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RESEARCH PAPER

Study of ecological factors on characteristics of germination of *Phalaris minor* and *Bromus tectorum*

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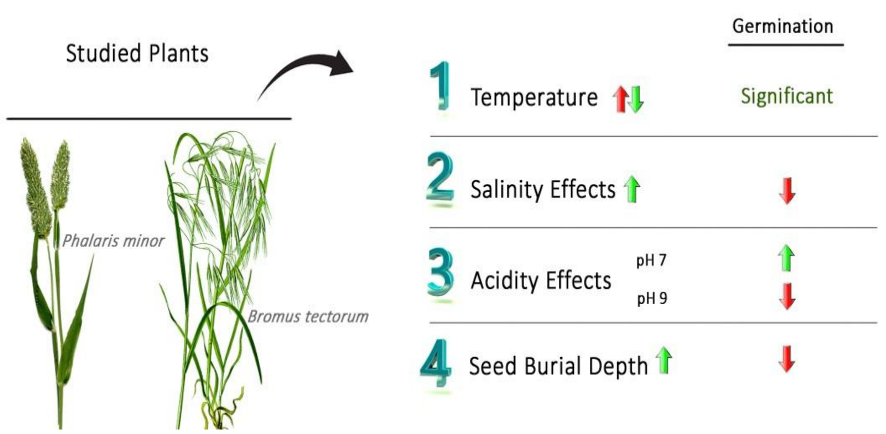
Highlights

- The results showed that the percentage and speed of germination of weed were affected by acidity.
- Increasing salinity reduced germination percentage.

Graphical Abstract



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Abstract

In order to recognize the ecological factors on characteristics of germination of Phalaris minor and Bromus tectorum, germination tests were conducted in a randomized complete block design with four replications at the Faculty of Agriculture, Ilam University. The effect of temperature on seed germination in germinator at 15/15, 20/25, 15/30 and 30/20 °C night/day, salinity effects using solutions 0, 10, 20, 40, 80, 160, and 320 mM sodium chloride and acidity effects were investigated using buffered solutions with pH adjusted to 5 to 9. To study the effect of seed burial depth on the emergence of seedlings in seeds in the research greenhouse of Lorestan University, the seed of each plant was buried at depths of 0, 1, 2, 3 and 4 cm. The results showed that the effect of different temperatures on the germination of both plants was significant. So that the highest and lowest germination percentage were at 25/15 (night/day) with 95.5% and 20/20 (n / d) with 0%, as well as germination in both dark regimens Absolute and darkness/brightness for Cheatgrass at temperatures of 25.15, 20.10 and 15.5 ° C was 94%, and no germination was observed at 20/20 °C. Increasing salinity reduced germination for both plants. By increasing the depth, the seedlings of two plants decreased. The lowest and the highest germination percentage of Canary grass in acidity 5 with 30% and in acidity 7 with 96% and in Cheatgrass in acidity 7 were observed and the highest germination with 95% and the lowest in acidity 9 was 26% also were observed.

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1. Introduction

To establish an integrated weed management system (IWM) in crop systems, recognizing the common weed biology is vital. Biological germination of weeds is also useful for developing long-term management strategies. In general, it is essential to improve the management systems, having information on seed dormancy, germination patterns, seedling greening and their changes between weeds. Temperature, soluble osmotic pressure, light quality and seed position in the seed bank of soil and soil texture are influential factors on germination and emergence (Gorbani et al., 2015). Temperature is the most critical environmental factor regulating germination, although it may play the role of light (Ren et al., 2002). The temperature of 20 and 30 °C could well be able to eliminate sleep in the seeds of the weed. The best germination temperature of wild oat (Avena fatua) is at 15 °C (Zhou et al., 2005). They also showed that the alternating darkness accelerated the germination of oat seeds at a temperature of 15.5 °C. The highest alternating germination temperature of common lambsquarters (Chenopodium album L.) seeds, 25.15 and 20.10, were at the same time for two the Denmark and Iranian populations took place (Eslami, 2011).

Besides, germination and emergence depend on seed depth in the soil. Depths greater than optimum effectively increase seedling germination. For example, plowing may have a significant impact on weed ecology. Destruction of soil by plowing systems places weeds in deeper depths so that in terms of moisture availability, daily fluctuation and exposure to these depths, different depths are present. Finally, all of these factors are effective in seed germination (Chauhan et al., 2006). Also, the effect of pH on germination potential varies in different plants. Some species prefer acidic conditions, prefer some alkaline or neutral acidity, and others do not show any reaction (Pierce et al., 1999; Susko et al., 1999). On the other hand, the increase of magnesium oxide in field conditions was observed that reduced the emerging percentage (Miller, 2000). Also, observed that water potential changes led to a reduction in grass bedtime in the post-harvest period (Christensen et al., 1996). Seeds of the Denmark populations of Chenopodium album compared to the Iranian population were more susceptible to osmotic potential and soil salinity (Eslami, 2011). He also observed that both populations at the soil level had the highest germination and no germination at a depth of 3 cm.

Canary grass (*Phalaris minor*) is a herbaceous plant, one-year-old from a Poaceae family with right or curved stems, at the height of 30 to 130 cm, which is multiplied by seed and is due to the tolerance and resistance to aggressive crop operations in the strata. This weed is seen in various fields, especially in vegetables, peas, sugar beet fields, cereals, legumes and gardens. One-year weed is a grass that is seen more in winter crops. The grass is also one of the most commonly winterized plants of the Poaceae family, self-infected and quantitatively altered; this plant has different ecotypes for morphological and phenotypic characteristics. It is a native species of Southwest Asia, which has a high ability to adapt quickly to new climatic conditions and quickly assumes aggressive forms (Menalled et al., 2008). Grass, which has a high germination rate, is considered a severe problem in winter wheat, reducing the yield and reducing its quality (Hardegree et al., 2010). Hence, because weeds (*Phalaris* and *Bromus*) are one of the most damaging factors to cereal fields and gardens, and today they are in aggressive states in some regions and cause changes in ecosystems, this study aimed to recognize the ecological factors affecting their seed germination to facilitate decision making for management of these aggressive species (Chachalis and Reddy, 2000).

2. Materials and Methods

2.1. Collecting seeds and seed breaking

Phalaris *(Phalaris minor*) and Bromus *(Bromus tectorum)* seeds were collected from more than 200 adult plants. The seeds were separated from the plant, and 1000 kernel weight of the seeds (1-1.2 g) and 1000 kernel weight of grass (2.5-2.9 g) were measured. Seeds of both weeds were broken down by interval, and their germination percentage increased to 94%. The seeds were kept in laboratory conditions under normal light conditions and adjusted temperature (25.15 ± 50 centigrade) (night/day) until the experiments were carried out (Ahmadi et al., 2013).

2.1.1. Germination experiments

Germination experiments were performed by placing 25 seeds in a 9 cm diameter petri dish containing two layers of filtered wet paper with 5 ml of the solution of each test's treatments. Each germination experiment was carried out in a randomized complete block design with four replications (each incubator floor was considered as a block), and the experimental treatments were based on the type of test as follows:

The effect of temperature on seed germination in germinator at 15/15, 20/25, 15/30 and 30/20 °C day/night, salinity effects using solutions 0, 10, 20, 40, 80, 160, and 320 mM sodium chloride and acidity effects were investigated using buffered solutions with pH adjusted to 5 to 9. To study the effect of seed burial depth on the emergence of seedlings in seeds in the research greenhouse of Lorestan University, the seed of each plant was buried at depths of 0, 1, 2, 3, and 4 cm. Germination experiments were repeated twice. Since the interaction between test and treatment time was not significant in any germination experiments, the results showed that the average is twice tested. Counting of germinated seeds was carried out 14 days after the start of the experiment and with the visible germination criterion of the root germination (Chauhan et al., 2006).

2.1.1.1. Testing the effect of temperature and light on germination

This experiment aimed to found the optimum temperature and light regimen and investigate their interactions on both weeds' germination. For this experiment, a factorial design based on randomized complete block design was carried out under the first factor, five treatments with a temperature variation of 15/5, 20/10, 25/15, 30/15, and 35/20 °C (day/night), and the second factor was the optic day/The night was 12/12, 16/8 and 8/16 hours. To germinate in full darkness, dishes were covered with two aluminum sheet layers to prevent any light from reaching the seeds. In this study, the factors studied were percentage, speed, and uniformity of germination based on Formulas 1 and 2 (Soltani et al., 2001).

$$R50 = 1 / D50 \quad (1)$$

$$GU = D10 - D90 \quad (2)$$

Where R50 is the germination speed, D50 is the maximum germination time, GU is the germination uniformity, D10 and D90, respectively, reaching a maximum of 10 and 90%, respectively (calculated by the Germin program). The traits were measured for germination percentage, germination rate and germination uniformity, time to reach 10, 50, and 90% maximum germination.

2.1.1.2. Tests on the effect of salinity on germination

The salinity effect on germination of these two weeds was investigated under seven saline treatments of 0, 10, 20, 40, 80, 160, and 320 mM sodium chloride. In order to obtain a solution of 10 mM sodium chloride, 0.59 grams of pure salt, 20 moles were added in the amount of 1.18 grams of salt, 40 moles in the amount of 2.36 grams of salt, 80 moles in the amount of 4.24, 160 moles in the amount of 449 grams of salt and 320 molars, 18.88 grams of pure salt per liter distilled water (Michel, 1983). The three-parameter logistic model was used to evaluate the different salinity potential in reducing germination percentage:

$$Y = a/[1+(x/x_{50})^{b}] \quad (3)$$

Y is the germination percentage at salinity level x, a maximum germination percentage, X50 drought stress level required for 50% maximum germination inhibitory activity, and b shows a germination slope decrease due to increased salinity levels (Chauhan et al., 2006).

At the end of the salinity test, to determine whether the non-germination of the seeds was due to ionic toxicity or only due to the reduction of osmotic potential, the seeds that were not spiked in high salt concentrations were rinsed again in distilled water. The germinator in the intermittent temperature was 20/20 (the optimum germination temperature obtained in the experiment) and the 12-hour light period (recovery test).

2.1.1.3. Testing the effect of pH on germination

The effect of pH on germination of seeds was carried out using buffered solutions with adjusted pH 5 to 9. Materials for obtaining the desired acidity: KHP Potassium Hydrogen Bifenthalate-Merck, HCL Chlorideic Acid (37%) -Merc, NaOH Sodium Hydroxide (Solid), KH2PO4 Gravel Hydrogen Phosphate-Merck and Trysin-Merc. In experiments on the effect of salinity and acidity, seeds were placed in an incubator with a temperature of 25.15 °C/day because the highest germination rate was obtained at this temperature.

2.2. Effect of seed burial depth on seedling emergence

This experiment was conducted in a randomized complete block design with four replications and five treatments of sowing depth (0, 1, 2, 3, and 4 cm) at the time of normal emergence of weeds in a research greenhouse of Lorestan University. Soil pots were a mixture of soil, farm soil and manure completely decayed at 25:10:25. After planting, the seeds of the pots were transferred to the greenhouse at a temperature of 2 ± 25 °C and 15 ± 2 °C at night, with normal photoperiod. Then the irrigation was carried out to the same extent. Irrigation was carried out on different days following soil conditions and to prevent drying. For the green planting data under the influence of cultivated depths, a descending exponential model was used:

$$E\ (\%) = Emax/\ (exp\ (-(x-x50)/\ Erate) \qquad (4)$$

In this model, E (%) represents the percentage of greening at a depth of x, Emax, the maximum percentage of greening, and Erate represents the model slope (Chauhan and Johnson, 2008). To study the effect of seed depth on seedling emergence, at the beginning of the fall, 50 seeds per plant were buried at depths of 0, 1, 2, 3, and 4 cm. Seedlings are counted daily when they are green from the soil (when their coleoptiles or their cotyledons are visible above the surface of the soil). Then, the dry weight of the stem and root, and the ratio of root to stem were calculated. The test ended 30 days after the burial.

2.3. Data analysis method

The statistical analysis of the data was done by SAS (version 9.1) software, and the means were compared based on FLSD (LSD protected) and at a probability level of 5%. The shapes are illustrated using the Sigma Plot and EXCEL software. Germination speed and time to 50% maximum seed germination were calculated by Germin program in Excel software environment (Soltani et al., 2001).

3. Results and discussion

3.1. Temperature and light

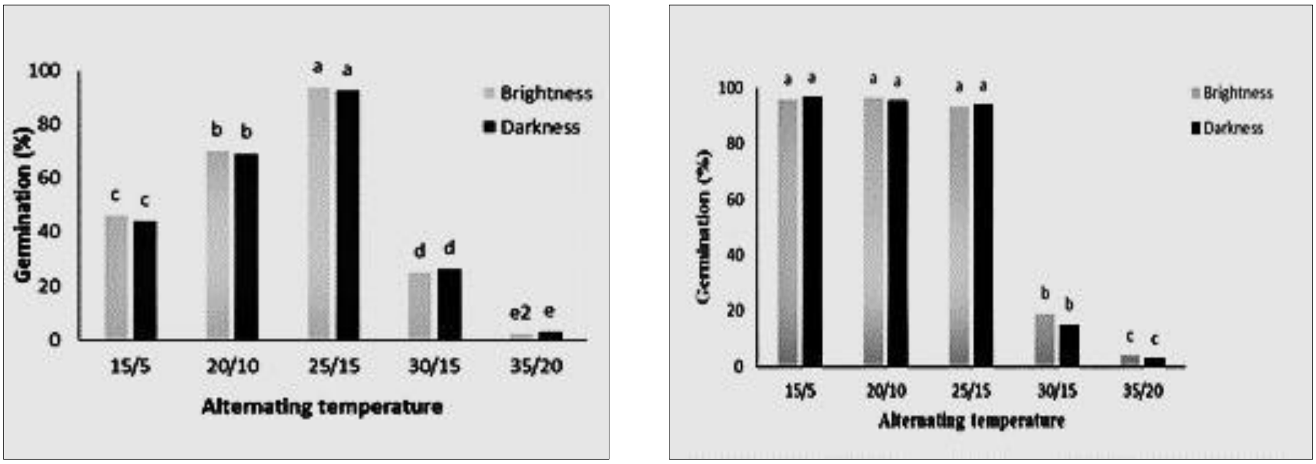
The effect of different temperatures on percent, speed and time of reaching 10, 50 and 90% of maximum germination, and uniformity of germination of blood and vein were significant (Table 1). But the effects of their interactions were not significant (Table 1). Therefore, the main factor influencing the germination of these two herbs was temperature variation.001).

The highest and lowest germination percentages were in the treatment of 25/15 (day/night) with 95.5% and 20/35 (Night/day) with 0% germination (Fig. 1). At three temperatures, 15/5, 20/10, and 25/15 °C, both germinations of this plant was more than 93%, but there was little germination at daylight and a temperature of 30/20 degrees. It has been suggested that high temperatures reduced the germination of this plant (Fig. 1). The results of the experiment also showed that the best germination uniformity and the highest germination rate were obtained in both weeds at the light rotation of 15/25 °C (Fig. 1). Of course, the results of the experiment showed that the sensitivity of the plant to the temperature of the period was more than that of the grass.

Table 1. Analysis of variance of traits in the study of light and Temperature periodicity.

	Mean Square							
Plant name	**D90**	**D50**	**D10**	**GU**	**R50**	**Gmax**	**DF**	**Source**
Phalaris minor	200.87 ns	277.93 ns	43.28 ns	488.07 ns	0.00000024 ns	16.26 ns	3	Rep
	3472.21**	24518.82**	12495.59**	7953.86**	0.00002897**	5557.5000**	4	Temperature
	2173.26 ns	19520.83 ns	10128.42 ns	6947.42 ns	0.00002 ns	498.4200 ns	2	Light
	4127.32 ns	316.45 ns	1012.006 ns	27562.34 ns	0.0000021 ns	42.17 ns	8	Light×Tem
	10.84	5.61	10.21	13.25	5.84	8.27		C.V
Bromus tectorum	200.87 ns	3896.63 ns	6.51 ns	119.55 ns	0.000058 ns	9.16 ns	3	Rep
	2011.37**	6350.89**	4490.06**	30006.10**	0.00018**	21937.90**	4	Temperature
	1473.26 ns	17520.83 ns	10028.42 ns	4947.42 ns	0.00012 ns	408.4200 ns	2	Light
	30895.22 ns	206.75 ns	903.001 ns	14477.57 ns	0.00018 ns	31.10 ns	8	Light×Tem
	7.47	8.94	5.40	13.53	8.09	5.61		C.V

NS, * and ** respectively not significantly, 5 and 1 %.



(A) (B)

Figure 1. The effect of alternating temperatures on germination of Canary grass seeds (A) and Ceatgrass (B). Columns without a common letter have a significant difference based on the FLSD test at a level of 5%.

Similar results were obtained regarding the effect of light and temperature on germination of the germplasm of alfalfa (Ahmadi et al., 2013). Also, stated that freshly harvested grass weeds have a high potential for germination at temperatures of 23-27 ° C under light-balance conditions (early spring) (Beck et al., 2008). Light and temperature are two important environmental factors that influence the various levels of seeds dormancy. The Intermittent temperatures greatly increased the sleep disturbance of sorghum (*Echinochloa crus–galli*), lobster seeds (*Chenopodium album*) and *Amaranthus retroflexus* seeds (Martinez-Ghersa et al., 1997). There are the different treatments on bloody germination, which show that light/dark and continuous dark treatments alone had no significant effect on the amount of germination. The maximum germination of lobsters was observed in exposure to the red light and intermittent temperatures (Tang et al., 2008). Tang's results confirmed the importance of increasing the effect of alternating temperatures and red light on breaking the seeds of lambs' quarters.

According to the results, the following points clearly illustrate a few points. Firstly, most winter weeds sprout in the autumn for one year. Only a few of these species have a secondary sleep mechanism, which prevents their sprouting in the spring (Baskin and Baskin, 1983), and many weed grasses that use the technology of the one occur in spring crops (Hald, 1999). Secondly, there may be a slight overlap compared to species that sprout in the late spring, when germinating species sprout early in the spring. Autumnal weeds sprout in autumn, completing their life cycle in the spring or early summer. Autumnal should be exposed to high summer temperatures for several months to sprout in autumn (Baskin and Baskin, 1984; Roberts and

Nilson, 1982). Generally, low temperatures cause dying in winter-type species (Baskin and Baskin, 1986). The highest germination of 80% in white light for 16 hours was observed by light studying *Phalaris arundinacea* (Lindig-Cisneros and Zedler, 2001).

Another study found that Phalaris arundinacea seeds at a temperature of 20 °C in a 12 hour dark/light regime had germination of 88% (Kon et al., 2007). Seeds of summer annuals sprout in the spring or summer and thus complete their life cycle before or during the frosty autumn. In the autumn, depending on the species, the seeds are sleeping or sleeping conditionally. Specimen-free seeds germinate at high temperatures (35/20 and 30/15 °C, night/day), but at low temperatures (15.6 and 20/10 °C, night/day) not able to germinate. Depending on the species, the germination response varies with latitude, altitude, soil moisture, soil nutrition, temperature, type and density of vegetation, and the degree of degradation of the habitat where the seeds have reached maturity in those places (Baskin and Baskin, 1984). The maximum germination of lime seeds was observed in seed placement conditions in red light and intermittent temperatures, which confirmed the importance of increasing the intermittent temperatures and red light on germination of lamb quarters seeds (Tang et al., 2008).

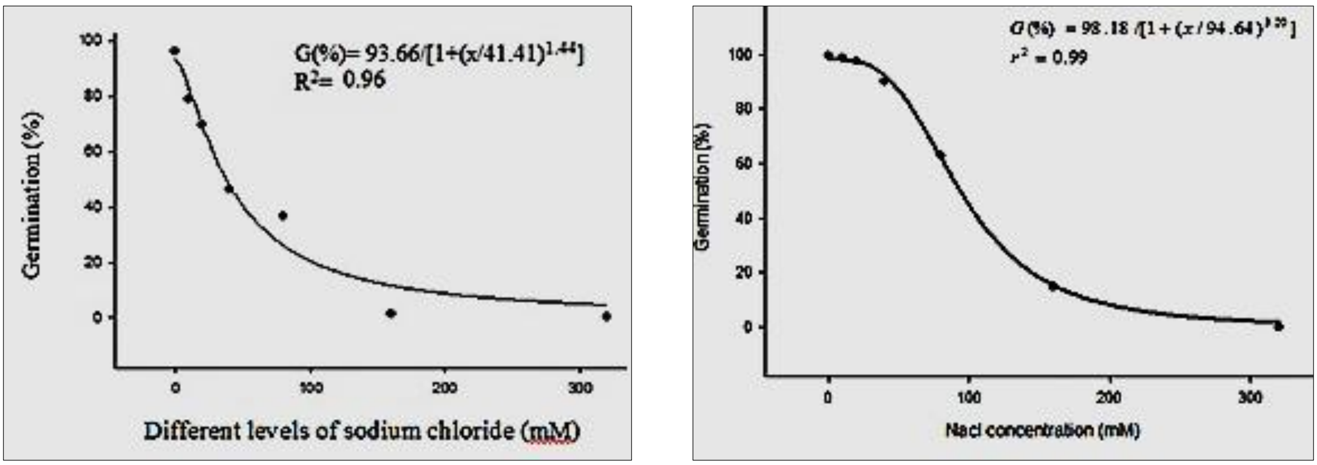
3.2. Salinity

Salinity treatment was significant on all measured parameters in both plants. Increasing salinity reduced germination percentage, and the fitted model for phalaris was significant ($P < 0.001$ and R2 = 0.96) (Table 2). The highest germination percentage of phalaris was observed in the control treatment with 96.5%, and in 320 ml salinity, sodium chloride stopped germination, which was the least treatment. In salinity 40.41 mM, sodium chloride reduced 50% germination (Fig. 2).

Table 2. Mean squares of measured *Phalaris* parameters.

Experiment	Source	DF	Mean Square							
			D95	D90	D50	D10	D05	GU	R50	Gmax
Salt	Treat	6	**	**	**	**	**	**	**	**
	Rep	3	NS	NS	NS	NS	NS	NS	NS	*
C.V		-	17.21	16.42	17.06	15.18	17.62	18.45	20.09	7.15
pH of buffered solution	Treat	4	NS	NS	NS	NS	NS	NS	*	**
	Rep	3	NS	NS	NS	NS	NS	NS	NS	NS
C.V		-	22.40	23.45	23.33	21.25	20.65	18.37	21.83	8.07

NS, * and ** respectively not significantly, 5 and 1% significantly.



(A) (B)

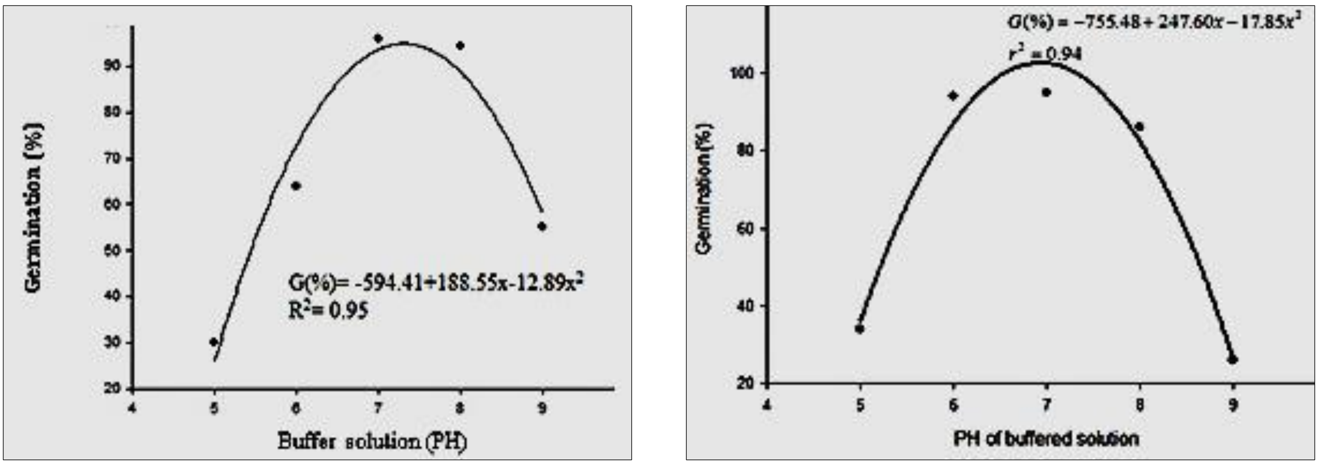
Figure 2. Final percentage of germination of Canary grass (A) and Cheatgrass (B) under the influence of different levels of salinity potential of sodium chloride (Nacl). The points representing the observed data and the lines are the result of fitting the data to the logistic equation.

The model of this reduced germination trend for *B. tectorum* was well explained (P< 0.001, r2 = 0.99). The highest germination percentage of *B. tectorum* were observed in control and ten mM with 99.5 and 98.5%, respectively, and in the 320 mM treatment, they reached the lowest level (zero) (Fig. 2). The fitted model indicates that 94.44 M molar salinity is required to reduce germination by 50%. High salinity usually reduces the speed and amount of germination. Salinity reduces seed germination by decreasing water availability or interfering with some aspects of metabolism, such as changing the growth regulator balance. Some scholars believe that salinity stresses seeds' germination by increasing the osmotic pressure and decreasing water absorption by the seeds. Also, it influences the germination of seeds through the toxic effects of sodium and chloride ions. Germination speed is a good indicator for the success of seedlings in the next stages, which in good condition can provide faster seedling establishment.

The cause of the speed decrease and percentage of germination with increasing salinity levels can be attributed to the excessive presence of anions and cations and causing poisoning, reducing the water potential in growing cells due to their solubility in water such as chlorine and sodium. Despite the presence of water in the environment, the plant seeds are not able to absorb water, and with a lack of water and subsequent reduction of germination. The maximum germination rate of this weed (*Bromus tectorum*) was 89% in the concentration of zero mM sodium chloride during germination study conditions in Birjand-Iran. With increasing salt concentration, its germination decreased. Also observed the effect of salinity on germination of wild melon seeds under salt stress in seeds' germination.

3.3. Acidity (PH)

Acidity treatment had a significant effect on germination percentage (P< 0.001). The second-order model was fitted to the data and justified its trend (P< 0.05 and R2 = 0.95). The lowest and highest germination percentage was observed in acidity 5 with 30% and acidity 7 with 96% germination, respectively (Fig. 3). The results also showed that the percentage and speed of germination of grass were affected by acidity. The highest germination in acidity 7 with 95% and the lowest germination in acidity 5 and 9 were observed 34 and 26% respectively (Fig. 3). The fitted two-dimensional model was well explained by changes in germination percentage in different acids (P< 0.05, r2 = 0.94).



(A) (B)

Figure 3. Effect of PH solution on germination percentage of Canary grass (A) and Cheatgrass (B) germination at 25.15 °C. The fitted model represents a quadratic model of data.

The most important effect of pH is the amount of nutrients in the soil. In very low pHs, elements such as calcium, phosphorus, and potassium are removed from the soil or are insoluble in soil. At high pHs, phosphorous, iron, manganese and other micronutrient elements may be present in the soil.

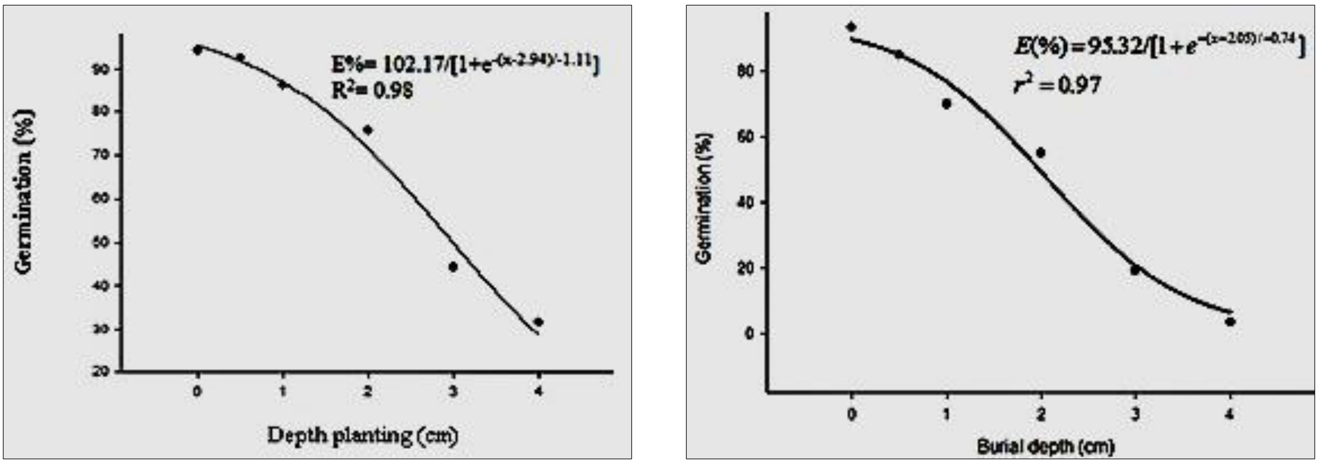
Also, found that pH is higher than 8.5 for the total number of seeds and the seedling survival is harmful (Zhou et al., 2005). At a pH of about 10, the germination is carried out to a low level, and seedling survival is reduced to zero after two weeks. The fitted two-dimensional model well explained the trend of germination changes under different acidity (Fig. 3) (Ahmadi et al., 2013).

The study of the factors affecting germination showed that this plant's lowest germination rate was 33% in acidity. The highest germination in acidity 7 with 97% yield Became. Also, germination has been reported in a wide range of pH (4 to 10) in the species of bitter hawthorn and brassica species (Chauhan et al., 2008). The conclusion can be made that soil pH cannot be a limiting factor for plants' germination, especially weed plants.

The reduction of germination of some species in highly acidic conditions is due to the increased solubility of some nutrients such as iron, potassium, calcium, copper, manganese and zinc in these conditions, which in the concentration of saturation inhibit activity Organisms and enzymes involved in germination.

3.4. Depth of cultivation

Seed burial depths showed that the seeds of Phalaris at 0 and 0.5 cm had 94.3 and 92.5% germination, respectively, and the seedlings emerged as the depth of cultivation increased ($P < 0.001$) so, the reduction of 50% of the germination was observed at a depth of 2.94 cm (Fig. 4). The fitted model is well explained by the decrease in plant emergence with increasing depth (R2 = 98.33).



(A) (B)

Figure 4. The Effect of Deepening of Canary grass (A) and cheatgrass (B) on the emergence of a plant at 25.15 °C. The fitted model represents the sigmoidal model of the data.

As with the study results, the emergence of cheat grass (*Bromus tectorum*) seedlings was influenced by the depth of cultivation, so that significant differences were observed at different depths (Fig. 4). Also, the experiment results showed that increasing the depth of root length was not affected, but the length of the stem increased (Table 3). The root weight and stems in both root and stem tissues decreased with increasing depth. However, the stem's weight loss was affected more than the root, which caused the root-to-shoot ratio to increase with increasing depth (Table 3) shows that germination of grass was highest at zero depth and increased by a depth of 0.5 cm, with a decrease of 8.37%. A minimum green emergence of 4 cm depth with 3/27 the percentage of germination was allocated (Fig. 4). The fitted model is well explained (r2=0.97). The suggests that at a depth of 2.5 cm soil, a 50% reduction in grass seedling emergence occurs. In general, this experiment showed that to reduce the emergence of seedlings, this weed requires a depth of more than 2 cm, which can be considered in management strategies.

Table 3. Effect of planting depth on seedling characteristics of canary grass and cheatgrass.

R/S		Stem weights (mg)		Root weights (mg)		Stem length (mm)		Root length (mm)		Planting depth
Phalaris minor	*Bromus tectorum*	Phalaris minor	*Bromus tectorum*	Phalaris minor	*Bromus tectorum*	Phalaris minor	*Bromus tectorum*	*Phalaris minor*	*Bromus tectorum*	
0.6	0.56	0.62	0.6	0.4	0.4	27	26	32.4	31.2	0
0.62	0.61	0.49	0.48	0.38	0.39	27	26.2	34	33.1	1
0.65	0.7	0.42	0.44	0.28	0.38	37.6	36.3	33.3	33	2
0.7	0.8	0.37	0.32	0.26	0.28	47.5	46.3	33.8	33	3
0.74	0.71	0.23	0.29	0.17	0.25	58	56.5	33	32	4
0.8	0.8	0.16	0.2	0.12	0.22	59	57	34	31.6	5
0.08	0.07	0.11	0.09	0.05	0.04	1.1	0.6	2.1	2	FLSD

The results showed that increasing the depth of burial of weed seeds severely reduced weed germination, and also emerged seeds would also be seedling and root weakness. The results are completely justifiable because the depth of 0.5 cm absorbs irrigation water, and immediately the seed begins to sprout. However, the amount of water needed for germination has not yet entered the next depth. The effect of soil moisture and depth on the emergence of grasshoppers. The highest amount of emergence of this plant has occurred on the soil surface and decreased with increasing grass depth. This experiment's results are in agreement with the results obtained from the study of Morrenia odorata sprout. Because in this species, the maximum germination is obtained at a depth of 0.5 to 1 cm (Susko et al., 1999). According to similar observations by other researchers, when the seeds fall under the desired depth of emergence, a diminution in seedlings emerges (Lafond and baker, 1986). Based on a well-fitted model, the depth of 50% of the maximum seedling emergence was 1.93 cm (Fig. 4).

This experiment shows that plowing more than 3 cm has a great effect on the germination and management of this plant. Generally, the depth of seeding, seedling germination and the emergence of seedlings can be influenced by available moisture, temperature and light (Chauhan et al., 2006). The main reason for not germination at a greater depth may be secondary sleep in the seed. Perhaps this is due to the hardening of gas exchanges by increasing seed placement depth (Bhowmik, 1997). Of course, the germination behavior and, finally, the emergence of seeds with increasing depth may also depend on the energy stored in the seed, since in some experiments it has been found that in some species, even in the absence of sufficient oxygen, and only with the availability of the necessary energy, seed metabolism begins (Al-Ani et al, 1985). In general, the results of studies have shown that, except for a few exceptions, the emergence of weed seeds from the seed bank takes place only in the 10-cm layer above the soil (Bhowmik, 1997).

In general, in unsuitable conditions, such as soil compaction, flooding, or high seed placement, the seed does not germinate until appropriate conditions are created. In this situation, germination, destructive and destructive seedling is shown. As soon as they receive proper biological signs such as light, temperature, precipitation, etc. or favorable agronomic conditions, such as the seedbed's proper preparation, they begin germination.

4. Conclusion

The experiment results showed that the germination of the seeds of these two plants did not react with light. However, the temperature variation was very useful in germination, and the temperature of 25/15 showed the highest percentage of germination. On the other hand, the experiment results showed that these two herbs deep depth was highly sensitive to debris, and the depth of burial showed a significant effect on all germination characteristics. Grasshopper weeds showed a higher susceptibility to soil acidity than weed control, but in both plants, the highest germination was observed in acidity 7. We recommend that researchers emphasize the need to investigate molecular mechanisms affecting the weed and plant interaction to manage the adverse effects of weeds more efficiently.

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