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Research Article

EFFECT OF DIFFERENT ORGANS JUICES OF LACTUCA, ALFALFA AND RUMEX ON GERMINATION AND SEEDLING GROWTH OF WHEAT

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ABSTRACT
One of the limiting factors in seed germination of field crops is allelopathic compounds of weed wastes. In order to study the effects of different organs juices of weeds on some of germination characteristics of seed wheat (Chamran cultivar), an experiment was conducted in agronomy lab of Ramin (Khouzestan) University of agricultural and natural resources in 2011. Experimental design was factorial experiment in randomized completely design with three replications. Experimental factors were weeds include Lactuca, Alfalfa and Rumex, weed organs include leaf, stem and root and different concentration include 0 (control), 10, 30 and 50 mg. liter of dry matter powder of weed organs. The results showed that weed, organ, concentration and their interaction effects were had significant effect on all of measured traits. Mean comparisons showed that alfalfa compared with other weeds, had more negative effect on measured traits. In organs, leaf and root had highest and lowest inhibitor effects, respectively. Also, with increase in juices concentration increased the negative effects. By attention to negative effects of studied weed wastes particularly alfalfa on germination and seedling growth of wheat, exiting of this weeds from farms can be recommended.

Keywords: *Wheat, Effect of Weed Wastes, Germination and Seedling Growth*

INTRODUCTION
In modern agriculture which extremely needs to an increase in performance per area unit, it is of specific importance to control and pay attention to limiting factors of agricultural crops. Interference of weeds is one of limiting factors of increasing the field crops' performance, which sometimes is caused because of their allelopathy. Allelopathy phenomenon has been existing from thousands years ago; and in recent years so many scientific researches have been conducted about identifying and reviewing this issue. It decreased manpower's costs and increased performance as a new method in weed control (Mighhani, 2003; Chung *et al.,* 2003; Saxena *et al.,* 2003). Allelopathy means any direct or indirect, stimulant or limiting effect of a plant on the germination and growth of other plants because of producing and dispersion of their allelochemical compounds. Chemicals causing allelopathy exude from living plants, segregated leaves, and dead plants and. or release from microbial or chemical decomposition of plant wastes into the environment. Allelochemical compounds do not have a direct effect on the growth and development of productive plants; however, they act as a defensive adaptation, and disturb plants' growth by interference in their important physiologic processes like changing the cell wall structure, membrane permeability and performance, preventing from cellular division and from activity of some enzymes, the balance of herbal hormones, germination of seed and pollen tube, absorption of nutrient elements, the amount of chlorophyll, water and plant relations, photosynthesis, respiration and changing RNA and DNA structure (Mojab and Mahmudi, 2008; Mighhani, 2003; Regiosa and Pedrol, 2002). Among the known allelopathic compounds we can point to Phenolic acids, Flavonoids, Terpenoids, Alkaloids, Quinones. Among them, Terpenoids have the lowest concentration by approximate activity of 0.3-10.5 mg.kg as compared to Phenols, Quinones and Alkaloids (Macias, 1993).
Scientific findings from years after 1950 showed that most of weed species had a limiting effect on the field crops, so that in developing countries where weeds are not controlled completely, a part of performance would be wasted because of competition with weeds or their allelopathy. In such situations,

identifying the type o interactions of weeds and crops will be effective in choose the correct way of destroying weeds (Kiarostami, 2003). So many researches have been taking place by the use of aqueous extracts of plant wastes and leaching, about seed germination and plant growth, which show that one of the limiting factors of field crops' growth by weeds is due to their allelopathic effects. Toxic and volatile compounds in these plants cause these effects. Type and amount of these compounds depends on species, organs and concentration of substances; so that the kind of allopathic compounds in leaf, stem, and root are different (Masudikhorasani *et al.*, 2005). Wheat is the most important field crop which provides 20% of energy existing in mankind's nutrition. The quality of wheat seed –as the most important part of this production- is of great importance in growth and optimum performance, which is influenced by various factors like allelopathic compounds (Moshatati *et al.*, 2009). Most of biometrics -which are present for studying wheat allelopathy- are done by the use of germination rate, germination percentage, and seedling growth (Ben-Hammouda *et al.*, 2001). When the juice of waste aerial organs and root of a weed like Lepidium draba is added to soil directly, prevents wheat germination and growth (Qasem, 2001). Various types of wheat are not the same in terms of sensitivity to different weeds' allelopathic compounds, and these substances have a meaningful difference in the germination percentage, linear seedling growth, and dry weight of types of this plant (Kiarostami, 2003). Even aqueous extract of leaves of orange, Ficus Religiosa, Ficus Bengalensis, and Cordia Mixa has limiting effect on the germination percentage and seedling length, so that the juice of orange and FicusReligiosa decreased germination percentage and wheat seedling length (Musavi *et al.*, 2008). Aqueous extract of field crops like Triticale decreased seedling primary growth, plumule, weight, and performance of wheat seed (Jaicskuish, 1997).

There are similar reports about the effect of various weeds' aqueous extract on the germination and growth of wheat. MasudiKhorasani *et al.*, (2005) showed that when the concentration of aqueous extract of charlock's different organs increased, growth and germination of canola seed decreased. Increase in the concentration of aqueous extract of aerial and underground organs of Lepidium draba, had more limiting effects on the germination and growth features of sorghum seedling (Mojab and Mahmudi, 2008). Generally, it has a special importance to identify weeds with a allelopathic feature and the level of their effect on the germination and growth of field crop's seedlings of every region; because scattering of weeds in different wheat fields is changeable. In Khuzestan's wheat fields there are weeds like Lactuca, Alfalfa, and Rumex; because of their existence, decrease in wheat seedling's germination and confirmation was observed in the cultivation of next year. However, there is no report on the reason of it and it's possible effects. This experiment was designed and conducted to study the allelopathic power of mentioned weeds on the germination and growth of wheat seedling in agronomy lab of Ramin (Khuzestan) university off agriculture and natural resources.

MATERIALS AND METHODS

This experiment was conducted in agronomy lab of Ramin (Khuzestan) University of agriculture and natural resources in 2011. It's design was factorial experiment in completely randomized design with three replications. Experimental factors were waste extract of weeds like Lactuca (Lactuca serriola), Alfalfa (Melilotusindicus), and Rumex (Rumex dentatus); weed organs like leaf, stem, and root; and their different concentrations include 0 (control), 10, 30, and 50 mg. liter of dry matter powder of the mentioned weed organs. Under studied weeds were collected from region's wheat fields at the end of April and in their flowering stage. Aerial and under-ground parts of the collected weeds (leaves, stems, and roots) were ground into powder after they dried in the shade and fresh air in the average temperature of 24°C by electric mill, and then stored in the 5°C in refrigerator. For preparation of different concentrations of weed organ's aqueous extract, 10, 30, and 50g of each sample (Chung *et al.*, 2003) added to one liter of distilled water (control) and mixed with it and then after 48 hours of keeping in the temperature of 25°C along with a continual stirring, a kind of aqueous extract was prepared from them and then these extracts were centrifuged for 4 hours in a slow speed and by transmitting from a 4-layer cloth for infiltration and elimination of the rest of fiber substances. After that, the remainder substances on the liquid were aggregated by whatman filter paper number one (Chuna *et al.*, 2003).

Wheat seeds (Chamran cultivar) were 10% disinfected first by the use of sodium hypochlorite, then 50 seeds were put on a filter paper in a sterile petri dish for each experimental unit. 20ml of each aqueous extract of every weed compound, organs and desired concentration in two steps (10ml at the beginning of experiment, and another 10ml proportionate to seedling's activity) added to petri dishes contained Chamran cultivar seeds. Petri dishes were kept in bright growth chamber (germinator) in the temperature of 24°C. after that, seed were reviewed in a week, and those that their radicle was observable were counted as germinated seed (Hoseini and Rezvanimoghddam, 2006). After germination test, all the seeds which germinated after 7 days, dried in the temperature of 65°C in order to measure the average dry weight. MoradiDezfuly *et al.*, (Moradi-Dezfuli *et al.*, 2008) computed the deterrence percentage by measuring the germination percentage, the average time of germination, seedling length, seed stamina and seedling dry weight and the usage of applied relations. Obtained data got variance-analyzed by Statistic Analysis System (SAS) and under examination features got average-compared by Duncan's multiple-range test and LSmeans.

RESULTS AND DISCUSSION

Table 1: Analysis of variance (mean squares)

S. O. V	df	mean squares					
		GP	GR	MGT	SL	SV	SDW
Treatments	27	431.45**	945.73**	0.38**	43.27**	431240.68**	13.51**
Treatment group compared with the control	1	889.23**	6356.71**	2.01**	418.47**	473711.80**	58.08**
Error	79	16.17	18.14	0.02	1.39	16114.48	1,31
CV(%)		4.26	5.01	10.19	12.37	13.86	14.74

*** : respectively highly significant (p≤0.01)*

Table 2: Analysis of variance (mean squares)

S. O. V	df	mean squares					
		GP	GR	MGT	SL	SV	SDW
Weeds	2	983.24**	1790.86**	0.6535**	39.72**	402596.42**	44.46**
Organ	2	683.81**	2334.13**	0.8848**	21.90**	247272.58**	0.44ns
Concentration	2	679.67**	3910.28**	1.7327**	224.39**	2037664.27**	47.49**
WO	4	427.22**	467.19**	0.2147**	29.52**	273957.16**	17.23**
WC	4	519.33**	607.01**	0.2556**	6.07**	43494.77*	8.76**
OC	4	601.89**	522.78**	0.2113**	16.13**	140348.83**	4.47**
WOC	8	486.39**	161.48**	0.0413ns	3.26*	36036.14*	2.88**
Error	53	21.08	24.03	0.0232	1.29	14462.62	0.64
CV(%)		4.94	6.06	11.50	13.51	15.10	10.92

ns: non significant, ,** : respectively significant (p≤0.05) and highly significant (p≤0.01)*

Table 3: mean comparison effects of weed, organ, and concentration

S. O. V		mean squares					
		GP (%)	GR	MGT	SL (cm)	SV	SDW (mg)
	Lactuca	94.96a	83.55a	1.26b	6.99b	661.54b	8.14a
Weeds	Alfalfa	87.39b	72.80b	1.48a	8.889a	826.51ab	5.84b
	Rumex	96.44a	86.12a	1.24b	9.38a	1105.10a	7.92a
	Leaf	88.92b	72.46c	1.50a	7.61c	712.57b	7.49a
Organ	Stem	94.37a	81.46b	1.30b	8.42b	792.40ab	7.27a
	Root	95.56a	88.54a	1.18c	9.18a	1078.4a	7.20a
	10	94.52a	89.72a	1.12c	11.26a	1067.10a	8.73a
Concentration	30	95.41a	83.90b	1.28b	8.26b	987.8a	6.94b
	50	88.92b	68.70c	1.59a	5.60c	527.00b	6.24c

Mean followed by the same letters in each column are not significantly different by using Duncan multiple rang test at %5 probability level are not significantly different by using Duncan multiple rang test at %5 probability level.

Table 4: mean comparison effects of weed in organ

Weeds	Organ	mean squares					
		GP (%)	GR	MGT	SL (cm)	SV	SDW (mg)
	Leaf	94.67a	77.67de	1.40b	8.23bc	771.21b	9.39a
Lactuca	Stem	96.00**a**	86.33**bc**	1.20**cd**	6.80**de**	649.83**b**	8.23**b**
	Root	94.22a	86.67b	1.19cd	5.95e	563.59b	6.79cd
	Leaf	76.00c	56.52f	1.84a	6.75de	636.40b	4.52e
Alfalfa	Stem	89.78b	74.11e	1.40b	9.17b	824.56b	6.31d
	Root	95.11a	85.96bc	1.25bcd	10.47a	997.29b	6.55d
	Leaf	94.67a	81.42cd	1.30bc	7.76cd	737.8b	8.23b
Rumex	Stem	97.33a	83.93bc	1.31bc	9.27b	902.90b	7.26c
	Root	97.33a	93.00a	1.10d	11.11a	1674.40a	8.26b

Mean followed by the same letters in each column are not significantly different by using Duncan multiple rang test at %5 probability level are not significantly different by using Duncan multiple rang test at %5 probability level.

Table 5: mean comparison effects of weed in concentration

Weeds	Concentration	mean squares					
		GP (%)	GR	MGT	SL (cm)	SV	SDW (mg)
	10	93.77a	52.89a	08.1c	73.10a	72.1001ab	37.10a
Lactuca	30	96.00a	81.86a	21.1c	79.6cd	43.655bc	22.8c
	50	95.11a	33.74c	49.1b	46.3e	48.327c	83.5e
	10	92.89a	87.94a	14.1c	67.11a	60.1096ab	96.6d
Alfalfa	30	93.33a	77.67bc	41.1b	56.8b	68.799bc	53.5ef
	50	74.50b	50.29d	95.1a	09.6d	65.552bc	94.4f
	10	96.89a	91.70a	14.1c	39.11a	00.1103ab	86.8b
Rumex	30	96.89a	87.22a	21.1c	43.9b	30.1508a	07.7d
	50	95.56a	79.42b	36.1b	32.7c	80.703bc	82.7c

Mean followed by the same letters in each column are not significantly different by using Duncan multiple rang test at %5 probability level are not significantly different by using Duncan multiple rang test at %5 probability level.

Table 6: mean comparison effects of organ in concentration

Organ	Concentration	mean squares					
		GP (%)	GR	MGT	SL (cm)	SV	SDW (mg)
	10	89.92a	42.86bc	16.1cd	58.11a	00.1086ab	27.9a
Leaf	30	44.96a	70.76d	47.1b	26.7d	11.702bc	12.7c
	50	00.76b	98.51f	91.1a	55.3f	50.322c	91.5d
	10	67.94a	22.90ab	10.1d	45.11a	90.1082ab	93.8a
Stem	30	78.93a	96.83c	22.1cd	55.8bc	85.801bc	90.6c
	50	67.94a	18.70e	58.1b	24.5e	52.492bc	97.5d
	10	00.96a	52.92a	10.1d	77.10a	40.1032ab	99.7b
Root	30	00.96a	04.91ab	14.1d	97.8b	50.1459a	80.6c
	50	67.94a	07.82c	30.1c	79.7cd	40.743bc	82.6c

Mean followed by the same letters in each column are not significantly different by using Duncan multiple rang test at %5 probability level are not significantly different by using Duncan multiple rang test at %5 probability level.

Table 7: mean comparison effects of weed, organ, and concentration

Weeds	Organ	Concentration	mean squares					
			GP (%)	GR	MGT	SL (cm)	SV	SDW (mg)
		10	33.89 cd	33.87 bc	04.1h	57.12a	1.1123b	62.11 a
	Leaf	30	00.100a	67.84 bcde	31.1 efgh	61.7 hi	7.760 b	93.8bc
		50	67.94abcd	00.61 hi	84.1 bc	53.4 jk	9.429 b	63.7defgh
		10	00.96abcd	33.89 abc	08.1h	31.11abcd	0.1084b	01.11a
Lactuca	Stem	30	67.94abcd	67.91abc	08.1h	45.7 hi	0.706 b	15.9bc
		50	33.97abc	00.78 def	42.1 defg	65.1 l	3.159 b	54.4 k
		10	00.96abcd	89.91abc	12.1gh	31.8 fghi	0.798 b	48.8cde
	Root	30	33.93abcd	11.84 cde	23.1fgh	33.5 jk	5.499 b	57.6 ghi
		50	33.93abcd	00.84 cde	20.1fgh	20.4 k	1.393 b	33.5 jk
		10	33.93abcd	16.84 cde	27.1efgh	28.11abcd	1.1091b	45.6 hij
	Leaf	30	67.94abcd	11.60 i	91.1 b	27.6 ijk	9.595 b	26.4 k
		50	00.22 e	67.9 j	59.2 a	68.0 l	20.15 b	00.2 l
		10	67.90 bcd	00.88 abc	05.1h	89.11abc	0.1080b	70.7defg
Alfalfa	Stem	30	00.88 d	55.75 efg	30.1 efgh	21.9 defgh	8.810 b	36.5 jk
		50	67.90 bcd	78.58 i	85.1 bc	41.6 ij	9.582 b	88.5 ij
		10	67.94abcd	67.91abc	10.1h	85.11abc	8.1118b	72.6 ghi
	Root	30	33.97abc	33.97a	03.1h	19.10 bcdef	4.992 b	98.6fghi
		50	33.93abcd	89.68 gh	63.1 bc	37.9 fghij	7.880 b	95.5 ij
		10	00.96abcd	77.87*bc	18.1fgh	88.10abcde	0.1044b	74.9b
	Leaf	30	67.94abcd	33.85 bcd	20.1fgh	91.7 ghi	6.749 b	17.8cdef
		50	33.93 abcd	15.71 fg	54.1 de	48.4 jk	9.419 b	79.6ghi
		10	33.97abc	33.93abc	17.1gh	15.11abcde	7.1084b	09.8cdef
Rumex	Stem	30	67.98ab	67.84 bcde	28.1 efgh	00.9 efgh	7.888 b	20.6 ij
		50	00.96abcd	77.73 fg	47.1 def	67.7 ghi	3.735 b	50.7efgh
		10	33.97abc	00.94ab	08.1h	14.12ab	3.1180b	77.8bcd
	Root	30	33.97abc	68.91abc	15.1gh	39.11abcd	7.2886a	84.6ghi
		50	33.97 abc	33.93abc	08.1h	81.9 cdefg	3.956 b	18.9bc

Mean followed by the same letters in each column are not significantly different by using Duncan multiple rang test at %5 probability level are not significantly different by using Duncan multiple rang test at %5 probability level.

Results

Vegetative Duration

Results of first variance analysis (Table 1) showed compositions which have allelopathic compounds generally have a meaningful difference with the treatments without allelopathic compounds, so secreted allelopathic materials of under-studied plants have an effect of more than 99% certainty on the wheat Chamran cultivar's confirmation parameters and decreased them (Table 3). Factorial variance (Table 2) showed that the weed (W), organ (O), concentration (C), and mutual interactions of weed on the organ (WO), weed on the concentration (WC) and organ on the concentration (OC), and also trilateral interactions of weed on organ on concentration (WOC) had a meaningful effect on the features include germination percentage (GP), germination rate (GR), mean germination Time (MGT), seedling length (SL), seed vigor (SV), and seedling dry weight (SDW). But organ affected only first five features and did not have any effect on the seedling dry weight. Also, trilateral interactions of weed on organ on concentration did not show any meaningful effect on the mean germination type.

Effects of Weed, Organ and Concentration

Comparing the average of weed's-, organ's-, and concentration's effects (Table 3) showed that the reaction of wheat seed's different features to various weeds was not the same; and these features were affected in different manners; so that Alfalfa showed a great inhibitor effect on percentage, ate, and man time of wheat seed's germination. An increase in the germination time of weed seed could be a reason for no emergence of wheat seedling in the parts of wheat field where Alfalfa is dense and populated. Lactuca juice had a greater inhibitor effect on the seedling length and seed vigour. So, according to different effects of Alfalfa and Lactuca, the level of losses increases more and more in farms where these two weeds are together. As Kiarostami (2003) showed, the effect of allelopathic activity of various weed's aqueous extract on the wheat germination was different. Among under- studied organs, leaf extract had the maximum, and root's extract had the minimum inhibitor effect on the germination percentage, germination rate, mean time of germination, seedling length, and seed vigour. Although there was not a meaningful difference between the effect of leaf's-, stem's-, and root's aqueous extract on the seedling's dry weight, the results showed that leaf's aqueous extract had a more inhibitor effect on the most of wheat seed's germination features. Mojab and Mahmudi (2008) reported previously that in Lepidium draba's weed, aerial organs' juice had more inhibitor effects on the sorghum's germination as compared to underground organs. Rice (1984) believes that leaves are the main storage place for the production of allelopathic materials, and root has a lower level of these compounds. He believes that the most of allelopathic compounds in plants are produced in the flowering stage. However, Ben-Hammouda *et al.*, (2001) showed that leaves and root had the most inhibitor effects on the wheat and Durum germination comparing with all other organs of barley. the inhibitor effects on the mentioned features increased by increasing the juice's concentrations; so that features like germination percentage, germination rate, seedling length, seedling's vigour, and seedling's weight decreased –comparing to control- by 9.88, 29.68, 56.49, 58.55, and 30.43%, respectively in the concentration of 50 g.l, but mean germination time increased for 54.37%.

Mutual Interactions

Weed interaction on the organs: comparing the mean of weed's interactions –in different organs- on the measured features (Table 4) showed that Lactuca and Rumex did not have a considerable effect on the wheat germination even by changing different organs, but Alfalfa's leaf extract –comparing to its own other organs and organs of the two other weeds- had the most inhibitor effect on the germination percentage, germination rate, mean germination time, and seedling's dry weight; while Lactuca's root had the maximum, and Rumex's- and Alfalfa's root had the minimum inhibitor effect about the features of seedling length. Yet, Rumex's root showed the minimum inhibitor effect on the seed's vigour; while all other organs of Rumex and the weeds had the same inhibitor effects. Generally, obtained result shows that juice of Alfalfa's leaf –comparing to the juice of other weeds- had more inhibitor effects on the all of features. Probably it is related to the higher allelopathic power of Rumex and more production of allelopathic compounds in its leaves. Less production of these compounds can be the reason of less

inhibitor effect of Rumex root. Rice (1984) reported similar results, too. Also these results show that severe inhibition of germination rate has a very tight relation with the inhibitor effect of germination percentage, seedling length, seed vigour and seedling's total dry weight. It agrees with the results obtained by Chung *et al.*, (2003). The process of seedling length changings was influenced by root in the Lactuca –as compared to Alfalfa and Rumex- which shows that materials produced in Lactuca's root have more inhibitor effects on the wheat seedling length as compared to the materials produced in the root of two other weeds.

Weed interaction on the concentration: the results of comparing mean interactions of weed and different concentrations on the measured features (Table 5) showed that different concentrations of Lactuca's extract and Rumex's extract did not show any difference to control, in terms of germination percentage, and just concentration of 50 g.l –Alfalfa's extract- showed inhibitor effect on the germination percentage as compared to control, with a reduction of 24.83%. Also, germination rate set under influence of different concentrations of various weeds. Thus, concentration of 50g.l (5.89%, Rumex) –as compared to control- had maximum and minimum inhibitor effects on the germination rate. It increased the mean of germination mean time about 87.50% comparing to control and in the Alfalfa's concentration of 50g.l. whereas there was not a meaningful difference between concentrations of 10 and 30 in the Lactuca and Rumex about that. The effect of concentration of 50g.l in Lactuca and Rumex was similar to the effects of concentration of 30g.l in the Alfalfa. It shows that produced materials in the Alfalfa's extract have a higher inhibitor effect. But the concentration of 50g.l of Lactuca showed a great effect on the seedling length and vigour, so that decreased these features to 73.63 and 74.62 comparing to control. However, the concentration of 10g.l of Lactuca, Rumex and Alfalfa caused minimum inhibitor effects on above features. Moreover, seedling's dry weight had a higher reduction when the juice's concentration increased. Meanwhile, Alfalfa's concentration of 50g.l caused maximum inhibition on the seedling's dry weight, by 39.83% reduction as compared to control. According to obtained results it can be said that high concentration of Alfalfa's extract had the maximum inhibitor effects on the reviewed features. but there is a considerable point that high concentration of Lactuca's extract which had a lower effect on germination, germination rate, and mean germination time, has caused the maximum inhibitor effects on the seedling length and seed vigour. Apparently, as Ismail and Chong (2002) mentioned, allelopathic compounds of this weed had their inhibitor effects in another way when the concentrations were high.

Organ interaction on the concentration: the results of comparing mean interactions of organ and different concentrations on measured features (Table 6) showed that concentration of 50g.l of leaf's extract caused the maximum inhibitor effects on the germination percentage as compared to control, by 23.32%. The other concentrations in other organs did not have a meaningful difference on the germination percentage. Germination rate, seedling length, and vigour decreased more, when the concentration increased, so that the concentration of 50g.l in the extract of leaf, stem and root caused the maximum inhibitor effects on the germination rate as compared to control, by 47.08, 28.55, and 16.44, respectively. Accordingly, concentration of 50g.l of leaf extract increased mean germination time as compared to control, by 85.44%. Also, in the extract of leaf, stem, and root caused the maximum inhibitor effects on the seedling length by reductions of 73.09, 57.91, and 39.98%, and on the seed vigour by reductions of 75.32, 59.63, and 42.25%, as compared to control. The concentration of 50g.l of aerial part's extract reduced the wheat seed's seedling dry weight as compared to root. The considerable point is that increasing the concentration of root extract from 30g.l to 50g.l did not have a meaningful inhibitor effect on the seedling dry weight; while by increasing the concentration of leaf and stem, their inhibitor effect increased, too. In this regard, similar to what Rice (1984) have reported, probably leaf has produced more allelochemical materials so it could have a more negative effect on the germination of seed and growth of seedling; these results agree with reports of MasudiKhorasani *et al.,* (2005) and Turk *et al.,* (2003).

Trilateral interactions of weed organ on concentration: the results of comparing mean interactions of weed in different concentrations on the measured features (table 7) showed that in the feature of germination percentage, the concentration of 50g.l of Alfalfa –as compared to other levels- decreased its amount about 77.70%. the above extract influenced germination rate severely, so that –as compared to control- showed

the maximum inhibitor effect by reduction of 90.03% on this feature. Accordingly the concentration of 50g.l of Alfalfa's leaf, increased the mean germination time by 147.67% as compared to control. While, all other treatments showed less difference in this respect. Leaf's aqueous extract of Alfalfa and Lactuca caused severe inhibitor effects on the seedling length and wheat seed vigour in concentration of 50g.l. Alfalfa's leaf –as compared to control treatment- reduced seedling length and vigour by 94.25 and 98.70%, respectively. Generally, by increasing the concentration of aqueous extract of aerial and underground organs of weeds, seedling dry weight showed a reducing manner. Leaf's aqueous extract of Alfalfa had the maximum inhibitor effect –at the concentration of 50g.l- on the wheat seedling dry weight by a reduction of 73.61% as compared to control. But there is a considerable point: in Lactuca, low concentration of leaf and stem extract (10g.l) had stimulating effect on the seedling dry weight, so that leaf and stem extract increased seedling dry weight by 65.53 and 38.14%, as compared to control. As Ismail and Chong (2002), and Ahn and Chung (2000) believe, allelopathic materials in low concentrations could have contrasting positive (stimulating) or negative (inhibiting) effects on the target plants, but in high concentrations they are always inhibiting. Overall, according to experiment's findings, Alfalfa's leaf and also Lactuca's leaf and stem produced more allelopathical compounds and caused much more inhibition in the seed germination and seedling growth of wheat.

Summary and Conclusion

Generally, by doing researches for identifying field crops and weeds which have allelopathical nature, determination of specific sensitivity of every growth stage to allelopathic materials, and studying their inhibitor effects in wheat fields, we can make some changes in the management of weed control. Moreover, allelochemical compounds present in different organs of field crops and weeds, like leaf, stem, and root can be used in wheat field as a natural potential herbicide to prevent germination and growth of weedseed, so that dependency to industrial herbicides would reduce. According to obtained results, Alfalfa had more negative effects on the under-studied features as compared to Lactuca and Rumex. And also, among under-studied organs, leaf's juice and root's juice had the maximum and minimum inhibitor effects, respectively. In addition, increasing the concentration of extracts increased the negative inhibitor effects. So, chemical and mechanical fighting with above weeds and bringing out their wastes, specially Alfalfa, in areas where they are dense, or areas where there is a combination of them seems necessary so they would not have negative effects on the next cultivations. It seems necessary because it probably can cause more allelopathic compounds.

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