare an appropriate and sufficient quantity of the extract. The data were recorded on plant height (cm), stem diameter (mm), leaf area (cm^2), dry weight of the weeds at harvest (g m^2), number of rows in ear, (row ear^{-1}), grain per row (seed row^{-1}), weight of 500 grains (g), total yield, (ton ha^{-1}).

2.3. Statistical analysis

Data were analysed according to analysis of variance according to the design of randomized main plot in the arrangement of split-split design using the least significant difference test ($P \leq 0.05$) to statistically compare the arithmetic averages at a probability concentration of 0.05 (26) and using the statistical program (Genstat-2014).

3. Results and Discussion

3.1. Plant height (cm)

Table (1) shows that the effect of spraying with plant extracts of water hyacinth and silverleaf on plant height (cm) of corn. As the cultivars differed significantly between each other in the spring season, as the cultivar Fajr gave the highest plant height of 253.63 cm, which was not significantly different from the Sumer cultivar, which gave a height of 253.47 cm, while the Maha cultivar gave a plant height of 228.38. As for the fall season, the cultivars did not differ among them in the characteristic of plant height. As for the extracts of crop cultivars, they did not differ between them in the spring season, but they differed significantly between them in the fall season, as the water hyacinth extract gave the highest plant height of 264.9 cm, while the silverleaf extract gave the lowest plant height of 256.5 cm in the fall season. As for the concentrations, they were not significant in the spring season, but they differed significantly in the fall season in their effect on plant height, as the concentration 25 mg L^{-1} gave the highest plant height reached 267.7 cm, while the concentration 5 mg L^{-1} shows the lowest plant height of 255.2 cm in the fall season. As for the binary interaction between cultivars and species, there was no significant interaction between each other in all seasons. While the binary interaction between species and concentrations was not significant in the spring season, while it was significant in the fall season, the interaction between the water hyacinth and the concentration of 25 mg L^{-1} gave the highest plant height of 281.6 cm, while the interaction between silverleaf and the concentration was 5 mg L^{-1} . While the minimum plant height was 247.3 cm. Likewise, the binary interaction between cultivars and concentrations was not significant in the spring season, but it was significant in the fall season, as the interaction between the cultivar Maha and the spray concentration 15 mg L^{-1} gave the highest plant height of 293.3 cm, while the interaction between the cultivar gave Fajr and the spray concentration was 5 mg L^{-1} , the minimum plant height was 244.4 cm. It is also noted from Table (1) that there is a triple significant interaction between cultivars, concentrations and species in the plant height of corn in both seasons, as the interaction between the cultivar Fajr and the water hyacinth at 0 mg L^{-1} concentration gave the highest plant height of 261.33 cm, while the interaction between Maha and silverleaf at a concentration of 15 mg L^{-1} gave the lowest plant height of 210.2 cm in the spring season. The interaction between Maha cultivar and the water hyacinth at a spraying concentration of 15 mg L^{-1} shows the highest plant height of 294.30 cm, while the interaction between Fajr cultivar and silverleaf and a concentration of 5 mg L^{-1} gave the lowest plant height of 228.5 cm in the fall season.

Table1. The effect of spraying with the plant extract of the two weed, water hyacinth, silverleaf, on plant height

cultivars	weeds	2020 (spring)					2020 (fall)				
		concentration				mean	Concentration				mean
		0	5	15	25		0	5	15	25	
Sumer	silverleaf	254.00	259.33	253.87	253.67	253.47	227.00	259.30	247.30	275.00	259.20
	Water hyacinth	253.53	253.87	248.10	251.40		264.70	260.70	252.30	287.30	
Fajr	silverleaf	246.20	260.67	257.33	250.73	253.63	276.90	228.50	264.30	246.80	253.80
	Water hyacinth	261.33	244.33	254.43	254.00		243.50	260.50	233.30	276.70	
Maha	silverleaf	225.33	217.20	210.20	230.67	223.38	266.00	254.00	292.30	240.00	269.00
	Water hyacinth	233.63	233.33	216.87	219.77		256.50	268.00	294.30	280.00	
	p≤ 0.05	12.06**			12.33**	19.99**			N.S		
cultivars	Sumer	253.77	256.60	250.98	252.53		245.80	260.00	249.80	281.20	
	Fajr	253.77	252.50	255.88	252.37		260.20	244.40	248.80	261.70	
	Maha	229.48	225.27	213.53	225.22		261.30	261.00	293.30	260.30	
	p≤ 0.05	N.S				19.86**					
weeds	silverleaf	241.84	245.73	240.47	245.02		256.60	247.30	268.00	253.90	
	Water hyacinth	249.50	243.84	239.80	241.72		254.90	263.10	260.00	281.60	
	p≤ 0.05	N.S				11.54**					
	mean	245.67	244.79	240.13	243.37		255.80	255.20	264.00	267.70	
	p≤ 0.05	N.S				9.73**					
cultivars		weeds				weeds					
	Sumer	silverleaf	Water hyacinth			silverleaf	Water hyacinth				
	Fajr	255.22	251.72			252.20	266.20				
	Maha	253.73	253.52			254.10	253.50				
		220.85	225.90			263.10	274.90				
	p≤ 0.05	N.S			N.S						
	mean	243.27	243.72			256.50	264.90				
	p≤ 0.05	N.S			5.77**						

(cm) for corn.

3.2. Leaf area (cm²) of maize

Table (2) shows the effect of spraying with the plant extract of the two weeds, water hyacinth and silverleaf, on the leaf area of corn. There are significant differences among cultivars in both seasons, as the Fajr cultivar gave the largest leaf area of 4978 cm², while the Sumer cultivar gave the lowest leaf area of 4389 cm² for the spring season. Whereas, the Maha cultivar gave the largest leaf area of 4841 cm², while the Sumer cultivar gave the least leaf area of 4017 cm² in the fall season. Also, significant differences were observed between the species' extracts in the fall season, as the water hyacinth weed extract gave the largest leaf area of 4585 cm², while the silverleaf extract gave the least leaf area of 4299 cm². The concentrations of extracts were not significant in both seasons. It was observed that there was a significant binary interaction between the cultivars and species in the

Table2. The effect of spraying with the plant extract of the two weeds, water hyacinth, silverleaf, on plant leaf area (cm²) for corn.

cultivars	weeds	2020 (spring)				mean	2020 (fall)				mean
		concentration					Concentration				
		0	5	15	25		0	5	15	25	
Sumer	Silverleaf	3884	4381	5452	3986	4389	3606	3286	3448	4622	4017
	water hyacinth	4712	4555	4175	3972		4441	4514	4335	3886	
Fajr	Silverleaf	4858	5410	5568	4236	4978	5014	3241	4154	4492	4469
	water hyacinth	4723	4493	5061	5477		6244	5014	2392	5199	
Maha	Silverleaf	4645	4768	3801	5143	4665	4315	4799	6372	4244	4841
	water hyacinth	4928	4847	4957	4234		4445	4582	6403	3567	
p≤ 0.05		873.9**			290.9**		690.7**			398.5*	
cultivars	Sumer	4298	4468	4814	3979		4024	3900	3891	4254	
	Fajr	4791	4951	5315	4856		5629	4127	3273	4846	
	Maha	4787	4807	4379	4688		4380	4690	6388	3906	
p≤ 0.05		N.S				696.8**					
weeds	Silverleaf	4462	4853	4940	4455		4311	3775	4658	4453	
	water hyacinth	4788	4631	4731	4561		5044	4703	4377	4217	
p≤ 0.05		N.S				398.8**					
Mean		4625	4742	4836	4508		4677	4239	4517	4335	
p≤ 0.05		N.S				N.S					
Cultivars		silverleaf		water hyacinth			Silverleaf		water hyacinth		
	Sumer	4426		4353			3740		4294		
	Fajr	5018		4938			4225		4712		
	Maha	4589		4741			4932		4749		
p≤ 0.05		N.S				345.4**					
mean		4678		4678			4299		4585		
p≤ 0.05		N.S				199.4**					

fall season, as the interaction of the Maha cultivar with the silverleaf extract gave the highest leaf area of 4932 cm², while the interaction between the Sumer cultivar and the silverleaf extract gave the lowest leaf area of 3740 cm². As for the binary interaction between the types of extracts and concentrations, it was significant in the fall season and was not significant in the spring season. The interaction between water hyacinth and the comparison treatment 0 mg L⁻¹ gave the highest leaf area of 5044 cm², while the interaction between silverleaf and concentration 5 mg L⁻¹ gave the lowest leaf area of 3775 cm². Also, significant differences were observed between cultivars and concentrations in the fall season, as the double interaction between cultivar Maha and concentration 15 mg L⁻¹ gave the highest leaf area of 6388 cm², while the interaction between cultivar Fajr and concentration 15 mg L⁻¹ gave the lowest leaf area of 3273 cm² for the fall season. As for the triple interaction, it was significant in both seasons, as the interaction between the Fajr cultivar and the silverleaf at a concentration of 15 mg L⁻¹ gave the highest leaf area of 5568 cm², while the interaction between Maha cultivar and silverleaf at a concentration of 15 mg L⁻¹ gave the lowest leaf area of 3801 cm². In the fall season, the interaction between the Maha cultivar with the water hyacinth at a concentration of 15 mg L⁻¹ was higher by giving the highest leaf area

of 6403 cm², while the interaction between the cultivar Fajr and the water hyacinth at a concentration of 15 mg L⁻¹ gave the lowest leaf area of 2392 cm².

3.3. Stem diameter (mm)

Results of Table 4 indicated the effect of spraying with the plant extract of the two weeds, water hyacinth and silverleaf, in the stem diameter (mm) of the corn. As the results of the table showed that there were significant differences between the cultivars in the spring season, while there were no significant differences between them in the fall season. As the Maha cultivar gave the highest average stem diameter of 24.77 mm, while there were no significant differences between the two cultivars Sumer and Fajr in stem diameter and gave 22.47 and 22.35 mm to the two cultivars respectively. Results of the same table also indicate the presence of significant differences between the species in both seasons. In the spring season, silverleaf gave the highest stem diameter of 23.69 mm, while the water hyacinth gave the lowest stem diameter of 22.70 mm in the same season. In the fall season, the water hyacinth gave the highest stem diameter of 19.16 mm, while silverleaf gave the lowest stem diameter of 18.40 mm. It is noticed from [Table 4] that there are significant differences between the spraying concentrations of the two weeds and in both the spring and fall seasons. The comparison coefficient 0 mg L⁻¹ in the spring and fall seasons gave the highest stem diameter of 25.16 and 19.74 for the two seasons, respectively, while the spray concentration gave 25 mg L⁻¹ the lowest stem diameter of 22.16 mm in the spring season. In the fall season, the spray concentration was recorded at 5 mg L⁻¹ with a minimum stem diameter of 17.83 mm. The results of the binary interaction between the cultivars and species show the presence of significant differences between them, as the interaction between the Maha cultivar and silverleaf in the spring and fall seasons gave the highest stem diameter of 24.59 and 19.50 mm for the two seasons respectively, and the cultivar Sumer and silverleaf in the spring and fall seasons gave the lowest stem diameter of 22.49 and 17.32 mm for the two seasons respectively, while the interaction between the Maha cultivar and the water hyacinth in the spring season gave the highest stem diameter of 24.95 mm, while the cultivar Fajr with the water hyacinth gave the lowest stem diameter of 20.69 mm. In the fall season, the two-way interaction between the cultivar Sumer and the water hyacinth gave the highest stem diameter of 20.41 mm, while the cultivar Fajr and water hyacinth gave the lowest stem diameter of 18.25 mm. The results also showed significant differences for the binary interaction between species and concentrations in both seasons, as silverleaf and spraying concentration 15 mg L⁻¹ gave the highest stem diameter of 25.19 and 20.20 mm for the spring and fall seasons respectively, while silverleaf and spray concentration gave 25 mg L⁻¹ The minimum stem diameter was 21.97 mm in the spring season. While silverleaf at a concentration of 5 mg L⁻¹ gave the least stem diameter in the fall season. The water hyacinth, with a concentration (0 mg L⁻¹ distilled water only), gave the comparison treatment in the spring and fall seasons the highest stem diameter was 25.59 and 20.00 mm for the two seasons respectively, while the binary interaction between the water hyacinth and the concentration of the extract gave 15 mg L⁻¹, the lowest stem diameter reached 20.04 mm in the spring season, but in the fall season, the water hyacinth and the concentration of 15 mg L⁻¹ gave the minimum stem diameter of 18.85 mm, which did not differ significantly from the spray concentrations 5 and 25 mg L⁻¹, which reached 18.85 and 18.94 mm for the two concentrations respectively for the same season. As for the triple interaction between cultivars, species and concentrations, the results indicated that there were significant differences between them in both seasons. The cultivar gave the Maha and the water hyacinth at a concentration of (0) mg L⁻¹, the highest stem diameter was 29.13 mm, while the cultivar gave Fajr and the water hyacinth and the concentration of 15 mg L⁻¹ the lowest stem diameter was 18.37 mm, which did not differ significantly from the concentration of 25 mg L⁻¹, which reached 18.61 mm in the spring season. In the fall season, the triple interaction between the cultivar Maha and silverleaf and the concentration of spraying 15 mg L⁻¹ gave the highest stem diameter of 22.55 mm, while the cultivar gave Fajr, silverleaf and a concentration of 5 mg L⁻¹, and the cultivar Fajr and water hyacinth at a concentration of 15 mg L⁻¹, the minimum stem diameter was 15.48. And 15.87mm for two sequentially interactions. indicated that there were significant differences between them in both seasons.

Table 3. The effect of spraying with the plant extract of the two weeds, water hyacinth, silverleaf, on Stem diameter (mm) for corn.

cultivars	weeds	2020 (spring)					mean	2020 (fall)					mean
		concentration				concentration							
		0	5	15	25	0		5	15	25			
Sumer	silverleaf	25.56	21.32	22.73	20.33	22.47	16.07	16.83	18.20	18.17	18.87		
	water hyacinth	25.17	21.53	20.79	22.34		22.13	18.45	19.31	21.76			
Fajr	silverleaf	22.83	21.91	27.27	24.04	22.35	23.11	15.48	19.85	15.09	18.32		
	water hyacinth	22.46	23.34	18.37	18.61		19.58	19.67	15.87	17.90			
Maha	silverleaf	25.80	25.45	25.57	21.53	24.77	19.23	18.12	22.55	18.09	19.15		
	water hyacinth	29.13	23.60	20.96	26.09		18.30	18.44	21.36	17.15			
	p ≤ 0.05		2.49**			1.82**		2.56**		N.S			
cultivars	SUMER	25.37	21.43	21.76	21.34		19.10	17.64	18.75	19.97			
	FAJR	22.64	22.62	22.82	21.32		21.35	17.58	17.86	16.49			
cultivars	MAHA	24.52	24.52	23.26	23.81		18.76	18.28	21.96	17.62			
	p ≤ 0.05		2.18*					1.59**					
weeds	silverleaf	24.73	22.89	25.19	21.97		19.47	16.81	20.20	17.12			
	water hyacinth	25.59	22.82	20.04	22.35		20.00	18.85	18.85	18.94			
	p ≤ 0.05		1.44**					1.47**					
	mean	25.16	22.86	22.61	22.16		19.74	17.83	19.52	18.03			
	p ≤ 0.05		1.26**					0.92**					
			weeds					weeds					
cultivars	Sumer		silverleaf		water hyacinth		silverleaf		water hyacinth				
	Fajr		22.49		22.46		17.32		20.41				
			24.01		20.69		18.38		18.25				
			24.59		24.95		19.50		18.81				
	p ≤ 0.05		1.25**				1.27**						
	mean		23.69		22.70		18.40		19.16				
	p ≤ 0.05		0.72*				0.73*						

The cultivar gave the Maha and the water hyacinth at a concentration of (0) mg L⁻¹, the highest stem diameter was 29.13 mm, while the cultivar gave Fajr and the water hyacinth and the concentration of 15 mg L⁻¹ the lowest stem diameter was 18.37 mm, which did not differ significantly from the concentration of 25 mg L⁻¹, which reached 18.61 mm in the spring season. In the fall season, the triple interaction between the cultivar Maha and silverleaf and the concentration of spraying 15 mg L⁻¹ gave the highest stem diameter of 22.55 mm, while the cultivar gave Fajr, silverleaf and a concentration of 5 mg L⁻¹, and the cultivar Fajr and water hyacinth at a concentration of 15 mg L⁻¹, the minimum stem diameter was 15.48. And 15.87mm for two sequentially interactions.

3.4. Dry weeds weight after harvesting (g m²)

Results in Table (4) indicate that the cultivars did not differ significantly between each other in the dry weight of the growing weeds with the yield of corn at harvest. Also, the extracts of the two weeds species did not differ significantly between them in both seasons, but the results indicated that there were significant differences between the concentrations of concentrations and in both seasons, as the concentration 15 mg L⁻¹ gave the

minimum dry weight for the weeds of 0.092 g m^{-2} while the weeding treatment gave the lowest dry weight for the weeds 0.030 g m^{-2} for the spring season, while the concentration 25 mg L^{-1} significantly reduced the dry weight of the weed, as it gave 0.016 g m^{-2} , while weeding treatment gave a minimum dry weight of 0.009 g m^{-2} .

As for the binary interaction, it was not significant in cultivars and species, as well as between cultivars and concentrations, in both seasons. While the binary interaction between species and concentrations was significantly superior to the reduction of the dry weight of the weeds, as the interaction between the water hyacinth with a concentration of 15 mg L^{-1} gave a dry weight of the weed of 0.060 g m^{-2} , while the interaction between silverleaf and the concentration 15 mg L^{-1} gave the highest dry weight of the weeds of 0.123 g m^{-2} As compared to the treatment without weeds in the spring season. Whereas, the interaction between silverleaf and concentration of 25 mg L^{-1} gave the lowest dry weight of the weed at 0.015 g m^{-2} , while the interaction between silverleaf and concentration of 15 mg L^{-1} gave the highest dry weight of weeds of 0.027 g m^{-2} in the fall season. As for the triple interaction, it was significant in the spring season. The interaction between the cultivar Sumer and the water hyacinth at a concentration of 5 mg L^{-1} gave the lowest dry weight of the weeds at 0.030 g m^{-2} , while the interaction between the cultivar Maha with silverleaf at the concentration of 15 mg L^{-1} gave the highest dry weight of the weed which was 0.220 g m^{-2} . There were no significant differences for the triple interactions in the fall season.

Table 4. The effect of spraying with the plant extract of the two weed, water hyacinth, silverleaf, on Dry weeds weight after harvesting (g m²)

cultivars	Weeds	2020 (spring)					2020 (fall)				
		Concentration				mean	Concentration				mean
		0	5	15	25		0	5	15	25	
Sumer	Silverleaf	0.000	0.070	0.073	0.033	0.050	0.000	0.027	0.019	0.017	0.016
	Water hyacinth	0.033	0.030	0.048	0.113		0.017	0.019	0.010	0.019	
Fajr	Silverleaf	0.000	0.120	0.077	0.067	0.068	0.000	0.031	0.048	0.013	0.022
	Water hyacinth	0.057	0.057	0.057	0.107		0.025	0.018	0.023	0.014	
Maha	Silverleaf	0.000	0.100	0.220	0.167	0.097	0.000	0.014	0.014	0.013	0.014
	Water hyacinth	0.090	0.073	0.077	0.050		0.012	0.023	0.020	0.017	
	P ≤ 0.05		0.093*			N.S	N.S			N.S	
cultivars	Sumer	0.017	0.050	0.061	0.073		0.009	0.023	0.015	0.018	
	Fajr	0.028	0.088	0.067	0.087		0.012	0.024	0.036	0.014	
cultivars	Maha	0.045	0.087	0.148	0.108		0.006	0.019	0.017	0.015	
	P ≤ 0.05		N.S				N.S				
weeds	Silverleaf	0.000	0.097	0.123	0.089		0.000	0.024	0.027	0.015	
	Water hyacinth	0.060	0.053	0.060	0.090		0.018	0.020	0.018	0.017	
	P ≤ 0.05		0.053**				0.010**				
	mean	0.030	0.075	0.092	0.089		0.009	0.022	0.023	0.016	
	P ≤ 0.05		0.032**				0.007**				
			weeds				Weeds				
cultivars	Sumer		silverleaf		Water hyacinth		silverleaf		Water hyacinth		
	Fajr		0.044		0.056		0.016		0.016		
			0.066		0.069		0.023		0.020		
			0.122		0.073		0.010		0.018		
	P ≤ 0.05		N.S				N.S				
	mean		0.077		0.066		0.016		0.018		
	P ≤ 0.05		N.S				N.S				

3.5. Number of rows per ear (Row ear⁻¹)

The results of Table [5] indicate the effect of spraying with the plant extract of the weeds of water hyacinth and silverleaf on the number of rows of ear of corn. It is noted from the results of the same table that there are significant differences between cultivars in the spring season, and the absence of significant differences between cultivars in the fall season. The Fajr cultivar gave the highest number of rows in ear, which reached 18.58 row ear⁻¹, while the cultivar Sumer gave the lowest number of rows of ear, which reached 15.71 rows ear⁻¹ in the spring season. The results also show that there were no significant differences between species in both the spring and fall seasons. The results show that

Table 5. The effect of spraying with the plant extract of the two weed, water hyacinth, silverleaf, on Number of rows per ear (row ear⁻¹) for corn.

cultivars	weeds	2020 (spring)					2020 (fall)				
		concentration				Mean	Concentration				mean
		0	5	15	25		0	5	15	25	
Sumer	silverleaf	16.33	16.00	16.67	14.00	15.71	16.00	16.33	17.00	15.00	15.79
	water hyacinth	15.00	15.33	16.33	16.00		15.67	15.00	15.67	15.67	
Fajr	silverleaf	17.67	21.00	18.00	17.33	18.58	13.00	16.00	15.00	15.33	15.21
	water hyacinth	15.00	18.33	20.67	20.67		14.00	17.00	14.67	16.67	
Maha	silverleaf	16.33	17.33	17.33	16.33	17.00	17.67	15.67	16.33	17.33	16.12
	water hyacinth	15.33	18.33	19.67	15.33		16.67	15.33	15.67	14.33	
	P ≤ 0.05		2.57**			1.01**		N.S			N.S
cultivars	Sumer	15.67	15.67	16.50	15.00		15.83	15.67	16.33	15.33	
	Fajr	16.33	19.67	19.33	19.00		13.50	16.50	14.83	16.00	
	Maha	15.83	17.83	18.50	15.83		17.17	15.50	16.00	15.83	
	P ≤ 0.05		N.S					1.61*			
weeds	silverleaf	16.78	18.11	17.33	15.89		15.56	16.00	16.11	15.89	
	water hyacinth	15.11	17.33	18.89	17.33		15.44	15.78	15.33	15.56	
	P ≤ 0.05		1.48**					N.S			
	mean	15.94	17.72	18.11	16.61		15.50	15.89	15.72	15.72	
	P ≤ 0.05		1.28**					N.S			
cultivars			weeds				Weeds				
			silverleaf	water hyacinth			silverleaf	water hyacinth			
	Sumer		15.75	15.67			16.08	15.50			
	Fajr		18.50	18.67			14.83	15.58			
	Maha		16.83	17.17			16.75	15.50			
	P ≤ 0.05			N.S				0.82*			
	mean		17.03	17.17			15.89	15.53			
	P ≤ 0.05			N.S				N.S			

there are significant differences between the concentrations in the spring season only, with no significant differences between the species in the fall season, as the concentration 15 mg L⁻¹ gave the highest average number of rows per ear, which amounted to 18.11 row ear⁻¹, while the comparison treatment gave (0) mg L⁻¹ the lowest number of rows. In ear, it reached 15.94 row ear⁻¹ for the spring season. The results of the binary interaction between the cultivars and species showed that there were no significant differences between them in the spring season, while there were significant differences between them in the fall season. Maha cultivar with silverleaf gave the highest number of rows per ear, reaching 16.75 row ear⁻¹, and the cultivar at Fajr with the water hyacinth the highest number of rows in ear, which reached 15.58 row ear⁻¹. While the Fajr cultivar with silverleaf and the Sumer cultivar with the water hyacinth gave the lowest number of rows per ear, it was 14.83 and 15.50 row ear⁻¹ for interaction successively. It was noticed through the binary interaction between the cultivars and the concentrations that there were no significant differences between them in the spring season,

while there were significant differences between them in the fall season. The interaction between the Maha cultivar and the spray concentration (0) mg L⁻¹ (the comparison treatment) gave the highest number of rows in ear, which reached 17.17 row ear⁻¹, while the cultivar, Fajr, gave the lowest number of rows per ear when the comparison treatment reached 13.50 row ear⁻¹ for the fall the results of the triple interaction between them did not show significant differences in the fall season. The cultivar gave Fajr and silverleaf at a concentration of 5 mg L⁻¹, the highest number of rows per ear reached 21.00 row ear⁻¹, while the cultivar gave Sumer and silverleaf at a concentration of 25 mg L⁻¹, the lowest number of rows of ear was 14.00 row ear⁻¹.

3.6. Number of grains per row (grain row⁻¹)

It was noted from Table [6] the effect of spraying with the plant extract of the two weeds of water hyacinth and silverleaf on the number of grains per row of corn. The results indicate that there are significant differences between the cultivars in both the spring and fall seasons, as the Fajr cultivar gave the highest average number of grains in the row, which reached 45.54 grain row⁻¹, while the Sumer cultivar gave the lowest average for the number of grain in the cultivar, which amounted to 38.75 grain row⁻¹ for the spring season. In the fall season, the cultivar Sumer gave the highest average number of grains per row, which was 38.75, while the Fajr cultivar gave the lowest number of grains per row, which amounted to 35.00 grain row⁻¹. The results showed that there were significant differences between the species in both seasons, as the water hyacinth gave the highest average number of grains per row, which reached 44.39 and 37.75 grain row⁻¹ for the two seasons respectively, while silverleaf gave the lowest average number of grains per row, reaching 41.69 and 35.81 grain row⁻¹, for the two seasons, respectively. The results also indicate the presence of significant differences between the concentrations in both seasons. The 5 mg L⁻¹ concentration gave the highest average number of grains per row, which was 44.89 grain row⁻¹. While the concentration 15 mg L⁻¹ gave the lowest number of grains per row of 39.72 grain row⁻¹ for the spring season. In the fall season, the comparison treatment (0) mg L⁻¹ recorded the highest average number of grains per row, 39.67 grain row⁻¹, while the concentration 5 mg L⁻¹ gave the lowest average for the number of grains per row, which was 35.50 grain row⁻¹. As for the binary interaction between cultivars and species, the results showed significant differences between them and in both seasons, as the Maha and silverleaf gave the highest number of grains per row, reaching 44.83 grain row⁻¹, and the cultivar Fajr with the water hyacinth gave the highest average number of grains per row, which amounted to 48.75 grain row⁻¹ in spring seasons. While the cultivar Sumer with silverleaf and water hyacinth gave the lowest number of grains per row, which was 37.92 and 39.58 grains, respectively. Whereas, the Sumer cultivar with silverleaf and water hyacinth gave the highest average number of grains per row, which was 36.50 and 41.00 grain row⁻¹, respectively, in the fall season, while Fajr, along with silverleaf and water hyacinth gave the lowest number of grains per row, which amounted to 34.92 and 35.08 grain per row, for both in the fall season. It was noticed through the binary interaction between species and concentrations that there were significant differences between them in both seasons, as the binary interaction between silverleaf at a concentration of 25 mg L⁻¹ gave the highest number of grains per row, reaching 44.22 grain row⁻¹, while silverleaf and a concentration of 5 mg L⁻¹ gave the lowest number of grains per row. 39.89 grain row⁻¹. Water hyacinth at a concentration of 5 mg L⁻¹ gave the highest mean for the trait, which amounted to 49.89 grain row⁻¹, while water hyacinth and a concentration of 15 mg L⁻¹ gave the mean minimum of 38.78 for the characteristic for the spring season. In the fall season, the binary interaction between silverleaf and water hyacinth and the concentration of (0) mg L⁻¹ of comparison treatment gave the highest average for the number of grains per row, which was 37.22 and 42.11 grain row⁻¹ for each, respectively, while the interaction between silverleaf and a concentration of 5 mg L⁻¹ was average. For the recipe of 34.56 grain row⁻¹, while the water hyacinth at a spray concentration of 25 mg L⁻¹ gave the lowest number of grains per row was 35.11 grain row⁻¹. The results of the are significant differences between them in both seasons. The cultivar Fajr and concentration (0) mg L⁻¹ gave the highest number of grains per row, reaching 47.33 grain row⁻¹, while the cultivar Sumer at a concentration of 15 mg L⁻¹ gave the lowest average number of grains per row of 31.00 grain row⁻¹, for the spring season. In the fall season, the cultivar gave Sumer when the comparison treatment (0) mg L⁻¹ was the highest number of grains per row, reaching 47.17 grains, while the cultivar Sumer at a concentration of 25 mg L⁻¹ gave the lowest number of grains per row, reaching 34.17 grain row⁻¹. The results of the triple interaction between cultivars, species and concentrations indicated that there were no significant differences between them in both seasons.

Table 6. The effect of spraying with the plant extract of the two weed, water hyacinth, silverleaf, on Number of grain per row (grain row⁻¹) for corn.

cultivars	weeds	2020 (spring)					2020 (fall)				
		Concentration				mean	Concentration				mean
		0	5	15	25		0	5	15	25	
Sumer	Silverleaf	37.00	40.33	30.00	44.33	38.75	42.33	36.00	33.67	34.00	38.75
	water hyacinth	38.33	48.00	32.00	40.00		52.00	37.67	40.00	34.33	
Fajr	Silverleaf	43.67	38.67	44.67	42.33	45.54	35.00	34.00	35.00	35.67	35.00
	water hyacinth	51.00	50.33	47.33	46.33		37.33	34.67	34.00	34.33	
Maha	Silverleaf	45.33	40.67	47.33	46.00	44.83	34.33	33.67	37.67	38.33	36.58
	water hyacinth	46.67	51.33	37.00	44.33		37.00	37.00	38.00	36.33	
	P ≤ 0.05		N.S			2.55**	N.S			2.25**	
cultivars	Sumer	37.67	44.17	31.00	42.17		47.17	36.83	36.83	34.17	
	Fajr	47.33	44.50	46.00	44.33		36.17	34.33	34.50	35.00	
	Maha	46.00	46.00	42.17	45.17		35.67	35.33	37.83	37.50	
	P ≤ 0.05		3.42**				3.50**				
weeds	Silverleaf	42.00	39.89	40.67	44.22		37.22	34.56	35.44	36.00	
	water hyacinth	45.33	49.89	38.78	43.56		42.11	36.44	37.33	35.11	
	P ≤ 0.05		3.68**				2.75*				
	mean	43.67	44.89	39.72	43.89		39.67	35.50	36.39	35.56	
	P ≤ 0.05		1.98**				2.07**				
cultivars			weeds				Weeds				
			silverleaf	water hyacinth			silverleaf	water hyacinth			
	Sumer		37.92	39.58			36.50	41.00			
	Fajr		42.33	48.75			34.92	35.08			
	Maha		44.83	44.83			36.00	37.17			
	P ≤ 0.05		3.19**				2.46**				
	mean		41.69	44.39			35.81	37.75			
	P ≤ 0.05		1.84**				1.37**				

3.7. Weight of 500 grains (g)

It is noted from the results of Table [7] the effect of spraying with the plant extract of the water hyacinth and silverleaf weeds in a weight of 500 grains of corn. It was found that there were significant differences between the cultivars in the weight of 500 grains for both seasons. In the spring and fall seasons, the cultivar surpassed Sumer by giving the highest average weight of 500 grains, which reached 106.80 and 87.65 g for the two seasons respectively, while the Maha cultivar in both seasons gave the lowest average for the weight of 500 grains, which reached 92.40 and 81.68 g for the two seasons respectively. It was also found that the species differed significantly between them in the spring and fall seasons. Silverleaf gave the highest average for the trait,

Table 7. The effect of spraying with the plant extract of the two weed, water hyacinth, silverleaf, on Weight of 500 grains (g) for corn.

cultivars	weeds	2020 (spring)					mean	2020 (fall)					mean
		Concentration				Concentration							
		0	5	15	25	0		5	15	25			
Sumer	silverleaf	94.94	122.12	107.12	110.69	106.80	90.89	97.95	78.91	87.11	87.65		
	Water hyacinth	111.95	107.77	93.27	106.54		92.77	82.17	84.34	87.02			
Fajr	silverleaf	109.62	88.38	104.86	90.66	99.84	89.97	95.55	88.34	91.64	84.80		
	Water hyacinth	117.45	113.77	84.73	86.40		73.30	85.34	73.65	80.60			
Maha	silverleaf	90.93	117.30	84.68	95.96	92.40	91.32	75.07	85.47	80.02	81.68		
	Water hyacinth	90.74	107.16	68.88	83.52		82.36	73.65	73.11	92.40			
	P ≤ 0.05		11.21**			10.60*		10.49**		3.48**			
cultivars	Sumer	103.72	114.94	100.20	108.62		91.83	90.06	81.63	87.07			
	Fajr	113.53	101.07	94.80	88.53		81.64	90.45	81.00	86.12			
cultivars	Maha	90.84	112.23	76.78	89.74		86.84	74.36	79.29	86.21			
	P ≤ 0.05		13.36**					7.70**					
weeds	silverleaf	98.50	109.26	98.89	99.10		90.73	89.52	84.24	86.26			
	Water hyacinth	106.71	109.56	82.30	92.15		82.81	80.39	77.04	86.67			
	P ≤ 0.05		6.47**					N.S					
	Mean	102.60	109.41	90.59	95.63		86.77	84.96	80.64	86.47			
	P ≤ 0.05		7.71**					4.44**					
			Weeds					Weeds					
cultivars			silverleaf	Water hyacinth			silverleaf	Water hyacinth					
	Sumer		108.72	104.88			88.72	86.58					
	Fajr		98.38	100.59			91.38	78.22					
	Maha		97.22	87.58			82.97	80.38					
	P ≤ 0.05		5.61**				5.25**						
	mean		101.44	97.68			87.69	81.73					
	P ≤ 0.05		3.24**				3.03**						

reaching 101.44 and 87.69 g, for the two seasons, respectively, while water hyacinth gave the lowest weight of 500 grains, which was 97.68 and 81.73 g for the two seasons, respectively. As for the concentrations, it is noticed from the same table that there are significant differences between them in the spring and fall season. The extract concentration of 5 mg L⁻¹ gave the highest average weight of 500 grains in the spring season, which was 109.41 g. While the concentration of 25 mg L⁻¹ gave the highest average for the weight of 500 grains, which did not differ significantly from the comparison treatment (0) mg L⁻¹, which was 86.47 and 86.77 g for the two concentrations, respectively. Whereas, the concentration of 15 mg L⁻¹ in both seasons gave the lowest average weight of 500 grains, which was 90.59 and 80.64 g for the spring and fall seasons respectively. As for the binary interaction between the cultivars and species, the results indicate that there are significant differences between them and for the spring and fall seasons. The Sumer cultivar in the spring season along with silverleaf and water

hyacinth gave the highest average weight of 500 grains, which was 108.72 and 104.88 g each respectively, while the binary interaction between the Maha cultivar, silverleaf and water hyacinth gave the lowest average for the weight of 500 grains in the spring season, which was 97.22 And 87.58g each, respectively. In the fall season, the cultivar, Fajr, with silverleaf, gave the highest average weight of 500 grains, which was 91.38 g, while the Maha cultivar with silverleaf gave the lowest average for the characteristic, which was 82.97 g While the cultivar Sumer and water hyacinth gave the highest average for the weight of 500 grains, which was 86.58 g, while the cultivar Fajr gave the lowest average for the trait, which was 78.22 g. The double interaction between species and concentrations gave significant differences in the spring season, and there were no significant differences between them in the fall season. Silverleaf and water hyacinth were given at the concentration of the extract 5 mg L⁻¹ the highest average for the weight of 500 grains was 109.26 and 109.56 g each, respectively, while silverleaf was given when the comparison treatment (0) mg L⁻¹ was the lowest average for the characteristic, which reached 98.50 g, while the water hyacinth gave At a concentration of 15 mg L⁻¹, the average weight of 500 grains was 82.30 g. Table [7] indicates the presence of significant differences for the binary interaction between cultivars and concentrations in both seasons. The cultivar gave Sumer and the spray concentration of 5 mg L⁻¹ in the spring season the highest average for the weight of 500 grains, which was 114.94 g, while the Maha cultivar and the concentration of 15 mg L⁻¹ gave the lowest average for the characteristic of 76.78 g in the spring season, but in the fall season the cultivar gave Sumer when The comparison treatment (0) mg L⁻¹, the highest average for the weight of 500 grains was 91.83 g, while the Maha cultivar and the extract concentration of 5 mg L⁻¹ were 74.36 g. As for the triple interaction between cultivars, species and concentrations, the results indicated that there are significant differences between them in the spring and fall seasons. The cultivar gave Sumer and silverleaf and the spray concentration of 5 mg L⁻¹ the highest average for the weight of 500 grains was 122.12 and 97.95 g for the spring and fall seasons respectively, while the Maha and water hyacinth cultivars and the spray concentration gave 25 mg L⁻¹, the average minimum for the trait was 83.52 g in the spring season. In the fall season, the Maha and water hyacinth cultivars and the spray concentration of 15 mg L⁻¹ gave the lowest average for the weight of 500 grains, which was 73.11 g.

3.8. Total yield (ton ha⁻¹)

The results of Table [8] show the effect of spraying with the plant extract of the two plants water hyacinth and silverleaf on the total yield of corn. The results show that there are no significant differences between cultivars, species, and concentrations, as well as the binary interaction between cultivars and species in both the spring and fall seasons. The results also indicated in the same table that there were no significant differences for the binary interaction between species and concentrations in the spring season, while there were significant differences between them in the fall season only, as silverleaf and concentration 15 mg L⁻¹ gave the highest yield for corn, which reached 4.75 ton ha⁻¹, while silverleaf was given. While the concentration of spraying was 25 mg L⁻¹, the lowest average for the total yield was 3.75 ton ha⁻¹, while the water hyacinth at a concentration of 25 mg L⁻¹ gave the highest yield of the trait, which reached 4.48 ton ha⁻¹, while the water hyacinth at a concentration of 15 mg L⁻¹ gave the lowest average for the total yield of corn, which reached 3.84. ton ha⁻¹. The results of the binary interaction between the cultivars and the concentrations indicate that there are no differences between them in the spring season, while there are significant differences between them in the fall season. When the comparison treatment (0) mg L⁻¹, the Sumer cultivar gave a higher total yield of 5.18 ton ha⁻¹, while the Fajr cultivar gave (0) mg L⁻¹ the lowest average of the total yield of 3.15 ton ha⁻¹. As for the triple interaction between study factors, the results indicated that there were no significant differences between them in the spring season, while there were significant differences between them in the fall season. Maha and silverleaf cultivars and a concentration of 15 mg L⁻¹ gave the highest total seed yield of 5.47 ton ha⁻¹, while the Fajr and water hyacinth cultivar when compared with (0) mg L⁻¹ gave the lowest average for the total seed yield of 3.02 ton ha⁻¹, which did not differ significantly with the cultivar Sumer. And water hyacinth, spray concentration 15 mg L⁻¹, Sumer

Table 8. The effect of spraying with the plant extract of the two weed, water hyacinth, silverleaf, on Total yield (ton ha⁻¹) for corn.

cultivars	weeds	2020 (spring)					mean	2020 (fall)					mean
		Concentration				Concentration							
		0	5	15	25	0		5	15	25			
Sumer	silverleaf	2.7	3.3	2.9	3.0	2.83	5.29	4.60	4.01	3.04	4.12		
	Water hyacinth	2.4	2.8	2.5	3.0		5.06	3.51	3.09	4.33			
Fajr	silverleaf	2.9	2.3	2.8	2.4	2.6	3.28	3.93	4.78	4.23	4.16		
	Water hyacinth	2.9	2.5	2.4	2.2		3.02	4.99	4.44	4.58			
Maha	silverleaf	2.4	3.2	2.3	2.6	2.5	3.85	3.54	5.47	3.98	4.21		
	Water hyacinth	2.6	3.0	2.1	2.2		4.71	3.56	3.99	4.54			
P ≤ 0.05		N.S			N.S		1.028**			N.S			
cultivars	Sumer	2.6	3.0	2.7	3.0		5.18	4.06	3.55	3.69			
	Fajr	2.9	2.4	2.6	2.3		3.15	4.46	4.61	4.40			
cultivars	Maha	2.5	3.1	2.2	2.4		4.28	3.55	4.73	4.26			
	P ≤ 0.05		N.S				0.982**						
weeds	silverleaf	2.7	2.9	2.6	2.6		4.14	4.02	4.75	3.75			
	Water hyacinth	2.3	2.7	2.3	2.5		4.27	4.02	3.84	4.48			
P ≤ 0.05		N.S			0.593**								
Mean		2.5	2.8	2.5	2.6		4.20	4.02	4.30	4.12			
P ≤ 0.05		N.S			N.S								
		Weeds				Weeds							
cultivars		silverleaf		Water hyacinth			silverleaf		Water hyacinth				
	Sumer	3.0		2.7			4.24		3.99				
	Fajr	2.6		2.5			4.06		4.26				
cultivars	Maha	2.6		2.5			4.21		4.20				
	P ≤ 0.05		N.S			N.S							
mean		2.7		2.6			4.17		4.15				
P ≤ 0.05		N.S			N.S								

cultivar, silverleaf and 25 mg L⁻¹ concentration, which gave 3.09 and 3.04 ton ha⁻¹ for the two interactions respectively.

4. Discussion

It is noted from the results above that the superiority of the cultivar Fajr in the characteristics of plant height, leaf area, the number of rows per ear and the number of grains in the row [Table 1,2,5 and 6] may be attributed to the nature of genotype of the cultivar Fajr, which led to its superiority over the other two cultivars, as its genotype was known about itself up. What is in the spring season. As for the Maha cultivar superior to all traits [Table 1,2,3,4,5,6 and 8] except for the number of grains in row [Table 6] for the fall season, this is due to the extraction of genotype inherent in the fall season to the highest that can be compared. The previous two types. its

competition was also strong for the weeds as it reduced its dry weight in the same season. As for the extract of the two weeds and their concentrations, the concentration of 25 mg L⁻¹ of them increased the plant height [Table 1] and the concentration 15 mg L⁻¹ increased the number of rows per ear, the number of grains per row and the weight of 500 grains [Tables 5,6 and 7] in the spring season. The reason is that the extracts reduced the competition of the associated weed, as the concentration reduced 5 mg L⁻¹ of the dry weight of the weed in the two seasons [Table 4], because the extracts possessed retardant effects [8][12][15][17][21], as found by Njeh et al. [17], The methanolic extract of silverleaf weed seeds contains β-solamarin and some saponins and glycoalkaloids, and these compounds have antifungal properties. Gul et al. [21] also found that the aqueous water hyacinth extract reduced the germination and growth of wild oats and milk thistle by 10%, which concluded that this plant can be used as mulching for the management of the weeds in the wheat fields due to the allelopathic potential that this weed has towards the virulent weeds, which may be used as natural pesticides. And because of the containment of extracts of water hyacinth and silverleaf. Berry was based on active inhibitory compounds [8][17][21], which allowed the crop to take its sufficiency from the important growth factors. Houda et al. [14] and Mashavira et al. [26] found that the addition of compost made from the water hyacinth increased by 74 ton ha⁻¹. From plant height and number of days until maturity, and it gave a yield of 68 ton ha⁻¹ of the fruits, and the various extracts of the silverleaf weed stimulated the growth of some crops due to their containing some phenolic and flavonoids compounds, as the growth of the roots and the vegetative total of alfalfa, *Secale cereale*, *Lepidium* and *lattuca sativa* increased in concentrations Low concentrations of water hyacinth weed and increased concentration led to increased inhibition [20].

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