JOURNAL OF APPLIED SCIENCES RESEARCH

ISSN:1819-544X

JOURNAL home page: http://www.aensiweb.com/JASR 2014 December; 10(13): pages 39-42.

Published Online 2 0 November 2014. **Research Article**

The Effect of Drought and Salt Stress on Germination Characteristics in Tanacetum Partenium and Alyssum spp

[1]Farnaz Riyahi Dehkordi, [2]Mehrab Yadegari, [3]Behzad Hamedi

[1]Department of Agronomy and Medicinal Plants, Faculty of Agriculture, Islamic Azad University, Shahrekord Branch, Shahrekord, Iran.
[2]Department of Agronomy and Medicinal Plants, Faculty of Agriculture, Islamic Azad University, Shahrekord Branch, Shahrekord, Iran.
[3]Department of Agronomy and Medicinal Plants, Faculty of Agriculture, Islamic Azad University, Shahrekord Branch, Shahrekord, Iran.

Received: 10 September 2014; **Revised:** 13 October 2014; **Accepted:** 14 November 2014, **Available online:** 20 November 2014

ABSTRACT

One of the most important steps of growing plants is germination. This stage was affected Environmental stress specially salinity and drought. we performed a factorial on base completely randomized test to check the effect of salinity and drought stress on germination of the seed of two plants "Alyssum spp" and "*Tanacetum Partenium*" with 6 levels of salinity(0, 0.12, 0.25, 0.5, 0.75, 1 molar) and 5 levels of drought (0, -0.3, -0.6, -0.09, -1.2 bar) in 4 replications. For causing sality treatment, we use of Nacl and we use of PEG for dough stress. Result showed within increasing salinity and doughty stress, decreased the speed and percentage of germination, length of root and shoot and fresh and dry weight of seeds. The highest salinity tolerance limit for seeds "*Tanacetum Partenium*" and "*Alyssum spp*" respectively are 0.5 and 0.75 molar and in drought stress was -0.9 bar. The reciprocal influence of salinity a drought shows tolerance limits 0.5 molar and -0.9 bar for "*Tanacetum Partenium*" and 0.75 molar and -0.9 bar for "*Alyssum spp*". Correlation result shows the high influence on salinity and drought stress over the features on length of root and length of shoot.

Keywords: Alyssum spp, drought, salinity, *Tanacetum Partenium*.

INTRODUCTION

Increase in world population coupled with declining freshwater resources and arable land salinization requires In the case of plants tolerant to environmental conditions, further studies are necessary. Dryness of the major factors limiting crop production in arid and semi-arid regions of the world and this world is more important [1]. About a third of the Earth's arid and semiarid regions, which covers an area of more than 45 million square kilometers, this region has been estimated. The extent of arid and semiarid areas in Iran for more than 1/5 million square kilometers. Among abiotic stresses, drought is the most important problem that decreases the performance of the agricultural products that are exposed to constant or periodic [6]. Salinity is another important factor in reducing the growth of plants in many parts of the world. Soils of approximately 15% of total agricultural land of 24 million hectares, the equivalent form [2]. Salinity of the soil and disturbs the absorption of water by roots, plants of nutritional and metabolic processes is difficult. Salinity damage caused by osmotic effect, specific ion toxicity and nutrient uptake is impaired. Seed germination stage in determining the final density of plants is important to the proper density is achieved when the percentage and rate of seed germination is a useful [11]. Germination and early seedling growth stage of the crop in many of the most critical steps towards environmental stresses [5]. For this reason, several studies have been conducted on the effects of environmental stresses on the germination process. Decaying vegetation is one of the important processes in the world. The land was poor and destruction of plants tolerant to environmental stresses the role of nurse plants for other plants plays We can make a plant community that reduces the intensity of rainfall infiltration into the soil, resulting in increased flooding and erosion and reduce soil and groundwater downstream was followed in which food and agriculture developed. With the revival and development of vegetation are afforded the protection of biodiversity and ecological balance [7]. *Tanacetum partenium* and alyssum an important medicinal plant in the world and Iran. Species adapted to soil and climatic conditions for agricultural activities plays a fundamental role in the stability of these two herbs can be helpful in advancing these goals. Given the importance of medicinal plants to determine tolerance to drought and salinity in seed germination of the seedlings is

Corresponding Author: Mehrab Yadegari, Department of Agronomy and Medicinal Plants, Faculty of Agriculture, Islamic Azad University, Shahrekord Branch, Shahrekord, Iran.

important for good posture [7]. Drawing on some of the active ingredients in the pharmaceutical industry are not only important for the artificial nature of the plants are extractable desired. These materials are generally unknown chemical structure or the chemical structure is very complex, providing them artificially in poor seedling establishment due to drought Lack of sufficient moisture is one of the most important problems in arid and semiarid regions. Thus, given the difficult conditions prevailing in these areas should be Look for plants that can adapt to such environmental conditions [8]. Germination rate is one of the indices of drought tolerance, So that the figures are higher germination rate under stress conditions, the better chance we have to go green [10]. Effect of drought stress by using a solution of polyethylene glycol on germination stated that stress is a process of water absorption, germination, growth stops rootlet [4]. Sallari and Shams aldin [9], Effects of water stress on the germination and seedling establishment of two species Elymus junceus and Kochia prostrate examined and the results of their experiments showed that drought reduced growth and weight of the species. Hosseini and Rezvan Moghaddam [3] reported that drought stress by increasing the percentage of seed germination and root and shoot length was reduced in the herb psyllium.

Method:

In order to study the effect of osmotic treatment of polyethylene glycol 6000 (PEG) and sodium chloride induced salinity treatments on indices Germination *Tanacetum partenium* and alyssum two separate tests based on completely randomized design with four replications in a factorial Herb Research Branch, Islamic Azad University was conducted in 2013. The effect of different levels of osmotic treatments (zero, -0/3 to -0/6 to -0/9 to -1/2 times, respectively, D1, D2, D3, D4, D5) and Salinity (zero 0/12, 0/25, 0/5, 0/75, 1 M, respectively, S1, S2, S3, S4, S5, S6) were investigated. The effects of water stress, soluble polyethylene glycol, using the formula of Michel and Kaufmann (Equation 1) was prepared. For the treatment of sodium chloride salt was used. Within each Petri dish of 10 cm, Whatman 100 filter paper was placed over the seed. Before, during and after the paper was disinfected with alcohol to disinfect with alcohol was washed with distilled water. Then 5 ml of the desired solution (polyethylene glycol and sodium chloride) was added to each petri dish. To reduce water losses due to evaporation of the solution into Petri, a Petri around each sealed with Teflon and air to penetrate for germination of seeds of 3 small holes in the Teflon has been created. The Petri dishes for 15 days at 25 ° C and the optical rotation of 12 hours light and 12 hours of darkness were placed in germinator. During the experimental period the number of germinated seeds was recorded daily. Exclusion criteria for seed germination and view rootlet [3].

Methods of data analysis and statistics:

9.1 SAS statistical analysis software and comparison using Duncan's test at 5%; drawing was done by Excel 2013 software.

*Results***:**

Table 1: Analysis of variance and the square of the speed of germination of seeds of alyssum.

Germination rate	Percent Germination	Degrees of freedom	Sources of Change
25/6	11/5	3	Repeat
22362/29**	26926/2**	5	Salinity
541/03**	464/07**	4	Drought
95/17**	32/8**	20	Salinity × drought
4/6	1/2	87	Error
0/9	2/9	Coefficient of Variation	

**Significant at the level of a percent.

Table 2: Analysis of variance and the square of the speed of germination *Tanacetum partenium*.

Germination rate	Percent Germination	Degrees of freedom	Sources of Change
0/9	7/6	3	Repeat
15137/9**	25837/5**	5	Salinity
119/6**	352/5**	4	Drought
41/15**	44/04**	20	Salinity × drought
13/8	0/8	87	Error
2/7	4/8	Coefficient of Variation	

** Significant at the level of a percent.

Table 3: Analysis of variance mean squares of dry weight of seeds of alyssum**.**

Dry weight	wet weight	Degrees of freedom	Sources of Change
0/00000236	0/00000236	3	Repeat
**0/003	**0/019	5	Salinity
**0/00003	0/00003829n.s	4	Drought
**0/00000812	**0/00000812	20	Salinity × drought
0/000000037	0/00000037	87	Error
3/1	0/9	Coefficient of Variation	

ns, *, **, respectively, non-significant, significant at the 5 and 1 per cent.

Table 4: Analysis of variance mean squares of dry weight of seed *Tanacetum partenium*.

Dry weight	wet weight	Degrees of freedom	Sources of Change
0/00000236	0/00000236	3	Repeat
**0/003	**0/019	5	Salinity
**0/00003	0/00003829$^{n.s}$	4	Drought
**0/00000812	**0/00000812	20	Salinity × drought
0/000000037	0/00000037	87	Error
3/1	0/9	Coefficient of Variation	

ns, *, **, respectively, non-significant, significant at the 5 and 1 per cent.

Table 5: Analysis of variance tetrazolium Seeds *Tanacetum partenium* after drought and salinity treatments.

Tetrazolium	Degrees of freedom	Sources of Change
$^{n.s}$38/02	3	Repeat
$^{n.s}$42/91	5	Salinity
$^{n.s}$45/87	4	Drought
$^{n.s}$24/33	20	* Dryness salinity
34/26	87	Error
	119	Total

Table 6: Analysis of variance tetrazolium alyssum seed after drought and salinity treatments.

Tetrazolium	Degrees of freedom	Sources of Change
$^{n.s}$50/16	3	Repeat
$^{n.s}$108/70	5	Salinity
$^{n.s}$23/77	4	Drought
$^{n.s}$22/94	20	* Dryness salinity
41/79	87	Error
	119	Total

Discussion and conclusions:

Percentage and rate of germination of seeds of alyssum and *Tanacetum partenium* decreased with increasing salinity and drought. The germination rate decreased with increasing salinity due to the presence of excess cations and anions can be attributed In addition to poisoning, due to its high solubility in water also reduces water potential, therefore, despite the presence of water in the environment due to the reaction capacity of the ion current occupation will be. The plant cannot absorb water and water shortages area. Percentage and rate of seed germination is important in terms of Agronomy. Reduction in germination rate and increase the time needed to reach the final germination due to salinity is a critical level in the semi-arid areas the conditions around the seed may be short. So one of the most important aspects of Agronomy and plant the seed germination rate sufficient number of them in the limited time that environmental conditions are suitable. The results with the results Hosseini and Rezvan Moghaddam [3] correspond to psyllium. Plants for salt tolerance in osmoregulation osmoregulation need a way of making organic substances such as sorbitol, proline and glycine in the tissue. The energy associated with building materials for plants, making the materials for plants with energy, so energy for osmoregulation in plants is reduced shoot growth. Overall reduction in germination and seedling growth, with increasing salt concentration in the medium, resulting in toxic effects due to physico-chemical or osmotic solutes in the salt are dissolved. In fact, by increasing the osmotic pressure (osmotic potential becomes more negative) resulting from increased salinity in the environment, on the one hand, seed filling stage was disrupted on the other hand, the presence of high concentrations of anions and cations (especially sodium and chloride) environment, The toxicity of seed germination is prevented. Reduced shoot length in this study with the results of observations Hosseini *et al* [3] correspond to the flax.

Acknowledgment

This article is extracted from my thesis under the title of "The effect of drought and salt stress on germination characteristics in *Tanacetum partenium* and Alyssum spp". Hereby, I extend my sincere appreciation to Islamic Azad university of Shahrekord for the efforts and supports they provided to me.

References

1. Al-Ibrahim, M., 2008. Effect of salinity stress on germination and seedling growth of maize inbred, Electronic Journal of Crop Production, 1: 17-15.
2. Bakhshayeshi Yeylaghi, C.E., 2009. Dryland and irrigated wheat genotypes to drought stress during seedling stage. Journal. Water in Agriculture, 25: 15-11.
3. Hosseini, H. and P. Rezvani Moghaddam, 2006. Effect of drought and salinity on germination of PP. Iranian agricultural research, C4: 15-23.

4. Kafi, M., A. Nezami, H. Hosaini, A. Masomi, 2005. Physiological effects of drought stress bypolyethylene glycol on germination of lentil (Lens culinaris Medik.) genotypes. Agronomy Researches of Iran, 3: 69-80.
5. Manchanda, G., N. Garg, 2008. Salinity and its effects on the functional biology of legumes. Acta Physiology Plant, 30: 595-618.
6. Oskuei, B., 2009. Effects of drought stress on certain genotypes of wheat in the vegetative stage. Eleventh Congress of Crop Sciences. Shahid Beheshti University.
7. Omydbeygy, 2007. Production and processing of medicinal plants. Volume One. Press Astan Ghods Razavi. 240 p.
8. Paknejad, F., M. Khashaman, M. Sadeghi-Shoae, M. Mirtaheri, M. Tookalloo, 2013. Effect of drought stress and methanol spraying on yield and yield components of soybean (cv.Williams). Adv. Environ. Biol., 7: 3957-3962.
9. Sallari, B. and M. Shams Aldin-Said, 2008. Pre NaCl on some agronomic traits of corn hybrids grown in saline conditions. Journal of Agricultural Science and Technology, 20-23.
10. Zare, M., Mehrabi A. Oladi, S.H. Sharif Zade, 2006. Evaluationof Giberlic acid and kenitin effects on germinationand development of wheat seedlings under salinity stress. Journal of Desert., 12: 855-865.
11. Zehtab Salmasi, S., 2008. The influence salinity and seed pre-treatment on the germination of German chamomile(Matricaria chamomilla L.). Research Journal Agronomy, 2: 28-30.